Allen-Bradley

Technical Data

PowerFlex™ 4-Class of AC Drives

- PowerFlex™ 4
- PowerFlex™ 40

Allen-Bradley
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PowerFlex™ 4-Class AC Drives Technical Data

Providing users with powerful motor speed control in a compact, space saving design, the Allen-Bradley PowerFlex 4-Class AC drives are the smallest and most cost-effective members of the PowerFlex family of drives. The PowerFlex 4-Class of drives consists of two products, the **PowerFlex 4** and **PowerFlex 40**. Available in power ratings from 0.2 to 7.5 kW (0.25 to 10 HP) and in voltage classes of 120, 240 and 480 volts, PowerFlex 4 and 40 are designed to meet global OEM and end-user demands for flexibility, space savings and ease of use. They are also cost-effective alternatives for speed control of applications such as machine tools, fans, pumps and conveyors and material handling systems.

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Shaded areas are applicable to PowerFlex 40 only.

PowerFlex 4-Class Common Attributes

Packaging and Mounting

- Installation can be a virtual snap using the **DIN rail mounting** feature on ratings through 4 kW (5 HP). 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 230V single phase ratings, providing a cost-effective means of meeting EN55011, Class A and B EMC requirements. External filters provide compliance to Class A and B requirements for all PowerFlex 4 and 40 ratings.
- An optional **IP30 (NEMA 1) conduit box** is easily adapted to the standard IP20 (NEMA Type Open) product, providing increased environmental ratings.

Start Up, Programming and Operation

- An **integral keypad** provides out of the box operation using the local potentiometer and control keys.
- The 10 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 Type 4X** remote and **NEMA Type 1 hand-held LCD keypad** provide additional programming and control flexibility, both featuring the popular CopyCat function.

Optimized Performance

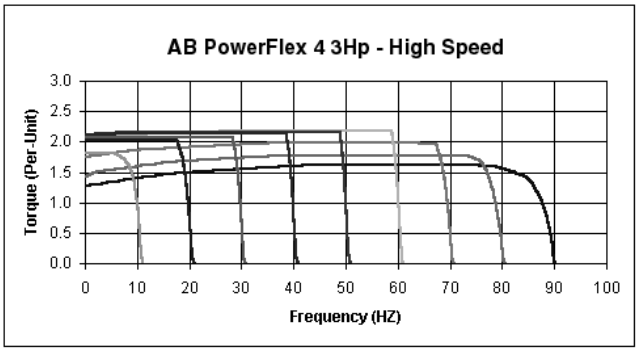
- **Removable MOV** to ground provides trouble-free operation when used on ungrounded distribution systems.
- A **relay pre-charge** limits inrush current.
- **Integral brake transistor**, available on 0.75 kW (1.0 HP) units and larger, provides dynamic braking capability with simple low cost brake resistors.
- 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 16 kHz** ensures quiet operation.

Performance

Sensorless Vector Performance

PowerFlex 4

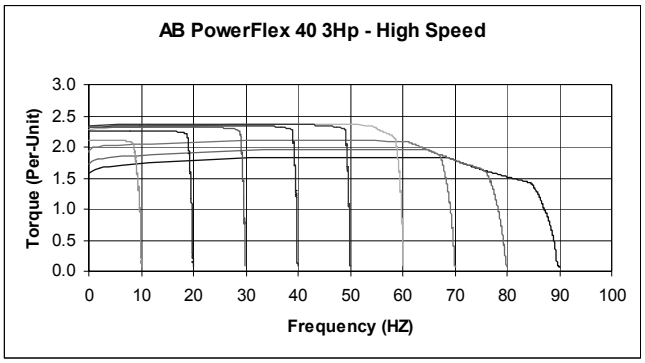
- Drive automatically provides auto boost (IR compensation) and slip compensation.
- Provides excellent speed regulation and high levels of torque across the entire speed range of the drive, and improved speed regulation even as loading increases.



Sensorless Vector Control

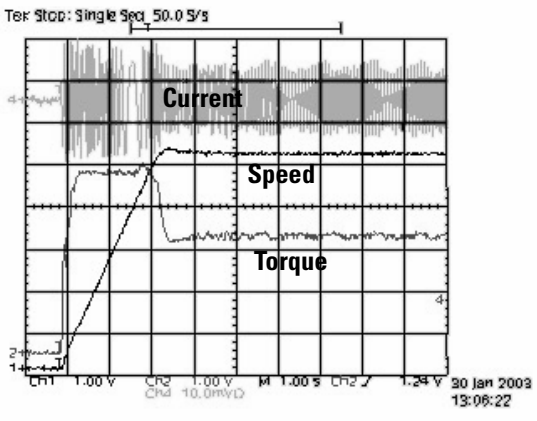
PowerFlex 40

- Sensorless Vector Control provides exceptional speed regulation and very high levels of torque across the entire speed range of the drive.
- The Autotune feature allows the PowerFlex 40 to adapt to individual motor characteristics.



Performance

- This graph depicts the ability of a PowerFlex 40 drive to accelerate into at least 150% load. A PowerFlex 4 will perform similarly, but with a slightly higher acceleration time.
- At 100% motor load, the drive will run the motor at synchronous speed.
- Excellent current regulation.
- Linear acceleration.
- Best in class digital input response time and repeatability.



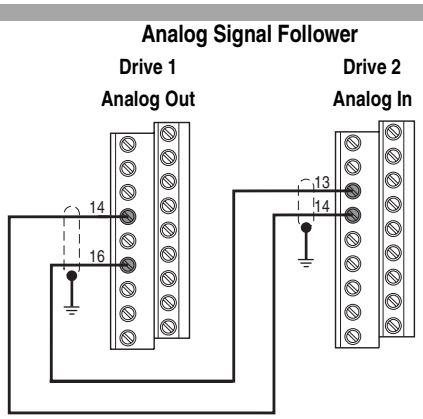
PowerFlex 40 Advanced Features

Performance

- **Sensorless Vector Control** develops high torque over a wide speed range and adapts to individual motor characteristics.
- **Variable PWM** allows the drive to output more current at low frequencies.
- Integral **PID** functionality enhances application flexibility.
- **Timer, Counter, Basic Logic and Step Logic functions** can reduce hardware design costs and simplify control schemes.
  - **Timer function**: Relay or opto outputs controlled by drive performing timer function. Timer is initiated by activating a digital input programmed as "Timer Start."
  - **Counter function**: Relay or opto outputs controlled by drive performing counter function. Counter function is activated by a digital input programmed as "Counter Input."
  - **Basic Logic**: Relay or opto outputs controlled by status of digital inputs programmed as "Logic Inputs." Performs basic Boolean logic.
  - **Step Logic**: Logic-based steps using preset speed settings. Each step can be programmed for a specific speed, direction and accel/decel profile. Drive outputs can be used to indicate which step is being performed.

I/O

- **Two (2) Analog Inputs** (one unipolar and one bipolar) are independently isolated from the rest of the drive I/O. These inputs can be toggled between via a digital input.
- **Three (3) fixed** and **four (4) fully programmable Digital Inputs** provide application versatility.
- **One (1) Analog Output** is DIP switch selectable for either 0-10V or 0-20mA. This scalable, 10-bit output is suitable for metering or as a speed reference for another drive.
- **Two (2) Opto Outputs** and one (1) form C relay output can be used to indicate various drive, motor or logic conditions.



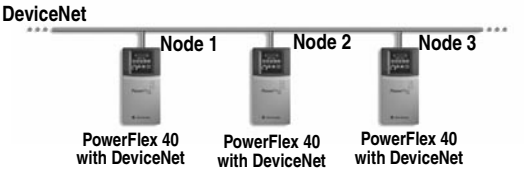
Communications

- Integral communication cards such as **DeviceNet™** can improve machine performance.
- **Field installed option** allows for future addition of stand-alone drives to a network.
- **Online EDS file creation** with RSNetWorx™ providing ease of set-up on a network.

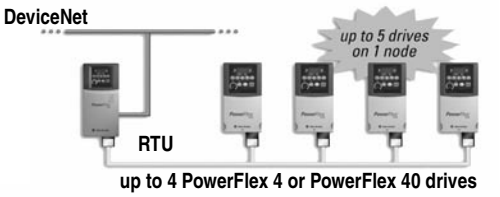
Versatile Programming and Network Solutions

- PowerFlex 4 and PowerFlex 40 are compatible with any device that acts as a RTU Master and support standard 03 and 06 RTU commands.

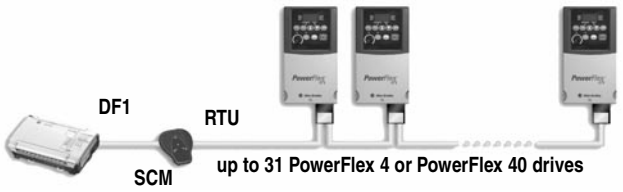
- A network can be configured using PowerFlex 40 drives with DeviceNet cards for high performance and flexible configuration capabilities.



- A multi-drive solution can be reached using a single PowerFlex 40 DeviceNet option, with the ability for up to five (5) drives to reside on one (1) node.

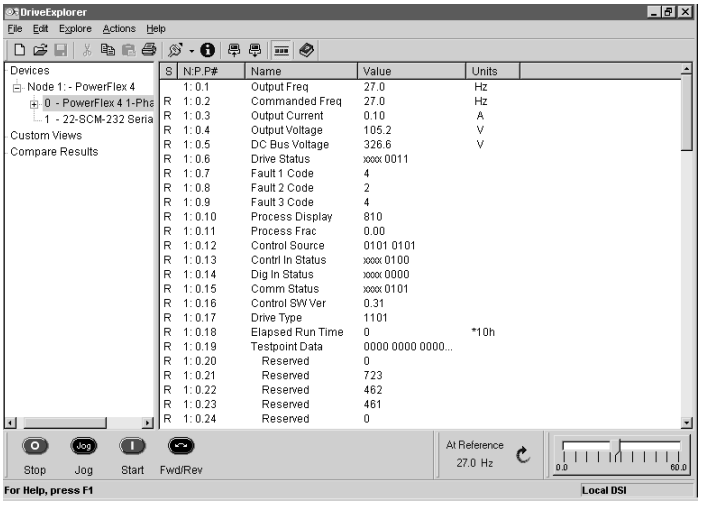


- Integral RS485 communications enable the drives to be used in a multi-drop network configuration. A serial converter module provides connectivity to any controller with a DF1 port.



PC Programming Software

Through the use of a Serial Converter Module and DriveExplorer™ or DriveExecutive™ 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.

DriveExecutive 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

Feature Comparison

Use the chart below to assist in determining which product is most appropriate for an application.

Feature	PowerFlex™ 4	PowerFlex™ 40
Catalog Reference	22A...	22B....
Maximum (kW) HP Rating/Input Voltage	(1.1)1.5 HP/115V, 1ø	(1.1) 1.5 HP/115V, 1ø
	(1.5) 2 HP/230V, 1ø	(2.2) 3 HP/230V, 1ø
	(3.7) 5 HP/230V, 3ø	(7.5) 10 HP/230V, 3ø
	(3.7) 5 HP/460V, 3ø	(7.5) 10 HP/460V, 3ø
Overload Capacity	150% for 60 seconds 200% for 3 seconds	150% for 60 seconds 200% for 3 seconds
NEMA 1/IP30 Option	●	●
EMC Filtering	Internal - 1ø, 230V External - All 1ø, 115V and 3ø Ratings	Internal - 1ø, 230V External - All 1ø, 115V and 3ø Ratings
DIN Rail Mounting Standard	●	● (Through 5 HP)
Integral Keypad with Speed Pot	●	●
Keypad - Remote LCD	●	●
Keypad CopyCat Function	●	●
Control Type	V/Hz	Sensorless Vector & V/Hz
Internal DB Transistor	● (0.75 kW/1 HP and higher)	● (0.75 kW/1 HP and higher)
Preset Speeds	4	8
Carrier Frequency	2-16 kHz	2-16 kHz
Skip Frequency		●
Process Control Loop		● (PID)
Step Logic Functionality		●
Timer/Counter Functions		●
Common Bus		●
Control Voltage	24V sink/source	24V sink/source
Discrete Inputs	3 fixed for START/STOP/REV	3 fixed for START/STOP/REV
	2 fully programmable	4 fully programmable
Analog Input - Unipolar	1 (0-10V or 4-20 mA)	2 (0-10V and 4-20 mA)
Analog Input - Bipolar		1 (+/- 10V) ❶
Analog Response	2 Hz (500 ms)	100 Hz (10 ms)
Relay Output	1 - N.O/N.C. dry contact	1 - N.O./N.C. dry contact
Digital/Optocoupler Output		2
Analog Output		● (0-10V or 4-20 mA)
Integral RS485	●	●
RS232 *(Requires use of Serial Converter Module)*	●	●
DeviceNet		●

❶ When using bipolar input, the 0-10V unipolar input cannot be used.

Catalog Number Explanation

22A	-	A	1P5	N	1	1	4
Drive	Dash	Voltage Rating	Rating	Enclosure	HIM	Emission Class	Comm Slot

Code	Version
4	RS485

Code	Rating
0	No Filter
1	Integral EMI Filter (200-240V, 1 Phase Only)

Code	Interface Module
1	Fixed Keypad

Code	Enclosure
N	Panel Mount - IP 20 (NEMA Type Open)

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

Code	PowerFlex 4
22A	PowerFlex 4
22B	PowerFlex 40

Output Current @ 380-480V Input

Code	Amps	kW (HP)
1P4	1.4	0.4 (0.5)
2P3	2.3	0.75 (1.0)
4P0	4.0	1.5 (2.0)
6P0	6.0	2.2 (3.0)
8P7	8.7	3.7 (5.0)
010	10.5	4.0 (5.0)
012	12	5.5 (7.5)
017	17	7.5 (10.0)

Output Current @ 100-120 Input or 200-240V Input

Code	Amps	kW (HP)
1P5	1.5	0.2 (0.25)
2P3	2.3	0.4 (0.5)
4P5	4.5	0.75 (1.0)
5P0	5.0	0.75 (1.0)
6P0	6.0	1.1 (1.5)
8P0	8.0	1.5 (2.0)
012	12	2.2 (3.0)
017	17.5	3.7 (5.0)
024	24	5.5 (7.5)
033	33	7.5 (10.0)

Product Selection

Drive Ratings				PowerFlex 4			PowerFlex 40		
Input Voltage	Output Voltage	kW	HP	Output Current	Catalog Number	Frame Size	Output Current	Catalog Number	Frame Size
100-120V 50/60 Hz	0-230V	0.2	0.25	1.5A	22A-V1P5N104	A	—	—	—
1-Phase	3-Phase	0.4	0.5	2.3A	22A-V2P3N104	A	2.3A	22B-V2P3N104	B
No Filter		0.75	1.0	4.5A	22A-V4P5N104	B	5.0A	22B-V5P0N104	B
		1.1	1.5	6.0A	22A-V6P0N104	B	6.0A	22B-V6P0N104	B
200-240V 50/60 Hz	0-230V	0.2	0.25	1.5A	22A-A1P5N114	A	—	—	—
1-Phase	3-Phase	0.4	0.5	2.3A	22A-A2P3N114	A	2.3A	22B-A2P3N114	B
With Integral "S Type"		0.75	1.0	4.5A	22A-A4P5N114	A	5.0A	22B-A5P0N114	B
EMC Filter		1.5	2.0	8.0A	22A-A8P0N114	B	8.0A	22B-A8P0N114	B
		2.2	3.0	—	—	—	12A	22B-A012N114	C
200-240V 50/60 Hz	0-230V	0.2	0.25	1.5A	22A-A1P5N104	A	—	—	—
1-Phase	3-Phase	0.4	0.5	2.3A	22A-A2P3N104	A	2.3A	22B-A2P3N104	B
No Filter		0.75	1.0	4.5A	22A-A4P5N104	A	5.0A	22B-A5P0N104	B
		1.5	2.0	8.0A	22A-A8P0N104	B	8.0A	22B-A8P0N104	B
		2.2	3.0	—	—	—	12.0A	22B-A012N104	C
200-240V 50/60 Hz	0-230V	0.2	0.25	1.5A	22A-B1P5N104	A	—	—	—
3-Phase	3-Phase	0.4	0.5	2.3A	22A-B2P3N104	A	2.3A	22B-B2P3N104	B
No Filter		0.75	1.0	4.5A	22A-B4P5N104	A	5.0A	22B-B5P0N104	B
		1.5	2.0	8.0A	22A-B8P0N104	A	8.0A	22B-B8P0N104	B
		2.2	3.0	12.0A	22A-B012B104	B	12.0A	22B-B012N104	B
		3.7	5.0	17.5A	22A-B017N104	B	17.5A	22B-B017N104	B
		5.5	7.5	—	—	—	24.0A	22B-B024N104	C
		7.5	10.0	—	—	—	33.0A	22B-B033N104	C
380-480V 50/60 Hz	0-460V	0.4	0.5	1.4A	22A-D1P4N104	A	1.4A	22B-D1P4N104	B
3-Phase	3-Phase	0.75	1.0	2.3A	22A-D2P3N104	A	2.3A	22B-D2P3N104	B
No Filter		1.5	2.0	4.0A	22A-D4P0N104	A	4.0A	22B-D4P0N104	B
		2.2	3.0	6.0A	22A-D6P0N104	B	6.0A	22B-D6P0N104	B
		4.0	5.0	8.7A	22A-D8P7N104	B	10.5A	22B-D010N104	B
		5.5	7.5	—	—	—	12.0A	22B-D012N104	C
		7.5	10.0	—	—	—	17.0A	22B-D017N104	C

See page 19 for dimensions.

Shaded areas denote options for PowerFlex 40 only.

IP30/NEMA 1/UL Type 1 Conversion Kit

Item	Description	Drive Frame	PowerFlex 4 Catalog Number ❶	PowerFlex 40 Catalog Number ❶
IP30/NEMA 1/UL Type 1 Kit	Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes conduit box with mounting screws and plastic top panel.	A	22-JBAA	–
		B	22-JBAB	22-JBAB
		C	–	22-JBAC
IP30/NEMA 1/UL Type 1 Kit with Communication Option	Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes communication option conduit box with mounting screws and plastic top panel.	B	–	22-JBCB
		C	–	22-JBCC

Human Interface Module Option Kits and Accessories

Item	Description	Catalog Number ❶
Remote Human Interface Modules (HIMs)	LCD Display, Remote Panel Mount, Digital Speed Control, Full Numeric Keypad, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only. Includes 2.9 meter cable.	22-HIM-C2
	LCD Display, Remote Handheld, Digital Speed Control, Full Numeric Keypad, CopyCat capable, IP30 (NEMA Type 1). Includes 1.0 meter cable, Panel Mount with optional Bezel Kit.	22-HIM-A3
Bezel Kit	Panel Mount for LCD Display, Remote Handheld unit, IP30 (NEMA Type 1).	22-HIM-B1
DSI HIM Cable	DSI HIM Cable (DSI HIM to RJ45 cable) 1.0 Meter (3.3 Feet) 2.9 Meter (9.51 Feet)	 22-HIM-H10 22-HIM-H30

Communication Option Kits

Item	Description	Catalog Number ❶
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 (1) 1203-SFC serial cable (1) 22-RJ45CBL-C20 cable (1) DriveExplorer Lite CD (1)	22-SCM-232
Serial Cable	2.0 meter serial cable with a locking low profile connector to connect to the serial converter and a 9-pin sub-miniature D female connector to connect to a computer.	1203-SFC
Null Cable Converter	For use when connecting the serial converter to DriveExplorer on a handheld PC.	1203-SNM
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	RJ45 120 Ohm resistors (2 pieces).	AK-U0-RJ45-TR1
Terminal Block	RJ45 Two position terminal block (5 pieces).	AK-U0-RJ45-TB2P
DeviceNet™ Card	Embedded communication option for use with the PowerFlex family of drives. Requires a Communication Adapter Cover (Ordered Separately).	22-COMM-D
Communication Covers	Houses the DeviceNet Communication Adapter. These covers add 25 mm (0.98 in.) to the overall depth of the drive. PowerFlex 40 Drive Frame B PowerFlex 40 Drive Frame C	 22B-CCB 22B-CCC

PC Programming Software

Item	Description	Catalog Number
DriveExecutive™ Software, Version 1.01 or later	"Windows" based software package that provides an intuitive means for monitoring or configuring Allen-Bradley drives and communications adapters online and offline. Compatibility: Windows 98, ME, NT, 4.0 (Service Pack 3 or later), 2000 and XP. ❷	9303-4DTE01ENE
DriveExplorer™ Software, Version 3.01 or later	"Windows" based software package that provides an intuitive means for monitoring or configuring Allen-Bradley drives and communications adapters online and offline. Compatibility: Windows 95, 98, ME, NT, 4.0 (Service Pack 3 or later), 2000, XP and CE. ❷	9306-4EXP01ENE
DC Bus Inductors	Use MTE RB Series or equivalent inductors: 240V 50/60 Hz, 3-Phase 480V 50/60 Hz, 3-Phase	❸

❶ For pricing information, refer to the PowerFlex 4-Class Price List, publication 22-PL001.

❷ See www.ab.com/drive/ for support devices.

❸ See www.mtecorp.com for catalog numbers.

Shaded areas are applicable to PowerFlex 40 only.

Dynamic Brake Resistors

Drive Ratings			PowerFlex 4	PowerFlex 40
Input Voltage	kW	HP	Catalog Number ❶	Catalog Number ❶
120V 50/60 Hz 1-Phase	0.2	0.25	❷	–
	0.4	0.5	❷	
	0.75	1.0	AK-R2-091P500	
	1.1	1.5	AK-R2-091P500	
240V 50/60 Hz 1-Phase	0.2	0.25	❷	–
	0.4	0.5	❷	
	0.75	1.0	AK-R2-091P500	
	1.5	2.0	AK-R2-091P500	
	2.2	3.0	–	AK-R2-047P500
240V 50/60 Hz 3-Phase	0.2	0.25	❷	–
	0.4	0.5	❷	
	0.75	1.0	AK-R2-091P500	
	1.5	2.0	AK-R2-091P500	
	2.2	3.0	AK-R2-047P500	
	3.7	5.0	AK-R2-047P500	
	5.5	7.5	–	AK-R2-030P1K2
	7.5	10.0	–	AK-R2-030P1K2
480V 50/60 Hz 3-Phase	0.4	0.5	❷	
	0.75	1.0	AK-R2-360P500	
	1.5	2.0	AK-R2-360P500	
	2.2	3.0	AK-R2-120P1K2	
	4.0	5.0	AK-R2-120P1K2	
	5.5	7.5	–	AK-R2-120P1K2
	7.5	10.0	–	AK-R2-120P1K2

❶ Resistors listed in this table are rated for a minimum 5% duty cycle. See publication no. PLFEX-AT001 for additional information.

❷ Drive does not support dynamic braking.

3% Line Reactors

Input Voltage	kW	HP	Fundamental Amps	Maximum Continuous Amps	Inductance	Watts Loss	Catalog Number ❶
240V 50/60 Hz 3-Phase	0.2	0.25	2	3	12.0 mh	7.5 W	1321-3R2-A
	0.4	0.5	4	6	12.0 mh	21 W	1321-3R4-D
	0.75	1.0	8	12	3.0 mh	29 W	1321-3R8-B
	1.5	2.0	8	12	1.5 mh	19.5 W	1321-3R8-A
	2.2	3.0	12	18	1.25 mh	26 W	1321-3R12-A
	3.7	5.0	18	27	0.8 mh	36 W	1321-3R18-A
	5.5	7.5	25	37.5	0.5 mh	48 W	1321-3R25-A
	7.5	10.0	35	52.5	0.4 mh	49 W	1321-3R35-A
480V 50/60 Hz 3-Phase	0.4	0.5	2	3	20.0 mh	11.3 W	1321-3R2-B
	0.75	1.0	4	6	9.0 mh	20 W	1321-3R4-C
	1.5	2.0	4	6	6.5 mh	20 W	1321-3R4-B
	2.2	3.0	8	12	5.0 mh	25.3 W	1321-3R8-C
	3.7	5.0	18	27	3.0 mh	29 W	1321-3R8-B
	4.0	5.0	12	18	2.5 mh	31 W	1321-3R12-B
	5.5	7.5	12	18	2.5 mh	31 W	1321-3R12-B
	7.5	10.0	18	27	1.5 mh	43 W	1321-3R18-B

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

PowerFlex 4 EMC Filters

Drive Ratings			S Type Filter	L Type Filter
Input Voltage	kW	HP	Catalog Number ❶	Catalog Number ❷
120V 50/60 Hz 1-Phase	0.2	0.25	–	22-RF010-AL
	0.4	0.5	–	22-RF010-AL
	0.75	1.0	–	22-RF018-BL
240V 50/60 Hz 1-Phase	0.2	0.25	❸	22-RF010-AL
	0.4	0.5	❸	22-RF010-AL
	0.75	1.0	❸	22-RF010-AL
	1.5	2.0	❸	22-RF018-BL
240V 50/60 Hz 3-Phase	0.2	0.25	22-RF9P5-AS	22-RF9P5-AL
	0.4	0.5	22-RF9P5-AS	22-RF9P5-AL
	0.75	1.0	22-RF9P5-AS	22-RF9P5-AL
	1.5	2.0	22-RF9P5-AS	22-RF9P5-AL
	2.2	3.0	22-RF021-BS	22-RF021-BL
	3.7	5.0	22-RF021-BS	22-RF021-BL
480V 50/60 Hz 3-Phase	0.4	0.5	22-RF5P7-AS	22-RF5P7-AL
	0.75	1.0	22-RF5P7-AS	22-RF5P7-AL
	1.5	2.0	22-RF5P7-AS	22-RF5P7-AL
	2.2	3.0	22-RF012-BS	22-RF012-BL
	3.7	5.0	22-RF012-BS	22-RF012-BL

PowerFlex 40 EMC Filters

Drive Ratings			S Type Filter	L Type Filter
Input Voltage	kW	HP	Catalog Number ❶	Catalog Number ❷
120V 50/60 Hz 1-Phase	0.4	0.5	–	22-RF018-BL
	0.75	1.0	–	22-RF018-BL
	1.1	1.5	–	22-RF018-BL
240V 50/60 Hz 1-Phase	0.4	0.5	❸	22-RF018-BL
	0.75	1.0	❸	22-RF018-BL
	1.5	2.0	❸	22-RF018-BL
	2.2	3.0	❸	22-RF025-CL
240V 50/60 Hz 3-Phase	0.4	0.5	22-RF021-BS ❹	22-RF021-BL
	0.75	1.0	22-RF021-BS ❹	22-RF021-BL
	1.5	2.0	22-RF021-BS ❹	22-RF021-BL
	2.2	3.0	22-RF021-BS ❹	22-RF021-BL
	3.7	5.0	22-RF021-BS ❹	22-RF021-BL
	5.5	7.5	22-RF034-CS	22-RF034-CL
	7.5	10.0	22-RF034-CS	22-RF034-CL
480V 50/60 Hz 3-Phase	0.4	0.5	22-RF012-BS	22-RF012-BL
	0.75	1.0	22-RF012-BS	22-RF012-BL
	1.5	2.0	22-RF012-BS	22-RF012-BL
	2.2	3.0	22-RF012-BS	22-RF012-BL
	4.0	5.0	22-RF012-BS	22-RF012-BL
	5.5	7.5	22-RF018-CS	22-RF018-CL
	7.5	10.0	22-RF018-CS	22-RF018-CL

❶ This filter is suitable for use with a cable length of at least 10 meters for Class A and 1 meter for Class B environments.

❷ This filter is suitable for use with a cable length of at least 100 meters for Class A and 5 meters for Class B environments.

❸ Drives are available in these ratings with internal "S Type" filters.

❹ Filter must be Series B or later.

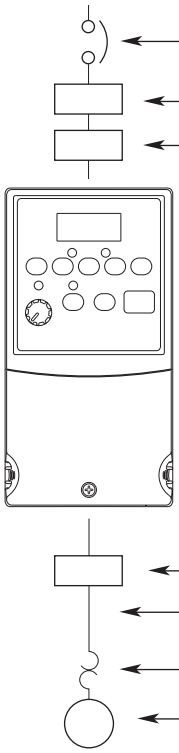
Shaded areas are applicable to PowerFlex 40 only.

The PowerFlex 4-Class drives have the following built in protective features to help simplify installation.

- Ground fault protection while starting and running ensures reliable operation
- Electronic motor overload protection increases motor life
- Removable MOV to ground ensures compatibility with ungrounded systems
- 6kV transient protection provides increased robustness for 380-480V system voltages

There are many other factors that must be considered for optimal performance in any given application. The block diagram below highlights the primary installation considerations. Consult the PowerFlex 4 or PowerFlex 40 *User Manual*, Publications 22A-UM001 or 22B-UM001 available online at **www.ab.com/manuals/dr**, for detailed recommendations on input power conditioning, CE conformance (EMC filtering), dynamic braking, reflected wave protection, motor cable types and motor cable distances.

Block Diagram



Branch Circuit Protective Devices – *See Specifications on page 14*

Input Power Conditioning – *See Line Reactors on page 10*

Line (EMC) Filter – *See page 10*

Integral Keypad

Reflected Wave Protection – *(Consult the appropriate User Manual)*

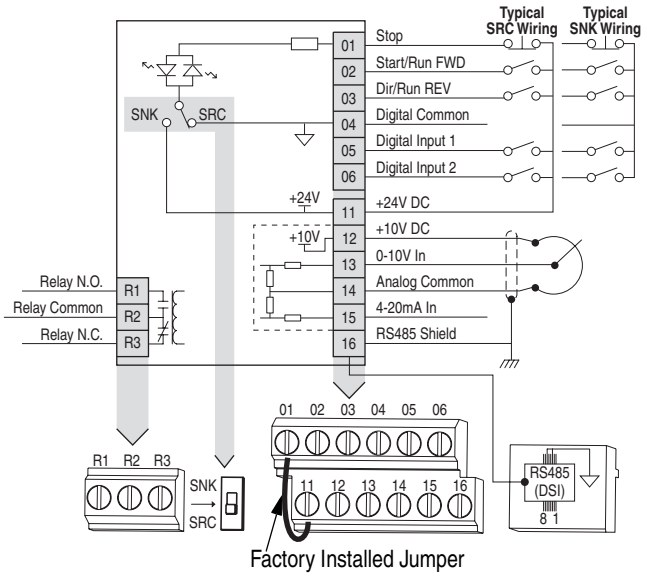
Motor Cable Type and Length Recommendations – *(Consult the appropriate User Manual)*

Class 10 Overload Protection – *Provided by the PowerFlex drive*

Motor – *See publication MOTORS-CA001*

PowerFlex 4

- 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 screw driver.
- 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- 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
  - Jog
  - Second Accel/Decel
  - Clear Fault
  - Preset Frequencies
  - RS485 Control
  - Auxiliary 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 11 to allow out of box operation from the keypad.



Terminal	Signal	Default	Description
R1	Relay N.O.	Fault	
R2	Relay Common	–	
R3	Relay N.C.	Fault	

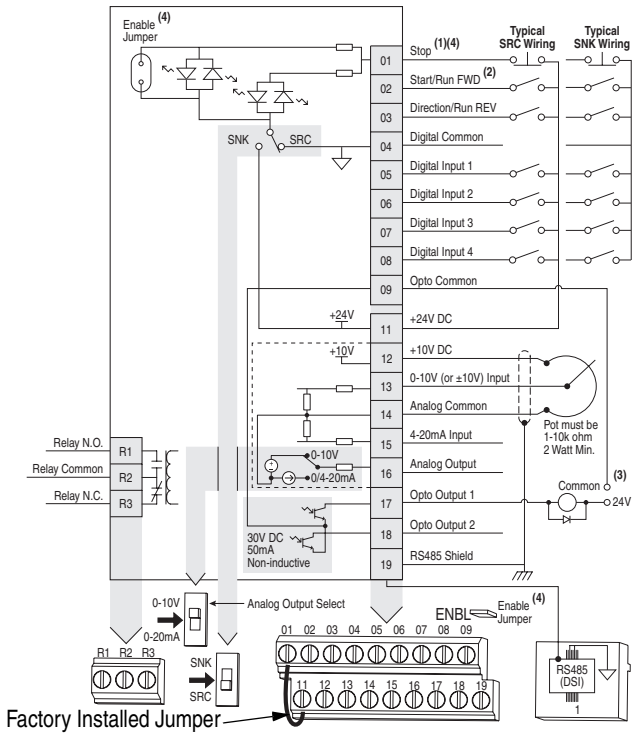
	30V DC	125V AC	240V AC
Resistive	3.0A	3.0A	3.0A
Inductive	0.5A	0.5A	0.5A

Sink/Source DIP Switch		Source (SRC)	Inputs can be wired as Sink (SNK) or Source (SRC) via DIP Switch setting.
01	Stop	Coast	The factory installed jumper or a normally closed input must be present for the drive to start.
02	Start/Run FWD	Not Active	Command comes from the integral keypad by default. To disable reverse operation, see A095 [Reverse Disable].
03	Dir/Run REV	Not Active	
04	Digital Common	–	For digital inputs. Electronically isolated with digital inputs from analog I/O.
05	Digital Input 1	Preset Frequencies	Program with A051 [Digital In1 Sel].
06	Digital Input 2	Preset Frequencies	Program with A052 [Digital In2 Sel].
11	+24V DC	–	Drive supplied power for digital inputs. Maximum output current is 100mA.
12	+10V DC	–	Drive supplied power for 0-10V external potentiometer. Maximum output current is 15mA.
13	0-10V In ❶	Not Active	For external 0-10V input supply (input impedance = 100k ohm) or potentiometer wiper.
14	Analog Common	–	For 0-10V In or 4-20mA In. Electronically isolated with analog inputs from digital I/O.
15	4-20mA In ❶	Not Active	For external 4-20mA input supply (input impedance = 250 ohm).
16	RS485 (DSI) Shield	–	Terminal should be connected to safety ground - PE when using the RS485 (DSI) communications port.

❶ Only one analog frequency source may be connected at a time. If more than one reference is connected at the same time, an undetermined frequency reference will result.

PowerFlex 40

- 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 screw driver.
- 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- or 3-Wire operation to meet application requirements.
- I/O Terminals 5, 6, 7 and 8 are programmable and provide added flexibility. Programmable functions include Local Control, Jog, Second Accel/Decel, Clear Fault, Preset Frequencies, RS485 Control and Auxiliary Fault.
- Speed can be controlled via a 0-10V input and/or 4-20 mA input. Both inputs are independently isolated from the rest of the drive and can be used for applications such as PID. Voltage input can be programmed for bipolar operation.
- The drive is shipped with a jumper installed between I/O Terminals 01 and 11 to allow out of box operation from the keypad.



Terminal	Signal	Default	Description
R1	Relay N.O.	Fault	
R2	Relay Common	–	
R3	Relay N.C.	Fault	

	30V DC	125V AC	240V AC
Resistive	3.0A	3.0A	3.0A
Inductive	0.5A	0.5A	0.5A

Analog Output Select DIP Switch		0-10V	Sets analog output to either voltage or current. Setting must match A065 [Analog Out Sel].
Sink/Source DIP Switch		Source (SRC)	Inputs can be wired as Sink (SNK) or Source (SRC) via DIP Switch setting.

01	Stop	Coast	The factory installed jumper or a normally closed input must be present for the drive to start.
02	Start/Run FWD	Not Active	Command comes from the integral keypad by default. To disable reverse operation, see A095 [Reverse Disable].
03	Dir/Run REV	Not Active	
04	Digital Common	–	For digital inputs. Electronically isolated with digital inputs from analog I/O.
05	Digital Input 1	Preset Frequencies	Program with A051 [Digital In1 Sel].
06	Digital Input 2	Preset Frequencies	Program with A052 [Digital In2 Sel].
07	Digital Input 3	Local	Program with A053 [Digital In3 Sel].
08	Digital Input 4	Jog Forward	Program with A054 [Digital In4 Sel].
09	Opto Common	–	For opto-coupled outputs. Electronically isolated with opto outputs from analog I/O and digital inputs.
11	+24V DC	–	Drive supplied power for digital inputs. Maximum output current is 100mA.
12	+10V DC	–	Drive supplied power for 0-10V external potentiometer. Maximum output current is 15mA.
13	0-10V In	Not Active	For external 0-10V input supply (input impedance = 100k ohm) or potentiometer wiper.
14	Analog Common	–	For 0-10V In or 4-20mA In. Electronically isolated with analog inputs from digital I/O.
15	4-20mA In	Not Active	For external 4-20mA input supply (input impedance = 250 ohm).
16	Analog Output	OutFreq 0-10	The default analog output is 0-10V. To convert to a current value, change the Analog output Select DIP Switch to 0-20mA. Program with A065 [Analog Out Sel]. Maximum analog value can be scaled with A066 [Analog Out High]. Maximum load: 0-20mA - 525 Ohm (10.5V) 0-10V = 1k ohm (10 mA)
17	Opto Output 1	MotorRunning	Program with A058 [Opto Out1 Sel]
18	Opto Output 2	At Frequency	Program with A061 [Opto Out2 Sel]
19	RS485 (DSI) Shield	–	Terminal should be connected to safety ground - PE when using the RS485 (DSI) communications port.

Drive Ratings — PowerFlex 4

Catalog Number	Output Ratings		Input Ratings			Branch Circuit Protection			Power Dissipation
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses ❶	140M Motor Protectors ❷	Contactors	IP20 Open Watts
100 - 120V AC – 1-Phase Input, 0 - 230V 3-Phase Output									
22A-V1P5N104	0.2 (0.25)	1.5	90-126	0.75	6.0	10	140M-xxE-C10	100-C09	25
22A-V2P3N104	0.4 (0.5)	2.3	90-126	1.15	9.0	15	140M-xxE-C16	100-C12	30
22A-V4P5N104	0.75 (1.0)	4.5	90-126	2.25	18.0	30	140M-xxE-C20	100-C23	50
22A-V6P0N104	1.1 (1.5)	6.0	90-126	3.00	24.0	40	140M-xxE-C32	100-C37	70
200 - 240V AC – 1-Phase ① Input, 0 - 230V 3-Phase Output									
22A-A1P5N104	0.2 (0.25)	1.5	180-265	0.75	5.0	10	140M-xxE-B63	100-C09	25
22A-A2P3N104	0.4 (0.5)	2.3	180-265	1.15	6.0	10	140M-xxE-B63	100-C09	30
22A-A4P5N104	0.75 (1.0)	4.5	180-265	2.25	10.0	15	140M-xxE-C16	100-C12	50
22A-A8P0N104	1.5 (2.0)	8.0	180-265	4.0	18.0	30	140M-xxE-C20	100-C23	80
200 - 240V AC – 3-Phase Input, 0 - 230V 3-Phase Output									
22A-B1P5N104	0.2 (0.25)	1.5	180-265	0.75	1.8	3	140M-xxE-B25	100-C09	25
22A-B2P3N104	0.4 (0.5)	2.3	180-265	1.15	2.5	6	140M-xxE-B40	100-C09	30
22A-B4P5N104	0.75 (1.0)	4.5	180-265	2.25	5.2	10	140M-xxE-C10	100-C09	50
22A-B8P0N104	1.5 (2.0)	8.0	180-265	4.0	9.5	15	140M-xxE-C16	100-C12	80
22A-B012N104	2.2 (3.0)	12.0	180-265	5.5	15.5	25	140M-xxE-C16	100-C16	115
22A-B017N104	3.7 (5.0)	17.5	180-265	8.6	21.0	35	140M-xxE-C25	100-C23	165
380 - 480V AC – 3-Phase Input, 0 - 460V 3-Phase Output									
22A-D1P4N104	0.4 (0.5)	1.4	340-528	1.4	1.8	3	140M-xxE-B25	100-C09	30
22A-D2P3N104	0.75 (1.0)	2.3	340-528	2.3	3.2	6	140M-xxE-B40	100-C09	40
22A-D4P0N104	1.5 (2.0)	4.0	340-528	4.0	5.7	10	140M-xxE-B63	100-C09	60
22A-D6P0N104	2.2 (3.0)	6.0	340-528	5.9	7.5	15	140M-xxE-C10	100-C09	90
22A-D8P7N104	3.7 (5.0)	8.7	340-528	8.6	9.0	15	140M-xxE-C16	100-C16	145

Drive Ratings — PowerFlex 40

Catalog Number	Output Ratings		Input Ratings			Branch Circuit Protection			Power Dissipation
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses ❶	140M Motor Protectors ❷	Contactors	IP20 Open Watts
100 - 120V AC – 1-Phase Input, 0 - 230V 3-Phase Output									
22B-V2P3N104	0.4 (0.5)	2.3	90-126	1.15	9.0	15	140M-xxE-C16	100-C12	30
22B-V5P0N104	0.75 (1.0)	5.0	90-126	2.45	20.3	35	140M-xxE-C20	100-C23	56
22B-V6P0N104	1.1 (1.5)	6.0	90-126	3.0	24.0	40	140M-xxE-C32	100-C37	70
200 - 240V AC – 1-Phase Input, 0 - 230V 3-Phase Output ❸									
22B-A2P3N104	0.4 (0.5)	2.3	180-265	1.15	6.0	10	140M-xxE-B63	100-C09	30
22B-A5P0N104	0.75 (1.0)	5.0	180-265	2.45	12.0	20	140M-xxE-C16	100-C12	55
22B-A8P0N104	1.5 (2.0)	8.0	180-265	4.0	18.0	30	140M-xxE-C20	100-C23	80
22B-A012N104	2.2 (3.0)	12.0	180-265	5.5	25.0	40	140M-xxE-C32	100-C37	110
200 - 240V AC – 3-Phase Input, 0 - 230V 3-Phase Output									
22B-B2P3N104	0.4 (0.5)	2.3	180-265	1.15	2.5	6	140M-xxE-B40	100-C07	30
22B-B5P0N104	0.75 (1.0)	5.0	180-265	2.45	5.7	10	140M-xxE-C10	100-C09	55
22B-B8P0N104	1.5 (2.0)	8.0	180-265	4.0	9.5	15	140M-xxE-C16	100-C12	80
22B-B012N104	2.2 (3.0)	12.0	180-265	5.5	15.5	25	140M-xxE-C16	100-C23	115
22B-B017N104	3.7 (5.0)	17.5	180-265	8.6	21.0	35	140M-xxE-C25	100-C23	165
22B-B024N104	5.5 (7.5)	24.0	180-265	11.8	26.1	40	140M-xxE-C32	100-C37	226
22B-B033N104	7.5 (10.0)	33.0	180-265	16.3	34.6	60	140M-xxE-C45	100-C60	290
380 - 480V AC – 3-Phase Input, 0 - 460V 3-Phase Output									
22B-D1P4N104	0.4 (0.5)	1.4	340-528	1.4	1.8	3	140M-xxE-B25	100-C07	30
22B-D2P3N104	0.75 (1.0)	2.3	340-528	2.3	3.2	6	140M-xxE-B40	100-C07	40
22B-D4P0N104	1.5 (2.0)	4.0	340-528	4.0	5.7	10	140M-xxE-B63	100-C09	60
22B-D6P0N104	2.2 (3.0)	6.0	340-528	5.9	7.5	15	140M-xxE-C10	100-C09	90
22B-D010N104	4.0 (5.0)	10.5	340-528	10.3	13.0	20	140M-xxE-C16	100-C23	150
22B-D012N104	5.5 (7.5)	12.0	340-528	11.8	14.2	25	140M-xxE-C20	100-C23	160
22B-D017N104	7.5 (10.0)	17.0	340-528	16.8	18.4	30	140M-xxE-C20	100-C23	200

❶ Recommended Fuse Type: UL Class J, CC, T or Type BS88; 600V (550V) or equivalent.

❷ Refer to Bulletin 140M Motor Protectors Selection Guide, publication 140-SG001 to determine the frame and breaking capacity required for your application.

❸ 200-240V AC - 1-Phase drives are also available with an integral EMC filter. Catalog suffix changes from N104 to N114.

Shaded areas are applicable to PowerFlex 40 only.

Specifications

Input/Output Ratings		Approvals
Output Frequency: 0-240 Hz (Programmable) *Efficiency:* 97.5% (Typical)	0-400 Hz (Programmable)	UL508C, CSA 22.2, 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:	SNK (Sink) Mode:	*4-20mA Analog:* 250 ohm input impedance
18-24V = ON	0-6V = ON	*0-10V DC Analog:* 100k ohm input impedance
0-6V = OFF	18-24V = OFF	*External Pot:* 1-10k ohms, 2 Watt minimum

Control Output

Programmable Output (form C relay)
Resistive Rating: 3.0A at 30V DC, 3.0A at 125V AC, 3.0A at 240V AC
Inductive Rating: 0.5A at 30V DC, 0.5A at 125V AC, 0.5A at 240V AC

Opto Outputs	*Analog Output (10-bit)*
30V DC, 50 mA	*0-10V, 1k ohm Min.*
Non-inductive	*4-20 mA, 525 ohm Max.*

Fuses and Circuit Breakers

Recommended Fuse Type: UL Class J, CC, T or Type BS88; 600V (550V) or equivalent.

Recommended Circuit Breakers: HMCP circuit breaker or equivalent.

Protective Features

Motor Protection: I²t 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)
380-480V 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 all ratings 0.75 kW (1 HP) and larger. Refer to page 10 for ordering information.

Environment	
Altitude:	1000 m (3300 ft) max. without derating
Ambient Operating Temperature	
IP20:	–10 to 50 degrees C (14 to 122 degrees F)
NEMA 1:	–10 to 40 degrees C (14 to 104 degrees F)
Cooling Method Fan:	All drive ratings
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.
Relative Humidity:	0 to 95% non-condensing
Shock (operating):	15G peak for 11ms duration (±1.0ms)
Vibration (operating):	1G peak, 5 to 2000 Hz

Control	
Carrier Frequency	2-16 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.
Analog Output:	±2% of full scale, 10-bit resolution
Speed Regulation - Open Loop with Slip Compensation:	±2% of base speed across a 40:1 speed range. 1% of base speed across a 60:1 speed range.
Stop Modes:	Multiple programmable stop modes including - Ramp, Coast, DC-Brake, Ramp-to-Hold and S Curve.
Accel/Decel:	Two independently programmable accel and decel 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	Class 10 protection with speed sensitive response.

Shaded areas are applicable to PowerFlex 40 only.

Parameter Number	Parameter Name	Description	Factory Default
Display Group			
d001	Output Freq	Output frequency present at T1, T2 & T3 (U, V & W)	Read Only
d002	Commanded Freq	Value of the active frequency command	Read Only
d003	Output Current	Output current present at T1, T2 & T3 (U, V & W)	Read Only
d004	Output Voltage	Output voltage present at T1, T2 & T3 (U, V & W)	Read Only
d005	DC Bus Voltage	Present DC bus voltage level	Read Only
d006	Drive Status	Present operating condition of the drive	Read Only
d007-d009	Fault x Code	A code that represents a drive fault	Read Only
d010	Process Display	The output frequency scaled by parameter A099 [Process Factor]	Read Only
d012	Control Source	Displays the source of the Start Command and Speed Reference	Read Only
d013	Contrl In Status	Status of the control terminal block control inputs	Read Only
d014	Dig In Status	Status of the control terminal block digital inputs	Read Only
d015	Comm Status	Status of the communications device	Read Only
d016	Control SW Ver	Main Control Board software version	Read Only
d017	Drive Type	Used by Rockwell Automation field service personnel	Read Only
d018	Elapsed Run Time	Accumulated time drive is outputting power	Read Only
d019	Testpoint Data	The present value of the function selected in parameter A102 [Testpoint Sel]	Read Only
d020	Analog In 0-10V	The present value of the voltage at I/O Terminal 13 (100.0% = 10 volts)	Read Only
d021	Analog In 4-20mA	The present value of the current at I/O Terminal 15 (0.0% = 4 mA, 100.0% = 20 mA)	Read Only
d022	Output Power	Output power present at T1, T2 & T3 (U, V & W)	Read Only
d023	Output Power Fctr	The angle in electrical degrees between motor voltage and motor current	Read Only
d024	Drive Temp	Present operating temperature of the drive power section	Read Only
d025	Counter Status	The current value of the counter when counter is enabled	Read Only
d026	Timer Status	The current value of the timer when timer is enabled	Read Only
d028	Stp Logic Status	When P038 [Speed Reference] is set to 6 "Stp Logic", this parameter will display the current step logic profile as defined by parameters A140-A147	Read Only
Basic Program Group			
P031	Motor NP Volts	20 to 240V for 120V and 240V drives, 20 to 460V for 460V drives	230 or 460
P032	Motor NP Hertz	10 to 240 Hz	60 Hz
		15 to 400 Hz	60 Hz
P033	Motor OL Current	0.0 Amps to (Drive Rated Amps x 2) in units of 0.1 Amps	Based on Drive Rating
P034	Minimum Freq	0.0 to 240.0 Hz	0.0 Hz
		0.0 to 400.0 Hz	0.0 Hz
P035	Maximum Freq	0.0 to 240.0 Hz	60.0 Hz
		0.0 to 400.0 Hz	60.0 Hz
P036	Start Source	6 settings; Keypad, 3-Wire, 2-Wire, 2-Wire Level Sensitive, 2-Wire High Speed, RS485 (DSI) Port	Keypad
P037	Stop Mode	8 settings; Ramp-Clear Fault, Coast-Clear Fault, DC Brake-Clear Fault, DC Brake w/Shutoff-Clear Fault, Ramp, Coast, DC Brake, DC Brake w/Shutoff	Ramp, CR (Clear Fault)
P038	Speed Reference	6 settings; Drive Potentiometer, Internal Freq, 0-10V Input/Remote Potentiometer, 4-20 mA Input, Preset Freq 0-3, RS485 (DSI) Port	Drive Pot
		7 settings; Drive Potentiometer, Internal Freq, 0-10V Input/Remote Potentiometer, 4-20 mA Input, Preset Freq 0-3, RS485 (DSI) Port, Step Logic	Drive Pot
P039	Accel Time 1	0.0 to 600.0 seconds	10.0 Secs
P040	Decel Time 1	0.1 to 600.0 seconds	10.0 Secs
P041	Reset To Defaults	Used to reset drive to factory default settings	Ready/Idle
Advanced Program Group			
A051 A052	Digital In1 Sel Digital In2 Sel	8 settings; Not Used, Accel 2 & Decel 2, Jog, Auxiliary Fault, Preset Frequencies, Local, RS485 (DSI) Port, Clear Fault	Preset Freq
		26 settings; Not Used, Accel 2 & Decel 2, Jog, Auxiliary Fault, Preset Frequencies, Local, RS485 (DSI) Port, Clear Fault, Ramp Stop - Clear Fault, Coast Stop - Clear Fault, DC Brake - Clear Fault, Jog Forward, Jog Reverse, 10V In Control, 20 mA In Control, PID Disable, MOP Up, MOP Down, Timer Start, Counter In, Reset Timer, Reset Counter, Reset Timer and Counter, Logic In1, Logic In2, Current Limit2	
A053	Digital In3 Sel	26 settings; Not Used, Accel 2 & Decel 2, Jog, Auxiliary Fault, Preset Frequencies, Local, RS485 (DSI) Port, Clear Fault, Ramp Stop - Clear Fault, Coast Stop - Clear Fault, DC Brake - Clear Fault, Jog Forward, Jog Reverse, 10V In Control, 20 mA In Control, PID Disable, MOP Up, MOP Down, Timer Start, Counter In, Reset Timer, Reset Counter, Reset Timer and Counter, Logic In1, Logic In2, Current Limit2	Local
A054	Digital In4 Sel		Jog Forward
A055	Relay Out Sel	10 different settings for a variety of drive status conditions	Ready (Not Faulted)
		21 different settings for a variety of drive status conditions	Ready/Fault

Shaded areas are applicable to PowerFlex 40 only.

Parameter Descriptions

Parameter Number	Parameter Name	Description	Factory Default
A056	Relay Out Level	0.0 to 9999	0.0
A058	Opto Out1 Sel	21 settings; Ready/Fault, At Frequency, Motor Running, Reverse, Motor Overload, Ramp Regulator, Above Frequency, Above Current, Above DC Voltage, Retries Exceeded, Above Analog Voltage, Logic In1, Logic In2, Logic 1 & 2, Logic 1 or 2, Step Logic Out, Timer Out, Counter Out, Above PF Angle, Analog Input Loss, Param Control	MotorRunning
A059	Opto Out1 Level	0.0 to 9999	0.0
A061	Opto Out2 Sel	21 settings; Ready/Fault, At Frequency, Motor Running, Reverse, Motor Overload, Ramp Regulator, Above Frequency, Above Current, Above DC Voltage, Retries Exceeded, Above Analog Voltage, Logic In1, Logic In2, Logic 1 & 2, Logic 1 or 2, Step Logic Out, Timer Out, Counter Out, Above PF Angle, Analog Input Loss, Param Control	At Frequency
A062	Opto Out2 Level	0.0 to 9999	0.0
A064	Opto Out Logic	Determines the logic (NO or NC) of the opto outputs, 4 settings - NO/NO, NC/NO, NO/NC, NC/NC	NO/NO
A065	Analog Out Sel	Sets the analog output signal mode, various settings	Output Freq 0-10, 0V=0Hz
A066	Analog Out High	0 to 800%	100%
A067	Accel Time 2	0.0 to 600.0 seconds	20.0 Secs
A068	Decel Time 2	0.1 to 600.0 seconds	20.0 Secs
A069	Internal Freq	0.0 to 240.0 Hz	60.0 Hz
		0.0 to 400.0 Hz	60.0 Hz
A070	Preset Freq 0	0.0 to 240.0 Hz	0.0 Hz
A071	Preset Freq 1	0.0 to 240.0 Hz	5.0 Hz
A072	Preset Freq 2	0.0 to 240.0 Hz	10.0 Hz
A073	Preset Freq 3	0.0 to 240.0 Hz	20.0 Hz
A074	Preset Freq 4	0.0 to 400.0 Hz	30.0 Hz
A075	Preset Freq 5	0.0 to 400.0 Hz	40.0 Hz
A076	Preset Freq 6	0.0 to 400.0 Hz	50.0 Hz
A077	Preset Freq 7	0.0 to 400.0 Hz	60.0 Hz
A078	Jog Frequency	0.0 to (Value set in P035 [Maximum Freq]	10.0 Hz
A079	Jog Accel/Decel	0.1 to 600.0 seconds	10.0 Secs
A080	DC Brake Time	0.0 to 90.0 seconds	0.0 Secs
		0.0 to 99.0 seconds	0.0 Secs
A081	DC Brake Level	0.0 to (Drive Rated Amps x 1.8)	Drive Rated Amps x 0.05
A082	DB Resistor Sel	Used to set percent duty cycle for external dynamic braking	Disabled
A083	S Curve %	0 to 100%	0% (Disabled)
A084	Boost Select	14 boost settings (in % of P031 [Motor NP Volts]), redefines the Volts per Hertz curve	5.0 (2.5 for 5 HP drives)
		15 boost settings (in % of P031 [Motor NP Volts]), redefines the Volts per Hertz curve	5.0, CT (2.5 for 5, 7.5 and 10 HP drives)
A085	Start Boost	0.0 to 25.0%	2.5%
A086	Break Voltage	0.0 to 100.0%	25.0%
A087	Break Frequency	0.0 to 400.0 Hz	15.0 Hz
A088	Maximum Voltage	20 to Drive Rated Volts	Drive Rated Volts
A089	Current Limit 1	0.1 to (Drive Rated Volts x 1.8)	Drive Rated Amps x 1.5
A090	Motor OL Select	3 settings; No Derate, Minimum Derate, Maximum Derate	No Derate
A091	PWM Frequency	2.0 to 16.0 kHz	4.0 kHz
A092	Auto Rstrt Tries	0 to 9	0
A093	Auto Rstrt Delay	0.0 to 120.0 seconds	1.0 Secs
		0.0 to 300.0 seconds	1.0 Secs
A094	Start At PowerUp	2 settings; Disabled, Enabled	Disabled
A095	Reverse Disable	2 settings; Reverse Enabled, Reverse Disabled	Rev Enabled

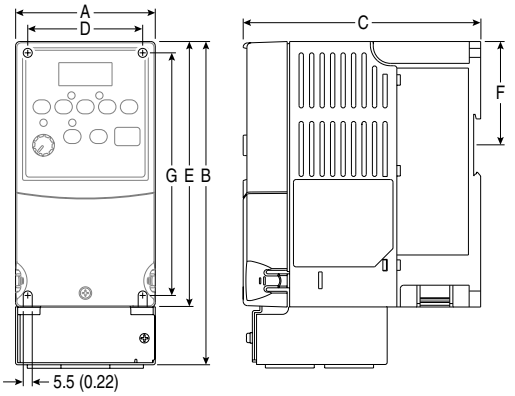
Shaded areas are applicable to PowerFlex 40 only.

Parameter Number	Parameter Name	Description	Factory Default
Advanced Program Group, Continued			
A096	Flying Start En	2 settings; Disabled, Enabled	Disabled
A097	Compensation	4 settings; Disabled, Electrical, Mechanical, Both	Disabled
A098	SW Current Trip	Software instantaneous trip, 0.0 to (Drive Rated Amps x 2)	0.0 (Disabled)
A099	Process Factor	0.1 to 999.9	30.0
A100	Fault Clear	Resets a fault and clears the fault queue	Ready/Idle
A101	Program Lock	Protects parameters against change by unauthorized personnel	Unlocked
A102	Testpoint Sel	Used by Rockwell Automation field service personnel	400
A103	Comm Data Rate	6 settings; 1200, 2400, 4800, 9600, 19.2K, 38.4K	9600
A104	Comm Node Addr	1 to 247	100
A105	Comm Loss Action	4 settings; Fault, Coast to Stop, Stop, Continue Last Speed	Fault
A106	Comm Loss Time	0.1 to 60.0 seconds	5.0 Secs
A107	Comm Format	3 settings; RTU 8-N-1, RTU 8-E-1, RTU 8-O-1	RTU 8-N-1
A108	Language	11 settings; English, Francais, Espanol, Italiano, Deutsch, Reserved, Portugues, Reserved, Reserved, Nederlands	English
A110	Anlg In 0-10V Lo	0.0 to 100.0%	0.0%
A111	Anlg In 0-10V Hi	0.0 to 100.0%	100.0%
A112	Anlg In4-20mA Lo	0.0 to 100.0%	0.0%
A113	Anlg In4-20mA Hi	0.0 to 100.0%	100.0%
A114	Slip Hertz @ FLA	0.0 to 10.0 Hz	2.0 Hz
A118	Current Limit 2	0.0 to (Drive Rated Amps x 1.8)	Drive Rated Amps x 1.5
A119	Skip Frequency	0 to 400 Hz	0 Hz
A120	Skip Freq Band	0.0 to 30.0 Hz	0.0 Hz
A121	Stall Fault Time	6 settings; 60 Seconds, 120 Seconds, 240 Seconds, 360 Seconds, 480 Seconds, Fit Disabled	60 Seconds
A122	Analog In Loss	7 settings; Disabled, Fault (F29), Stop, Zero Ref, Min Freq Ref, Max Freq Ref, Int Freq Ref	Disabled
A123	10V Bipolar Enbl	2 settings; Uni-Polar In, Bi-Polar In	Uni-Polar In
A124	Var PWM Disable	2 settings; Enabled, Disabled	Enabled
A125	Torque Perf Mode	2 settings; V/Hz, Sensorless Vector	Sensrls Vect
A126	Motor NP FLA	0.1/(Drive Rated Amps x 2)	Drive Rated Amps
A127	Autotune	3 settings; Ready/Idle, Static Tune, Rotate Tune	Ready/Idle
A128	IR Voltage Drop	0.0 to 230.0 VAC	Based on Drive Rating
A129	Flux Current Ref	0.00 to Motor NP Volts	Based on Drive Rating
A130	PID Trim High	0.0 to 400.0	60.0
A131	PID Trim Low	0.0 to 400.0	0.1
A132	PID Reference Select	9 settings; PID Disabled, PID Setpoint, 0-10V Input, 4-20mA Input, Comm Port, Setpoint - Trim, 0-10V - Trim, 4-20mA - Trim, Comm - Trim	PID Disabled
A133	PID Feedback Select	3 settings; 0-10V Input, 4-20mA Input, Comm Port	0-10V Input
A134	PID Proportional Gain	0.00 to 99.99	0.01
A135	PID Integral Time	0.0 to 999.9 Seconds	0.1
A136	PID Differential Rate	0.00 to 99.99 (1/Secs)	0.01 (1/Secs)
A137	PID Setpoint	0.0 to 100.0%	0.0%
A138	PID Deadband	0.0 to 10.0%	0.0%
A139	PID Preload	0.0 to 400.0 Hz	0.0
A140-A147	Step Logic 0-7	0001 to 4990	00F1
A150-157	Step Logic Time 0-7	0.0 to 999.9 Seconds	30.0

Shaded areas are applicable to PowerFlex 40 only.

Dimensions

Approximate Dimensions



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

Frame	A	B ❶	C	D	E ❷	F	Shipping Weight
A	80 (3.15)	152 (5.98)	136 (5.35)	67 (2.64)	140 (5.51	59.3 (2.33)	1.4 (3.1)
B	100 (3.94)	180 (7.09)	136 (5.35)	87 (3.43)	168 (6.61)	87.4 (3.44)	2.2 (4.9)
C	130 (5.1)	260 (10.2)	180 (7.1)	116 (4.57)	246 (9.7)	–	4.3 (9.5)

❶ Overall height of drive with IP 30/NEMA 1/ UL Type 1 option kit installed.

❷ Overall height of standard IP 20/Open Type drive.

Ratings are in kW and (HP).

PowerFlex 4 — 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) 3.7 (5.0)	2.2 (3.0) 3.7 (5.0)

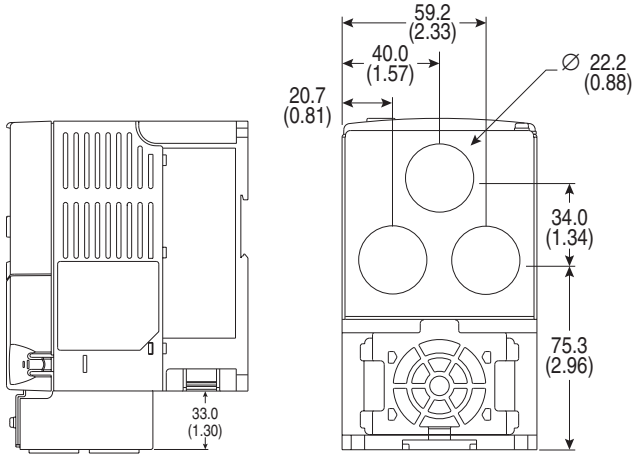
PowerFlex 40 — Frame	120V AC – 1-Phase	240V AC – 1-Phase	240V AC – 3-Phase	480V AC – 3-Phase
B	0.4 (0.5) 0.75 (1.0) 1.1 (1.5)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0) 2.2 (3.0) 3.7 (5.0)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0) 2.2 (3.0) 4.0 (5.0)
C		2.2 (3.0)	5.5 (7.5) 7.5 (10.0)	5.5 (7.5) 7.5 (10.0)

Shaded areas are applicable to PowerFlex 40 only.

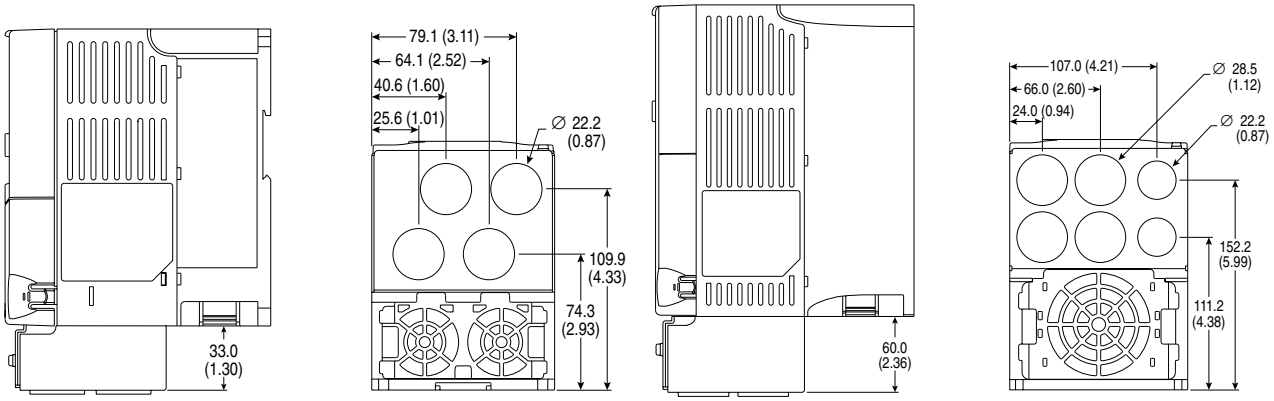
Dimensions

IP 30/NEMA Type 1/UL Type 1 Option Kit without Communication Options

PowerFlex 4 uses Frames A & B. PowerFlex 40 uses Frames B & C.



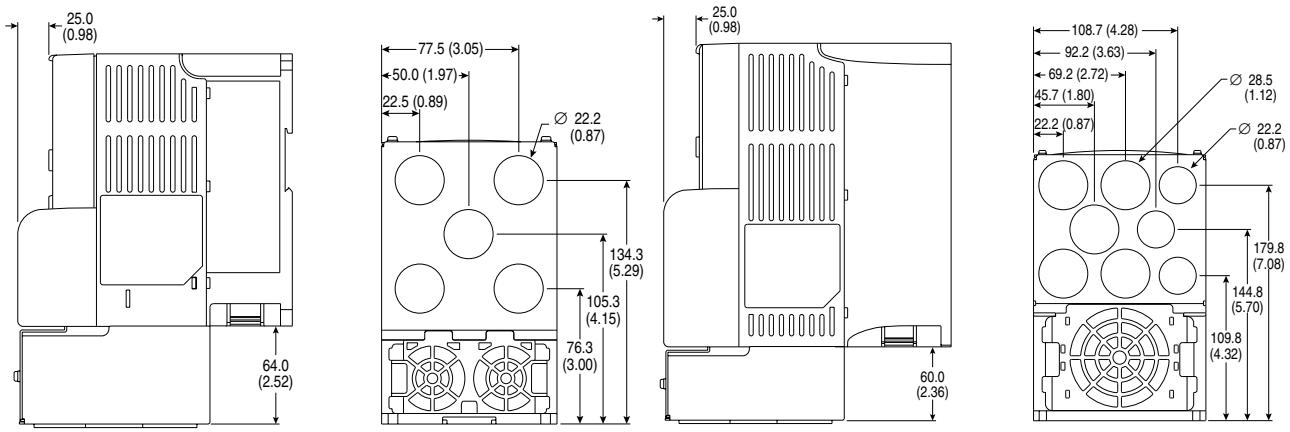
Frame A — 22-JBAA



Frame B — 22-JBAB

Frame C — 22-JBAC

PowerFlex 40 IP 30/NEMA 1/UL Type 1 Option Kit with Communication Option



Frame B — 22-JBCB

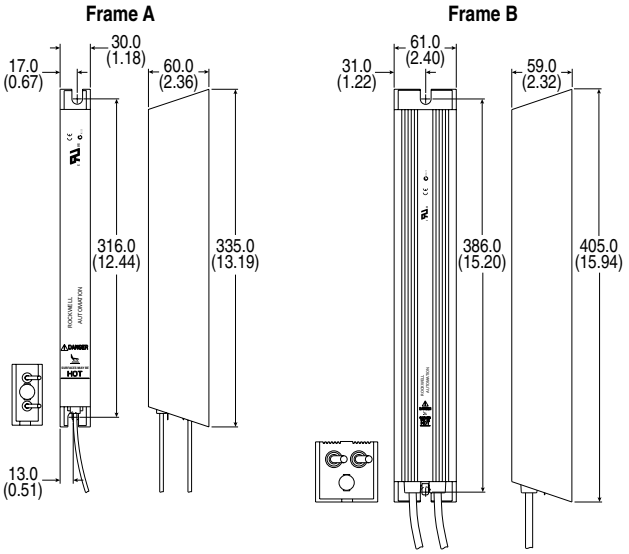
Frame C — 22-JBCC

Shaded areas are applicable to PowerFlex 40 only.

Dimensions

Dynamic Brake Resistors

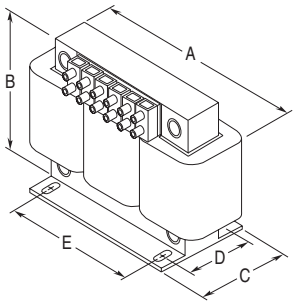
Dimensions are in millimeters and (inches)



Frame	Catalog Number
A	AK-R2-091P500, AK-R2-047P500, AK-R2-360P500
B	AK-R2-030P1K2, AK-R2-120P1K2

Bulletin 1321-3R Series Line Reactors

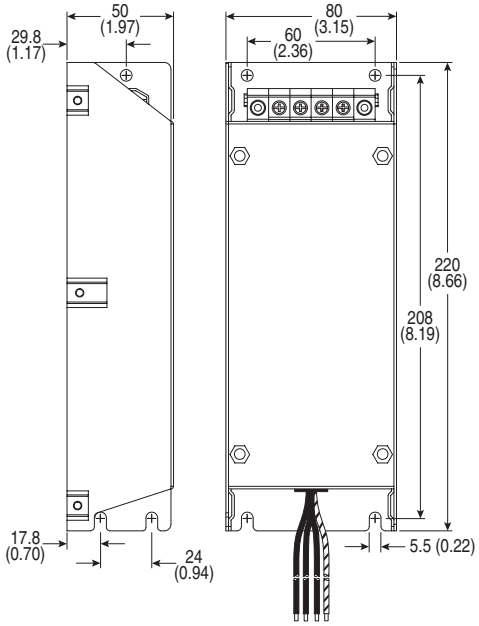
Dimensions are in millimeters and (inches). Weights are in kilograms and (pounds).



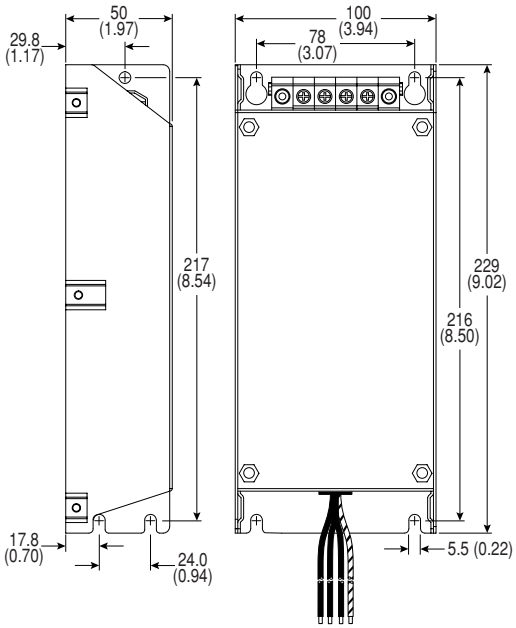
Catalog Number	A	B	C	D	E	Weight
1321-3R2-A	112 (4.40)	104 (4.10)	70 (2.75)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R2-B	112 (4.40)	104 (4.10)	70 (2.75)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R4-A	112 (4.40)	104 (4.10)	76 (3.00)	50 (1.98)	37 (1.44)	1.8 (4)
1321-3R4-B	112 (4.40)	104 (4.10)	76 (3.00)	50 (1.98)	37 (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)
1321-3R8-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)	133 (5.25)	86 (3.40)	63 (2.48)	51 (2.00)	5.4 (12)
1321-3R25-A	183 (7.20)	146 (5.76)	85 (3.35)	60 (2.35)	76 (3.00)	4.9 (11)
1321-3R35-A	193 (7.60)	146 (5.76)	91 (3.60)	66 (2.60)	76 (3.00)	6.3 (14)

EMC Line Filters

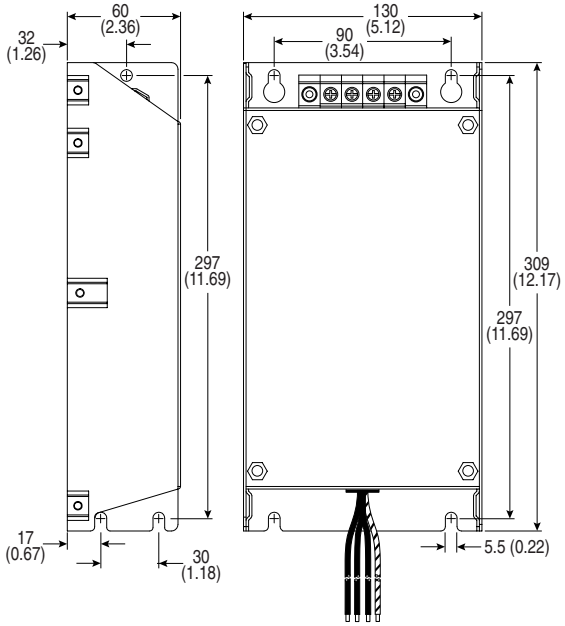
Frame A EMC Line Filters – Dimensions are in millimeters and (inches)
Catalog Numbers: 22-RF5P7-AS, -AL; 22-RF9P5-AS, -AL; 22-RF010-AL



Frame B EMC Line Filters – Dimensions are in millimeters and (inches)
Catalog Numbers: 22-RF012-BS, -BL; 22-RF018-BS; 22-RF021-BS, -BL



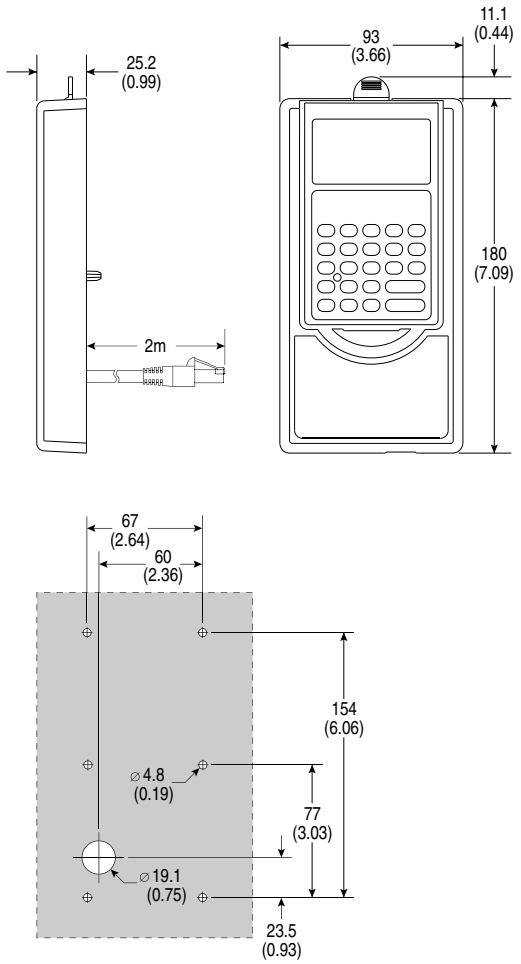
Frame C EMC Line Filters – Dimensions are in millimeters and (inches)
Catalog Numbers: 22-RF018-CS, -CL; 22-RF021-BL; 22-RF025-CL; 22RF034-CS, -CL



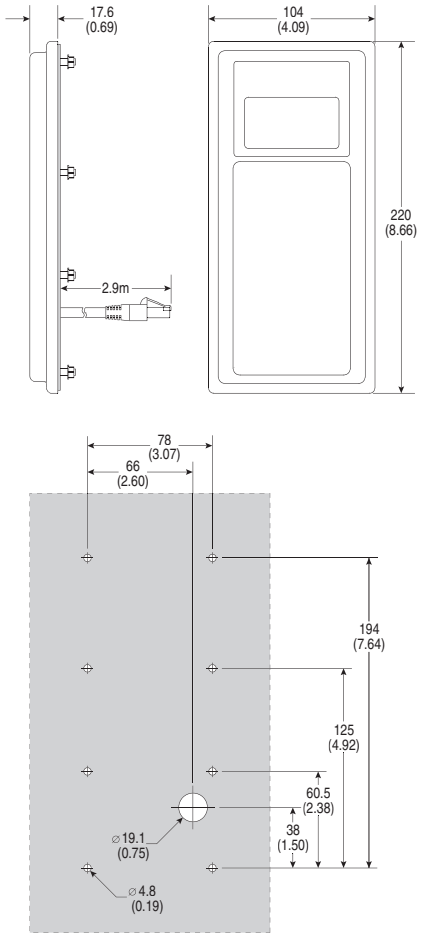
Shaded areas are applicable to PowerFlex 40 only.

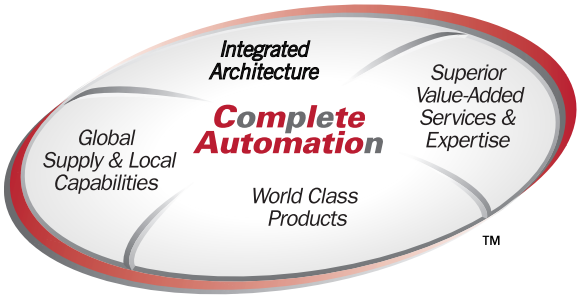
Human Interface Module (HIM) Dimensions

NEMA Type 1 Bezel – Dimensions are in millimeters and (inches)
Catalog Number: 22-HIM-B1



Remote (Panel Mount) HIM – Dimensions are in millimeters and (inches)
Catalog Number: 22-HIM-C2





The Allen-Bradley PowerFlex family of AC drives provides a single-source solution for virtually any drive application requirement ranging from 0.2 to 3,000 kW (0.25 to 4,000 hp). Significant commonality across multiple platforms including networks, operator interface, programming and hardware make PowerFlex drives easy to start up, operate and maintain. Multi-lingual programming, operator interface text and voltage-sensitive defaults in PowerFlex drives will help global OEMs and end-users save time and money during set-up, integration and maintenance of virtually any automation system.

Rockwell Automation supports drive users whenever and wherever needed, providing drive specialists and manufacturing expertise for unmatched service and support around the globe. In fact, one of every five Rockwell Automation employees is in the field with users every day. Rockwell Automation also offers a full spectrum of value-added services and expertise to help simplify maintenance and enhance productivity.

Rockwell Automation is committed to helping its customers meet ever-changing demands. PowerFlex drives illustrate our commitment to user productivity through timely delivery of world-class products and continued backward compatibility to minimize life-cycle costs. Count on Rockwell Automation to be your Complete Automation™ partner – now and in the future.

For further information on PowerFlex drives visit our web site at: **www.abpowerflex.com**

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