Technical Data

Original Instructions

PowerFlex 70 Adjustable Frequency AC Drive

Catalog Number 20A

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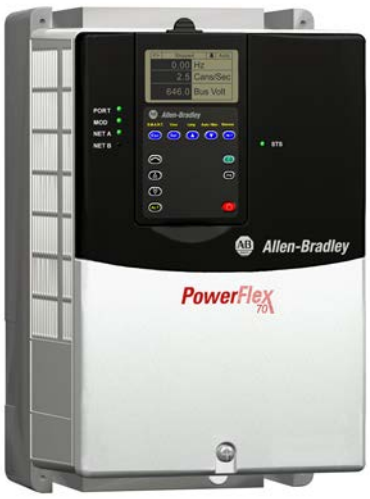

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Summary of Changes

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

Topic	Page
Added Efficiency Class of Ecodesign regulation (EU) 2019/1781 to Certification table.	40
Updated certification information	40

Product Overview

PowerFlex® 70 drives are designed to worldwide standards providing out-of-the-box performance around the globe. Available ratings include these options:

- 0.5...25 Hp output at 240V AC input
- 0.5...50 Hp output at 480V AC input
- 0.5...50 Hp output at 600V AC input

The PowerFlex 70 drive can be used with a full featured LCD human interface module (HIM) that provides multilingual text for startup, metering, programming, and troubleshooting.

The PowerFlex 70 can be programmed for either volts per Hertz, sensorless vector, or vector control with FORCE Technology to cover a wide range of applications from fans to extruders.

Optional internal communication modules provide fast and efficient control and/or data exchange with host controllers over popular interfaces. These interfaces include: Connected Components Workbench™ software, DeviceNetManager™, EtherNet/IP®, ControlNet®, serial communications, and other open control and communication networks. Computer tools such as DriveExplorer™ and DriveTools™ SP assist with programming, monitoring, and troubleshooting the PowerFlex 70.

DriveTools SP Software has been upgraded to Connected Components Workbench software. DriveTools support can be found at the Product Compatibility and Download Center rok.auto/pcdc, but is no longer available for sale.

Flexible Packaging and Mounting

- **IP20, NEMA / UL Type 1** – For conventional mounting inside or outside a control cabinet. Conduit plate is vertically removable for easy installation and replacement without disturbing conduit.
- **IP66, NEMA / UL Type 4X/12** (indoor use) – For mounting directly in the production environment. Listed by UL to resist dust, dirt, other contaminants, and to survive high-pressure water spray. Also certified by NSF International to verify conformity with international food equipment standards.
- **Flange Type** – For mounting heatsink through back of an enclosure, thus removing a large portion of the heat inside a cabinet. The backside is rated IP66, NEMA / UL Type 4X/12 for both indoor and outdoor use.
- **Zero-Stacking™ Drive** - Drives can be mounted directly next to one another with no reduction of ambient temperature rating (50 °C [122 °F] for IP20, NEMA / UL Type 1, and Flange Mount; 40 °C [104 °F] for IP66, NEMA / UL Type 4X/12).
- **Conformal Coating** - The drive is coated in an insulator, or non-conducting substance, that helps protect it from moisture, fungus, dust, corrosion, abrasion, and other environmental stresses caused by highly polluted atmospheres. The coating improves product lifetime expectancy when exposure to corrosive environment is present. It helps maintain long-term surface insulation resistance, ensuring operational integrity of the assembly.

Space Saving Hardware Features

- Integral electromagnetic compatibility (EMC) filtering provides a compact, all-in-one package solution for meeting EMC requirements, including CE in Europe.
- Integral dynamic brake transistor delivers a cost-effective means of switching regenerative energy without costly external chopper circuits.
- Internal dynamic brake resistor requires no extra panel space, and supplies a large amount of braking torque for short periods.
- Internal Communications allow you to integrate the drive into the manufacturing process. Status indicators for all internal communication options are visible on the cover for easy setup and monitoring of drive communications. You can easily manage information from shop floor to top floor and seamlessly integrate their complete system as they control, configure, and collect data.

Easy to Use Human Interface Tools

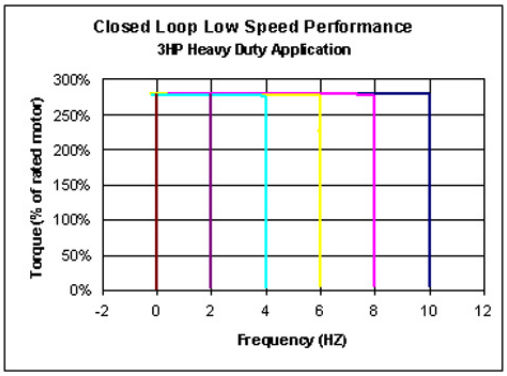
The PowerFlex 7-Class AC drives provide common human interface tools that are familiar and easy to use. These tools include the LCD human interface modules and computer-based configuration tools.

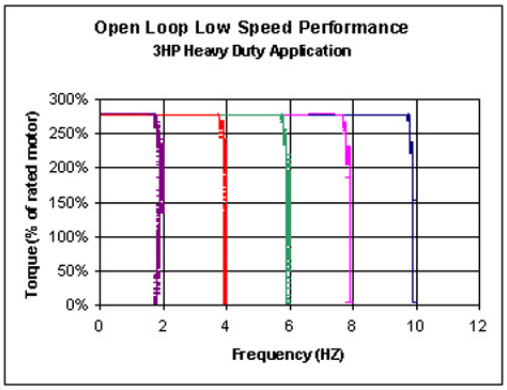
The LCD HIMs provide these features and functions:

- Large and easy to read 7-line x 21-character backlit display
- Variety of languages (English, French, German, Italian, Spanish, Portuguese, Dutch)
- Alternate function keys for shortcuts to common tasks
- 'Calculator-like' number pad for fast and easy data entry (full numeric version only)
- Control keys for local start, stop, speed, and direction
- Remote versions for panel mount application

Outstanding Control and Performance

- Volt/Hertz Control for simple Fan and Pump applications
- Vector Control with FORCE Technology provides outstanding torque and speed regulation, with or without encoder feedback.
- **Sensorless Vector Control** develops high torque over a wide speed range, and adapts to individual motor characteristics.





Drives Features

- Fast acting **Current Limit** and **Bus Voltage Regulation** result in maximum acceleration and deceleration without tripping.
- **Flying Start** delivers smooth connection into rotating loads, regardless of commanded direction, without the need for any speed feedback device.
- **PI Control** can eliminate the need for a separate process loop controller.
- **Inertia Ride-Through** offers tripless operation during a prolonged power outage by using the rotating energy that is stored in high-inertia, low-friction loads.
- **User Sets**, allowing up to three complete sets of parameter data, can be individually loaded for different batch processes.
- **Slip compensation** delivers minimum of 0.5% open-loop speed regulation across a wide speed range, eliminating the need for speed feedback devices in some applications.
- **Safe Torque Off**, the first offering available within the DriveGuard® series of safety solutions, helps prevent a drive from delivering rotational energy to motors by integrating a safety circuit with the power switching signals of the drive. This solution meets EN ISO 13849-1, Category 3.
- **Droop Control** for load sharing applications.
- **Sleep/Wake Control** for analog control of start and stop.

Unsurpassed Capability in Network Communications

PowerFlex drives are fully compatible with the wide variety of Allen-Bradley® DPI™ (drive peripheral interface) communication adapters, offering the following benefits.

Benefits and Description	Availability By Communication Adapter											
	BACnet	DeviceNet	ControlNet	EtherNet/IP	Dual-Port EtherNet/IP	RS-485 DF1	PROFIBUS DP	LonWorks	Modbus RTU	Modbus TCP	Metasys N2	Siemens P1 FLN
Unconnected Messaging: permits other network devices (for example, PanelView™) to communicate directly to a drive without routing the communication through the network scanner.		X	X	X	X							
Adapter Routing: plug personal computer into one drive and talk to other Allen-Bradley drives on same network, without being routed through network scanner.	X	X	X	X	X	X			X			
Access all parameters: provides access to 100% of parameters over the network.	X	X	X	X	X	X	X	X	X	X	X	X
Autobaud: makes initial connections less problematic.	X	X		X	X		X					
Change of state: significantly reduces network traffic by configuring control messages to be sent only upon customer defined states. Flexible configuration for each node (for example, reference must change by more than 5%).		X										
Peer Control: provides leader/follower type control between drives, where one or more follower drives (consumers) can run based on the status of a leader drive (producer). The leader drive can also significantly reduce network traffic.		X		X	X							
Automatic Device Replacement (ADR): saves significant time and effort when replacing a drive, by allowing the scanner to be configured to automatically detect a new drive and download the required parameter settings.		X										
Flexible Fault Configuration: adapters can be programmed to take fault-based actions such as ramp to stop, cost to stop, and hold last state, and send user configurable logic control and speed reference values. In addition, different actions can be taken based on whether the network experienced a serious problem (broken cable) versus a network idle condition (PLC set to 'Program.')	X	X	X	X	X	X	X	X	X	X	X	X

Catalog Number Explanation

1…3	4	5…7	8	9	10	11	12	13	14	15	16
20A	B	2P2	A	3	A	Y	Y	N	N	C	0
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*

a

Drive	
Code	Type
20 A	PowerFlex 70

b

Voltage Rating		
Code	Voltage	Ph.
B	240V AC	3 (6 pulse)
C	400V AC	3 (6 pulse)
D	480V AC	3 (6 pulse)
E	600V AC	3 (6 pulse)

c1

PowerFlex 70 ND Rating 208V, 60 Hz Input				
Code	208V amps	kW	Hp	Frame
2P2	2.5	0.37	0.5	A
4P2	4.8	0.75	1.0	
6P8	7.8	1.5	2.0	B
9P6	11	2.2	3.0	
015	17.5	4.0	5.0	C
022	25.3	5.5	7.5	D
028	32.2	7.5	10	
042	43	11	15	
054	56	15	20	E
070	78.2	18.5	25	

c2

PowerFlex 70 ND Rating 240V, 60 Hz Input				
Code	Amps	kW	Hp	Frame
2P2	2.2	0.37	0.5	A
4P2	4.2	0.75	1.0	
6P8	6.8	1.5	2.0	B
9P6	9.6	2.2	3.0	
015	15.3	4.0	5.0	C
022	22	5.5	7.5	D
028	28	7.5	10	
042	42	11	15	
054	54	15	20	E
070	70	18.5	25	

c3

PowerFlex 70 ND Rating 400V, 50 Hz Input				
Code	Amps	kW	Hp	Frame
1P3	1.3	0.37	0.5	A
2P1	2.1	0.75	1.0	
3P5	3.5	1.5	2.0	
5P0	5.0	2.2	3.0	B
8P7	8.7	4.0	5.0	
011	11.5	5.5	7.5	C
015	15.4	7.5	10	
022	22	11	15	D
030	30	15	20	
037	37	18.5	25	
043	42	22	30	
060	60	30	40	E
072	72	37	50	

c4

PowerFlex 70 ND Rating 480V, 60 Hz Input				
Code	Amps	kW	Hp	Frame
1P1	1.1	0.37	0.5	A
2P1	2.1	0.75	1.0	
3P4	3.4	1.5	2.0	
5P0	5.0	2.2	3.0	B
8P0	8.0	3.7	5.0	
011	11	5.5	7.5	C
014	14	7.5	10	
022	22	11	15	D
027	27	15	20	
034	34	18.5	25	
040	40	22	30	
052	52	30	40	E
065	65	37	50	

c5

PowerFlex 70 ND Rating 600V, 60 Hz Input[1]				
Code	Amps	kW	Hp	Frame
0P9	0.9	0.37	0.5	A
1P7	1.7	0.75	1.0	
2P7	2.7	1.5	2.0	
3P9	3.9	2.2	3.0	B
6P1	6.1	4.0	5.0	
9P0	9.0	5.5	7.5	C
011	11	7.5	10	
017	17	11	15	D
022	22	15	20	
027	27	18.5	25	
032	32	22	30	
041	41	30	40	E
052	52	37	50	

(1) 600V class drives are declared to meet the Low Voltage Directive. It is the responsibility of the user to determine compliance to the EMC Directive.

d

Enclosure	
Code	Enclosure[1]
A[2]	Panel Mount - IP 20, NEMA/UL Type 1
C[2]	Wall/Machine Mount = IP66, NEMA/UL Type 4X/12 for indoor use only
F	Flange Mount - Front Chassis = IP 20, NEMA/UL Type 1; Rear Heatsink = IP66, NEMA/UL Type 4X/12 for indoor use only
G	Wall/Machine Mount - IP54, NEMA/UL Type 12[3]

(1) All enclosures come with conformal coating standard.
(2) IP20 and IP66 frame E drives are manufactured with a flange-like heat heatsink with mounting holes.
(3) Only available on Frame E.

e

HIM	
Code	Interface Module
0	Blank Cover
3	Full Numeric LCD
5	Prog. Only LCD[1]

(1) Only available with NEMA 4X, enclosure C.

f

Documentation	
Code	Type
A	Manual
N	No manual

g

Brake IGBT	
Code	w/Brake
Y	Yes

h

Internal Brake Resistor	
Code	w/ Resistor
Y	Yes
N	No

i

Emission Class[1]	
Code	Rating
A	Filtered
N	Not Filtered

(1) For additional information, see the following table.

Emission Class by Frame Current Rating (A…E) and Voltage					
	A[1][2]	B[2]	C	D	E
240V	A or N	A or N	A	A	A
400V	A or N	A or N	A	A	A
480V	A or N	A or N	A	A	A
600V	N	N	N	N	A

(1) If a filter is used with a Frame A current rating, the drive with internal filter is supplied in the B Frame to accommodate the additional size.
(2) "A or N" indicates that filtering is optional.

j

Comm Slot	
Code	Network Type
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
N	None

k

Control and I/O		
Code	Control	Safe Torque Off [1] [2]
N[3]	Standard	–
C	Enhanced	No
G	Enhanced	Yes

(1) Safe Torque Off is not available user-installed for 600V drives.
(2) Drive is not CE EMC/TUV certified when the encoder interface option is installed.
(3) No longer available for sale.

l

Feedback[1]	
Code	Feedback
0	No Feedback - Enhanced Control
1	5V/12V Encoder w/Enhanced Control

(1) Drive is not CE EMC certified when the encoder interface option is installed or functionally safety certified when safe torque off option is installed.

Product Selection

Panel Mount - IP20, NEMA/UL Type 1, No HIM

200...240V AC, Three-phase Drives

240V AC Input						208V AC Input[1]						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
2.2	2.4	3.3	0.5	0.33	20AB2P2A0AYNNNC0	2.5	2.7	3.7	0.37	0.25	20AB2P2A0AYNNNC0	No	A
					20AB2P2A0AYNANC0						20AB2P2A0AYNANC0	Yes	B
4.2	4.8	6.4	1	0.75	20AB4P2A0AYNNNC0	4.8	5.5	7.4	0.75	0.55	20AB4P2A0AYNNNC0	No	A
					20AB4P2A0AYNANC0						20AB4P2A0AYNANC0	Yes	B
6.8	9	12	2	1.5	20AB6P8A0AYNNNC0	7.8	10.3	13.8	1.5	1.1	20AB6P8A0AYNNNC0	No	
					20AB6P8A0AYNANC0						20AB6P8A0AYNANC0	Yes	
9.6	10.6	14.4	3	2	20AB9P6A0AYNNNC0	11	12.1	16.5	2.2	1.5	20AB9P6A0AYNNNC0	No	
					20AB9P6A0AYNANC0						20AB9P6A0AYNANC0	Yes	
15.3	17.4	23.2	5	3	20AB015A0AYNANC0	17.5	19.2	26.2	4	3	20AB015A0AYNANC0		C
22	24.2	33	7.5	5	20AB022A0AYNANC0	25.3	27.8	37.9	5.5	4	20AB022A0AYNANC0		D
28	33	44	10	7.5	20AB028A0AYNANC0	32.2	37.9	50.6	7.5	5.5	20AB028A0AYNANC0		
42	46.2	63	15	10	20AB042A0AYNANC0	43	55.5	74	11	7.5	20AB042A0AYNANC0		
54	63	84	20	15	20AB054A0AYNANC0	62.1	72.4	96.6	15	11	20AB054A0AYNANC0		E
70	81	108	25	20	20AB070A0AYNANC0	78.2	93.1	124	18.5	15	20AB070A0AYNANC0		

(1) Drive must be programmed to lower voltage to obtain the currents shown.

380...480V AC, Three-phase Drives

480V AC Input						400V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
1.1	1.2	1.6	0.5	0.33	20AD1P1A0AYNNNC0	1.3	1.4	1.9	0.37	0.25	20AC1P3A0AYNNNC0	No	A
					20AD1P1A0AYNANC0						20AC1P3A0AYNANC0	Yes	B
2.1	2.4	3.2	1	0.75	20AD2P1A0AYNNNC0	2.1	2.4	3.2	0.75	0.55	20AC2P1A0AYNNNC0	No	A
					20AD2P1A0AYNANC0						20AC2P1A0AYNANC0	Yes	B
3.4	4.5	6	2	1.5	20AD3P4A0AYNNNC0	3.5	4.5	6	1.5	1.1	20AC3P5A0AYNNNC0	No	A
					20AD3P4A0AYNANC0						20AC3P5A0AYNANC0	Yes	B
5	5.5	7.5	3	2	20AD5P0A0AYNNNC0	5	5.5	7.5	2.2	1.5	20AC5P0A0AYNNNC0	No	B
					20AD5P0A0AYNANC0						20AC5P0A0AYNANC0	Yes	
8	8.8	12	5	3	20AD8P0A0AYNNNC0	8.7	9.9	13.2	4	3	20AC8P7A0AYNNNC0	No	B
					20AD8P0A0AYNANC0						20AC8P7A0AYNANC0	Yes	
11	12.1	16.5	7.5	5	20AD011A0AYNANC0	11.5	13	17.4	5.5	4	20AC011A0AYNANC0		C
14	16.5	22	10	7.5	20AD014A0AYNANC0	15	17.2	23.1	7.5	5.5	20AC015A0AYNANC0		C
22	24.2	33	15	10	20AD022A0AYNANC0	22	24.2	33	11	7.5	20AC022A0AYNANC0		D
27	33	44	20	15	20AD027A0AYNANC0	30	33	45	15	11	20AC030A0AYNANC0		D
34	40.5	54	25	20	20AD034A0AYNANC0	37	45	60	18.5	15	20AC037A0AYNANC0		D
40	51	68	30	25	20AD040A0AYNANC0	43	56	74	22	18.5	20AC043A0AYNANC0		D
52	60	80	40	30	20AD052A0AYNANC0	60	66	90	30	22	20AC060A0AYNANC0		E
65	78	104	50	40	20AD065A0AYNANC0	72	90	120	37	30	20AC072A0AYNANC0		E

500...600V AC, Three-phase Drives

600V AC Input							
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	With Filter	Frame Size
Cont.	60 s	3 s					
0.9	1	1.4	0.5	0.33	20AE0P9A0AYNNNC0	No	A
1.7	1.9	2.6	1	0.75	20AE1P7A0AYNNNC0		
2.7	3.6	4.8	2	1	20AE2P7A0AYNNNC0		
3.9	4.3	5.8	3	1.5	20AE3P9A0AYNNNC0		B
6.1	6.7	9.1	5	3	20AE6P1A0AYNNNC0		
9	9.9	13.5	7.5	5	20AE9P0A0AYNNNC0		C
11	13.5	18	10	7.5	20AE011A0AYNNNC0		
17	18.7	25.5	15	10	20AE017A0AYNNNC0		D
22	25.5	34	20	15	20AE022A0AYNNNC0		
27	33	44	25	20	20AE027A0AYNNNC0		
32	40.5	54	30	25	20AE032A0AYNNNC0		
41	48	64	40	30	20AE041A0AYNANC0		E
52	61.5	82	50	40	20AE052A0AYNANC0		

Wall/Machine Mount - IP66, NEMA/UL Type 4X/12 for Indoor Use with HIM

200...240V AC, Three-phase Drives

240V AC Input						208V AC Input[1]						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
2.2	2.4	3.3	0.5	0.33	20AB2P2C3AYNNNC0	2.5	2.7	3.7	0.37	0.25	20AB2P2C3AYNNNC0	No	B
					20AB2P2C3AYNANC0						20AB2P2C3AYNANC0	Yes	
4.2	4.8	6.4	1	0.75	20AB4P2C3AYNNNC0	4.8	5.5	7.4	0.75	0.55	20AB4P2C3AYNNNC0	No	
					20AB4P2C3AYNANC0						20AB4P2C3AYNANC0	Yes	
6.8	9	12	2	1.5	20AB6P8C3AYNNNC0	7.8	10.3	13.8	1.5	1.1	20AB6P8C3AYNNNC0	No	
					20AB6P8C3AYNANC0						20AB6P8C3AYNANC0	Yes	
9.6	10.6	14.4	3	2	20AB9P6C3AYNNNC0	11	12.1	16.5	2.2	1.5	20AB9P6C3AYNNNC0	No	
					20AB9P6C3AYNANC0						20AB9P6C3AYNANC0	Yes	
15.3	17.4	23.2	5	3	20AB015C3AYNANC0	17.5	19.2	26.2	4	3	20AB015C3AYNANC0		D
22	24.2	33	7.5	5	20AB022C3AYNANC0	25.3	27.8	37.9	5.5	4	20AB022C3AYNANC0		
28	33	44	10	7.5	20AB028C3AYNANC0	32.2	37.9	50.6	7.5	5.5	20AB028C3AYNANC0		
42	46.2	63	15	10	20AB042C3AYNANC0	43	55.5	74	11	7.5	20AB042C3AYNANC0		
54	63	84	20	15	20AB054C3AYNANC0	62.1	72.4	96.6	15	11	20AB054C3AYNANC0		E
70	81	108	25	20	20AB070C3AYNANC0	78.2	93.1	124	18.5	15	20AB070C3AYNANC0		

(1) The drive must be programmed to lower voltage to obtain the currents shown.

380...480V AC, Three-phase Drives

480V AC Input						400V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
1.1	1.2	1.6	0.5	0.33	20AD1P1C3AYNNNC0	1.3	1.4	1.9	0.37	0.25	20AC1P3C3AYNNNC0	No	B
					20AD1P1C3AYNANC0						20AC1P3C3AYNANC0	Yes	
2.1	2.4	3.2	1	0.75	20AD2P1C3AYNNNC0	2.1	2.4	3.2	0.75	0.55	20AC2P1C3AYNNNC0	No	
					20AD2P1C3AYNANC0						20AC2P1C3AYNANC0	Yes	
3.4	4.5	6	2	1.5	20AD3P4C3AYNNNC0	3.5	4.5	6	1.5	1.1	20AC3P5C3AYNNNC0	No	
					20AD3P4C3AYNANC0						20AC3P5C3AYNANC0	Yes	
5	5.5	7.5	3	2	20AD5P0C3AYNNNC0	5	5.5	7.5	2.2	1.5	20AC5P0C3AYNNNC0	No	
					20AD5P0C3AYNANC0						20AC5P0C3AYNANC0	Yes	
8	8.8	12	5	3	20AD8P0C3AYNNNC0	8.7	9.9	13.2	4	3	20AC8P7C3AYNNNC0	No	
					20AD8P0C3AYNANC0						20AC8P7C3AYNANC0	Yes	
11	12.1	16.5	7.5	5	20AD011C3AYNANC0	11.5	13	17.4	5.5	4	20AC011C3AYNANC0		D
14	16.5	22	10	7.5	20AD014C3AYNANC0	15	17.2	23.1	7.5	5.5	20AC015C3AYNANC0		
22	24.2	33	15	10	20AD022C3AYNANC0	22	24.2	33	11	7.5	20AC022C3AYNANC0		
27	33	44	20	15	20AD027C3AYNANC0	30	33	45	15	11	20AC030C3AYNANC0	Yes	
34	40.5	54	25	20	20AD034C3AYNANC0	37	45	60	18.5	15	20AC037C3AYNANC0		
40	51	68	30	25	20AD040C3AYNANC0	43	56	74	22	18.5	20AC043C3AYNANC0		
52	60	80	40	30	20AD052C3AYNANC0	60	66	90	30	22	20AC060C3AYNANC0		E
65	78	104	50	40	20AD065C3AYNANC0	72	90	120	37	30	20AC072C3AYNANC0		

500...600V AC, Three-phase Drives

600V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.		
Cont.	60 s	3 s					
0.9	1	1.4	0.5	0.33	20AE0P9C3AYNNNC0	No	B
1.7	1.9	2.6	1	0.75	20AE1P7C3AYNNNC0		
2.7	3.6	4.8	2	1	20AE2P7C3AYNNNC0		
3.9	4.3	5.8	3	1.5	20AE3P9C3AYNNNC0		
6.1	6.7	9.1	5	3	20AE6P1C3AYNNNC0		
9	9.9	13.5	7.5	5	20AE9P0C3AYNNNC0		D
11	13.5	18	10	7.5	20AE011C3AYNNNC0		
17	18.7	25.5	15	10	20AE017C3AYNNNC0		
22	25.5	34	20	15	20AE022C3AYNNNC0		
27	33	44	25	20	20AE027C3AYNNNC0		
32	40.5	54	30	25	20AE032C3AYNNNC0		
41	48	64	40	30	20AE041C3AYNANC0		E
52	61.5	82	50	40	20AE052C3AYNANC0		

Wall/Machine Mount - IP54, NEMA/UL Type 12, with HIM

200...240V AC, Three-phase Drives

240V AC Input					208V AC Input(1)					Cat. No.	With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Output Amps			Normal-Duty kW	Heavy-Duty kW			
Cont.	60 s	3 s			Cont.	60 s	3 s					
54	63	84	20	15	62.1	72.4	96.6	15	11	20AB054G3AYNANC0	Yes	E
70	81	108	25	20	78.2	93.1	124	18.5	15	20AB070G3AYNANC0		

(1) Drive must be programmed to lower voltage to obtain the currents shown.

380...480V AC, Three-phase Drives

480V AC Input						400V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
52	60	80	40	30	20AD052G3AYNANC0	60	66	90	30	22	20AC060G3AYNANC0	Yes	E
65	78	104	50	40	20AD065G3AYNANC0	72	90	120	37	30	20AC072G3AYNANC0		

500...600V AC, Three-phase Drives

600V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.		
Cont.	60 s	3 s					
41	48	64	40	30	20AE041G3AYNANC0	Yes	E
52	61.5	82	50	40	20AE052G3AYNANC0		

Flange Mount, Front Chassis = IP20, NEMA/UL Type 1, Heatsink = IP66, NEMA/UL Type 4X/12, No HIM

200...240V AC, Three-phase Drives

240V AC Input						208V AC Input[1]						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
2.2	2.4	3.3	0.5	0.33	20AB2P2F0AYNNNC0	2.5	2.7	3.7	0.37	0.25	20AB2P2F0AYNNNC0	No	A
					20AB2P2F0AYNANC0						20AB2P2F0AYNANC0	Yes	B
4.2	4.8	6.4	1	0.75	20AB4P2F0AYNNNC0	4.8	5.5	7.4	0.75	0.55	20AB4P2F0AYNNNC0	No	A
					20AB4P2F0AYNANC0						20AB4P2F0AYNANC0	Yes	B
6.8	9	12	2	1.5	20AB6P8F0AYNNNC0	7.8	10.3	13.8	1.5	1.1	20AB6P8F0AYNNNC0	No	
					20AB6P8F0AYNANC0						20AB6P8F0AYNANC0	Yes	
9.6	10.6	14.4	3	2	20AB9P6F0AYNNNC0	11	12.1	16.5	2.2	1.5	20AB9P6F0AYNNNC0	No	
					20AB9P6F0AYNANC0						20AB9P6F0AYNANC0	Yes	
15.3	17.4	23.2	5	3	20AB015F0AYNANC0	17.5	19.2	26.2	4	3	20AB015F0AYNANC0		C
22	24.2	33	7.5	5	20AB022F0AYNANC0	25.3	27.8	37.9	5.5	4	20AB022F0AYNANC0		D
28	33	44	10	7.5	20AB028F0AYNANC0	32.2	37.9	50.6	7.5	5.5	20AB028F0AYNANC0		
42	46.2	63	15	10	20AB042F0AYNANC0	43	55.5	74	11	7.5	20AB042F0AYNANC0		
54	63	84	20	15	20AB054F0AYNANC0	62.1	72.4	96.6	15	11	20AB054F0AYNANC0		E
70	81	108	25	20	20AB070F0AYNANC0	78.2	93.1	124	18.5	15	20AB070F0AYNANC0		

(1) Drive must be programmed to lower voltage to obtain the currents shown.

380...480V AC, Three-phase Drives

480V AC Input						400V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.	Output Amps			Normal-Duty kW	Heavy-Duty kW	Cat. No.		
Cont.	60 s	3 s				Cont.	60 s	3 s					
1.1	1.2	1.6	0.5	0.33	20AD1P1F0AYNNNC0	1.3	1.4	1.9	0.37	0.25	20AC1P3F0AYNNNC0	No	A
					20AD1P1F0AYNANC0						20AC1P3F0AYNANC0	Yes	B
2.1	2.4	3.2	1	0.75	20AD2P1F0AYNNNC0	2.1	2.4	3.2	0.75	0.55	20AC2P1F0AYNNNC0	No	A
					20AD2P1F0AYNANC0						20AC2P1F0AYNANC0	Yes	B
3.4	4.5	6	2	1.5	20AD3P4F0AYNNNC0	3.5	4.5	6	1.5	1.1	20AC3P5F0AYNNNC0	No	A
					20AD3P4F0AYNANC0						20AC3P5F0AYNANC0	Yes	
5	5.5	7.5	3	2	20AD5P0F0AYNNNC0	5	5.5	7.5	2.2	1.5	20AC5P0F0AYNNNC0	No	
					20AD5P0F0AYNANC0						20AC5P0F0AYNANC0	Yes	B
8	8.8	12	5	3	20AD8P0F0AYNNNC0	8.7	9.9	13.2	4	3	20AC8P7F0AYNNNC0	No	
					20AD8P0F0AYNANC0						20AC8P7F0AYNANC0		
11	12.1	16.5	7.5	5	20AD011F0AYNANC0	11.5	13	17.4	5.5	4	20AC011F0AYNANC0		C
14	16.5	22	10	7.5	20AD014F0AYNANC0	15	17.2	23.1	7.5	5.5	20AC015F0AYNANC0		
22	24.2	33	15	10	20AD022F0AYNANC0	22	24.2	33	11	7.5	20AC022F0AYNANC0		D
27	33	44	20	15	20AD027F0AYNANC0	30	33	45	15	11	20AC030F0AYNANC0	Yes	
34	40.5	54	25	20	20AD034F0AYNANC0	37	45	60	18.5	15	20AC037F0AYNANC0		
40	51	68	30	25	20AD040F0AYNANC0	43	56	74	22	18.5	20AC043F0AYNANC0		
52	60	80	40	30	20AD052F0AYNANC0	60	66	90	30	22	20AC060F0AYNANC0		E
65	78	104	50	40	20AD065F0AYNANC0	72	90	120	37	30	20AC072F0AYNANC0		

500...600V AC, Three-phase Drives

600V AC Input						With Filter	Frame Size
Output Amps			Normal-Duty Hp	Heavy-Duty Hp	Cat. No.		
Cont.	60 s	3 s					
0.9	1	1.4	0.5	0.33	20AE0P9F0AYNNNC0	No	A
1.7	1.9	2.6	1	0.75	20AE1P7F0AYNNNC0		
2.7	3.6	4.8	2	1	20AE2P7F0AYNNNC0		
3.9	4.3	5.8	3	1.5	20AE3P9F0AYNNNC0		B
6.1	6.7	9.1	5	3	20AE6P1F0AYNNNC0		
9	9.9	13.5	7.5	5	20AE9P0F0AYNNNC0		C
11	13.5	18	10	7.5	20AE011F0AYNNNC0		
17	18.7	25.5	15	10	20AE017F0AYNNNC0		D
22	25.5	34	20	15	20AE022F0AYNNNC0		
27	33	44	25	20	20AE027F0AYNNNC0		
32	40.5	54	30	25	20AE032F0AYNNNC0		
41	48	64	40	30	20AE041F0AYNANC0		E
52	61.5	82	50	40	20AE052F0AYNANC0		

Factory-installed Options

This section provides information about optional components that are installed at the factory.

Human Interface and Wireless Interface Modules *(Position)*

IP20, NEMA/UL Type 1 and Flange Type Drives

Cat. Code: 0
No HIM (Blank Plate)

Cat. Code: 3
LCD Display, Full Numeric Keypad

IP66, NEMA/UL Type 4X/12 Drives

Cat. Code: 5
LCD Display, Programmer Only

Cat. Code: 0
No HIM (Blank)

Cat. Code: 3
LCD Display, Full Numeric Keypad

Internal Dynamic Brake Resistors

Internal Dynamic Brake Resistors			
Drive Input Voltage	**Brake Resistance W**	**Frame**	**Cat. Code** *(Position h)*
200...240V AC	62	A	Y
		B	Y
		C	Y
	22	D	Y
		E	Not Available
380...480V AC	115	A	Y
		B	Y
		C	Y
	62	D	Y
		E	Not Available
600V AC	115	A	Y
		B	Y
		C	Y
	–	D and E	Not Available

These resistors have a limited duty cycle. See the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor is sufficient. An external resistor may be required.

Internal EMC Filter

Internal EMC Filter			
Drive Voltage	**CE Filter**	**Frame(1)**	**Cat. Code** *(Position i)*
200...240V AC	Optional	B	A
	Standard	C	
	Standard	D	
380...480V AC	Optional	B	A
	Standard	C	
	Standard	D	
	Standard	E	
600V AC (2)	Standard	E	–

(1) Internal CE filters are not available inside of the compact A Frame size. If an A Frame current rating is ordered with an internal filter option, the drive with internal CE filter is supplied in the B Frame to accommodate the additional size.
(2) 600V AC Frames A...D available only without filter.

Internal Communication Adapters

Internal Communication Adapters	Cat. Code *(Position j)*
ControlNet Communication Adapter (Coax)	C
DeviceNet Communication Adapter	D
EtherNet/IP Communication Adapter	E
None	N

Control Options

Control Options(1)	Cat. Code *(Position k)*
Enhanced Control without DriveGuard Safe Torque Off	C
Enhanced Control with DriveGuard Safe Torque Off	G

(1) Drive is not CE EMC/TUV certified when the Safe Torque Off encoder interface option is installed.

Feedback Options

Feedback Options	Cat. Code *(Position k)*
None	0
5V/12V Encoder(1)	1

(1) Drive is not CE EMC certified when the encoder interface option is installed.

Documentation

Documentation	Cat. Code *(Position f)*
Manual	A
No manual	N

User-installed Options

This section provides information about optional components that you can install.

Human Interface and Wireless Interface Modules

No HIM (Blank Plate)
20-HIM-A0

LCD Display, Full Numeric Keypad
20-HIM-A3

LCD Display, Programmer Only
20-HIM-A5

Enhanced LCD Display, Full Numeric Keypad
20-HIM-A6

Remote (Panel Mount) LCD Display, Full Numeric Keypad
20-HIM-C3S

Remote (Panel Mount) LCD Display, Programmer Only
20-HIM-C5S

Enhanced LCD Display, Full Numeric Keypad
20-HIM-C6S

Description	Handheld/Local (Drive Mount) Cat. No.	Remote (Panel Mount) IP66, NEMA/UL Type 4x/12 ∗ Cat. No.
No HIM (Blank Plate)	20-HIM-A0	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3S ‡
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5S ‡
Enhanced LCD Display, Full Numeric Keypad	20-HIM-A6	20-HIM-C6S

∗ For indoor use only.
‡ Includes a 1202-C30 interface cable, 3 m (9.8 ft), for connection to drive.

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA/UL Type 1 ‡	20-HIM-B1
PowerFlex HIM Interface Cable, 1 m (39 in) ⍰	20-HIM-H10
Cable Kit (Male-Female) ➢	
0.33 Meters (1.1 Feet)	1202-H03
1 Meter (3.3 Feet)	1202-H10
3 Meter (9.8 Feet)	1202-H30
9 Meter (29.5 Feet)	1202-H90
Comm Option Cable Kit	
0.33 Meters (1.1 Feet)	1202-C03
1 Meter (3.3 Feet)	1202-C10
3 Meter (9.8 Feet)	1202-C30
9 Meter (29.5 Feet)	1202-C90
DPI Cable Kit with Connectors, Tools and 100 m (328 ft.) Cable	1202-CBL-KIT-100M
DPI Cable Connector Kit	1202-TB-KIT-SET
DPI/SCANport™ One to Two Port Splitter Cable	1203-S03

‡ Includes a 1202-C30 interface cable (3 meters) for connection to drive.
⍰ Required only when HIM is used as handheld or remote.
➢ Required in addition to 20-HIM-H10 for distances up to a total maximum of 10 Meters (32.8 Feet).

Dynamic Brake Resistors

Small Duty Internal Dynamic Brake Resistors

Limited duty resistors mount directly to the back surface of the drive and require no extra panel space. Internal resistors are non-destructive and do not require a resistor overheat external safety circuit.

PowerFlex 70 AC Drive			Small Duty Internal DB Resistor								
								Application Type 1		Application Type 2	
Normal Duty∗ kW (Hp)	Heavy Duty∗ kW (Hp)	Min DB Res Ohms ±10%	Part Number	Resistance ❄ Ohms ±5%	Continuous Power kW	Max Energy kJ	Max Braking Torque % of ND Motor	Braking Torque % of ND Motor	Duty Cycle	Braking Torque % of ND Motor	Duty Cycle
200…240 Volt AC Input Drives											
0.37 (0.5)	0.25 (0.33)	33	20AB-DB1-A	62	0.048	8.3	307%	100%	25.9%	150%	17.3%
0.75 (1.0)	0.55 (0.75)	33	20AB-DB1-A	62	0.048	7.3	300%	100%	12.8%	150%	8.5%
1.5 (2.0)	1.1 (1.5)	33	20AB-DB1-B	62	0.028	0.8	160%	100%	3.7%	150%	2.5%
2.2 (3.0)	1.5 (2.0)	33	20AB-DB1-B	62	0.028	0.8	109%	100%	2.5%	109%	2.3%
4.0 (5.0)	3.0 (3.0)	30	20AB-DB1-C	62	0.040	0.8	60%	60%	3.3%	—	—
5.5 (7.5)	4.0 (5.0)	21	20AB-DB1-D	22	0.036	0.9	117%	100%	1.3%	117%	1.1%
7.5 (10)	5.5 (7.5)	21	20AB-DB1-D	22	0.036	0.9	86%	86%	1.1%	—	—
400…480 Volt AC Input Drives											
0.37 (0.5)	0.25 (0.33)	68	20AD-DB1-A	115	0.048	8.3	320%	100%	25.9%	150%	17.3%
0.75 (1.0)	0.55 (0.75)	68	20AD-DB1-A	115	0.048	9.0	259%	100%	12.8%	150%	8.5%
1.5 (2.0)	1.1 (1.5)	68	20AD-DB1-A	115	0.048	2.4	243%	100%	6.4%	150%	4.3%
2.2 (3.0)	1.5 (2.0)	68	20AD-DB1-B	115	0.028	0.9	206%	100%	2.5%	150%	1.7%
4.0 (5.0)	3.0 (3.0)	68	20AD-DB1-B	115	0.028	0.9	129%	100%	1.4%	129%	1.1%
5.5 (7.5)	4.0 (5.0)	74	20AD-DB1-C	115	0.04	0.9	94%	94%	1.5%	—	—
7.5 (10)	5.5 (7.5)	74	20AD-DB1-C	115	0.04	0.9	69%	69%	1.5%	—	—
11 (15)	7.5 (10)	44	20AD-DB1-D	62	0.036	0.8	87%	87%	0.8%	—	—
15 (20)	11 (15)	31	20AD-DB1-D	62	0.036	0.8	64%	64%	0.8%	—	—
500…600 Volt AC Input Drives											
0.37 (0.5)	0.25 (0.33)	117	20AD-DB1-A	115	0.048	8.3	287%	100%	25.9%	150%	17.3%
0.75 (1.0)	0.55 (0.75)	117	20AD-DB1-A	115	0.048	9.0	263%	100%	12.8%	150%	8.5%
1.5 (2.0)	1.1 (1.5)	117	20AD-DB1-A	115	0.048	2.4	243%	100%	6.4%	150%	4.3%
2.2 (3.0)	1.5 (2.0)	117	20AD-DB1-B	115	0.028	0.9	202%	100%	2.5%	150%	1.7%
4.0 (5.0)	3.0 (3.0)	80	20AD-DB1-B	115	0.028	0.9	193%	100%	1.4%	150%	0.9%
5.5 (7.5)	4.0 (5.0)	80	20AD-DB1-C	115	0.04	0.9	147%	100%	1.5%	147%	1.0%
7.5 (10)	5.5 (7.5)	80	20AD-DB1-C	115	0.04	0.9	108%	100%	1.1%	108%	1.0%
11 (15)	7.5 (10)	48	—	—	—	—	—	—	—	—	—
15 (20)	11 (15)	48	—	—	—	—	—	—	—	—	—

∗ Duty cycle listed is based on full speed to zero speed deceleration. For constant regen at full speed, duty cycle capability is half of what is listed. Application Type 1 represents maximum capability up to 100% braking torque where possible. Application Type 2 represents more than 100% braking torque where possible, up to a maximum of 150%.

❄ Always check resistor ohms against minimum resistance for drive being used.

Internal Dynamic Brake Resistor Kits

Drive Input Voltage	Brake Resistance Ω	Frame	Cat. No.
200…240V AC	62	A	20AB-DB1-A
		B	20AB-DB1-B
		C	20AB-DB1-C
	22	D	20AB-DB1-D
		E	—
380…480V AC	115	A	20AD-DB1-A
		B	20AD-DB1-B
		C	20AD-DB1-C
	62	D	20AD-DB1-D
		E	—
600V AC	115	A	20AD-DB1-A
		B	20AD-DB1-B
		C	20AD-DB1-C
		D and E	—

These resistors have a limited duty cycle. See the PowerFlex Dynamic Braking Resistor Calculator Application Technique, publication PFLEX-AT001, to determine if an internal resistor is sufficient. An external resistor may be required.

Medium Duty External Dynamic Brake Resistors

These resistors provide a larger duty cycle capability than the internal type. Includes an internal thermal switch for use in external safety circuit.

PowerFlex 70 AC Drive			Medium Duty External DB Resistor								
								Application Type 1		Application Type 2	
Normal Duty∗ *kW (Hp)*	Heavy Duty∗ *kW (Hp)*	Min DB Res *Ohms ±10%*	Part Number	Resistance ❄ *Ohms ±5%*	Continuous Power *kW*	Max Energy *kJ*	Max Braking Torque *% of ND Motor*	Braking Torque *% of ND Motor*	Duty Cycle	Braking Torque *% of ND Motor*	Duty Cycle
200…240 Volt ac Input Drives											
0.37 (0.5)	0.25 (0.33)	33	AK-R2-091P500	91	0.086	17	293%	100%	46%	150%	31%
0.75 (1.0)	0.55 (0.75)	33	AK-R2-091P500	91	0.086	17	218%	100%	23%	150%	15%
1.5 (2.0)	1.1 (1.5)	33	AK-R2-091P500	91	0.086	17	109%	100%	11%	109%	11%
2.2 (3.0)	1.5 (2.0)	33	AK-R2-047P500	47	0.166	33	144%	100%	15%	144%	11%
4.0 (5.0)	3.0 (3.0)	30	AK-R2-047P500	47	0.166	33	79%	79%	11%	N/A	N/A
5.5 (7.5)	4.0 (5.0)	23	AK-R2-030P1K2	30	0.26	52	90%	90%	10%	N/A	N/A
7.5 (10)	5.5 (7.5)	23	AK-R2-030P1K2	30	0.26	52	66%	66%	10%	N/A	N/A
400…480 Volt ac Input Drives											
0.37 (0.5)	0.25 (0.33)	68	AK-R2-360P500	360	0.086	17	305%	100%	47%	150%	31%
0.75 (1.0)	0.55 (0.75)	68	AK-R2-360P500	360	0.086	17	220%	100%	23%	150%	15%
1.5 (2.0)	1.1 (1.5)	68	AK-R2-360P500	360	0.086	17	110%	100%	12%	110%	11%
2.2 (3.0)	1.5 (2.0)	68	AK-R2-120P1K2	120	0.26	52	197%	100%	24%	150%	16%
4.0 (5.0)	3.0 (3.0)	68	AK-R2-120P1K2	120	0.26	52	124%	100%	13%	124%	10%
5.5 (7.5)	4.0 (5.0)	74	AK-R2-120P1K2	120	0.26	52	90%	90%	10%	N/A	N/A
7.5 (10)	5.5 (7.5)	74	AK-R2-120P1K2	120	0.26	52	66%	66%	10%	N/A	N/A
11 (15) ‡	7.5 (10) ‡	44	‡	60	0.52	104	90%	90%	10%	N/A	N/A
15 (20) ‡	11 (15) ‡	31	‡	60	0.52	104	66%	66%	10%	N/A	N/A
500…600 Volt ac Input Drives											
0.37 (0.5)	0.25 (0.33)	117	AK-R2-360P500	360	0.086	17	274%	100%	46%	150%	31%
0.75 (1.0)	0.55 (0.75)	117	AK-R2-360P500	360	0.086	17	251%	100%	23%	150%	15%
1.5 (2.0)	1.1 (1.5)	117	AK-R2-360P500	360	0.086	17	172%	100%	11%	150%	8%
2.2 (3.0)	1.5 (2.0)	117	AK-R2-120P1K2	120	0.26	52	193%	100%	24%	150%	16%
4.0 (5.0)	3.0 (3.0)	80	AK-R2-120P1K2	120	0.26	52	185%	100%	13%	150%	9%
5.5 (7.5)	4.0 (5.0)	80	AK-R2-120P1K2	120	0.26	52	141%	100%	9%	141%	7%
7.5 (10)	5.5 (7.5)	80	AK-R2-120P1K2	120	0.26	52	103%	100%	7%	103%	7%
11 (15) ‡	7.5 (10) ‡	48	‡	60	0.52	104	141%	100%	9%	141%	7%
15 (20) ‡	11 (15) ‡	48	‡	60	0.52	104	103%	100%	7%	103%	7%

∗ Duty cycle listed is based on full speed to zero speed deceleration. For constant regen at full speed, duty cycle capability is half of what is listed. Application Type 1 represents maximum capability up to 100% braking torque where possible. Application Type 2 represents more than 100% braking torque where possible, up to a maximum of 150%.

❄ Always check resistor ohms against minimum resistance for drive being used.

‡ For 11 and 15 kW (15 and 20 Hp) applications, use two 7.5 kW (10 Hp) size resistors wired in parallel.

External Dynamic Brake Resistor Kits

Drive Input Voltage	Brake Resistance Ω	Continuous Power W	Cat. No.
200…240V AC	30	260	AK-R2-030P1K2
	47	166	AK-R2-047P500
	91	86	AK-R2-091P500
480…600V AC	120	260	AK-R2-120P1K2
	360	86	AK-R2-360P500

Communication Options

The sections that follow describe the communication options that are available.

Communication Option Kits

Description	Cat. No.
BACnet® MS/TP RS-485 Communication Adapter	20-COMM-B
ControlNet Communication Adapter (Coax)	20-COMM-C
DeviceNet Communication Adapter	20-COMM-D
EtherNet/IP Communication Adapter	20-COMM-E
Dual-port EtherNet/IP Communication Adapter	20-COMM-ER
HVAC Communication Adapter	20-COMM-H
CANopen® Communication Adapter	20-COMM-K
LonWorks® Communication Adapter	20-COMM-L
Modbus/TCP Communication Adapter	20-COMM-M
PROFIBUS™ DP Communication Adapter	20-COMM-P
ControlNet Communication Adapter	20-COMM-Q
RS-485 DF1 Communication Adapter	20-COMM-S
External Communications Kit Power Supply	20-XCOMM-AC-PS1
DPI External Communications Kit	20-XCOMM-DC-BASE
External DPI I/O Option Board(1)	20-XCOMM-IO-OPT1
Compact I/O™ Module (3 Channel)	1769-SM1
Serial Null Modem Adapter	1203-SNM
Smart Self-powered Serial Converter (RS-232) includes 1203-SFC and 1202-C10 cables	1203-SSS
Universal Serial Bus (USB) Converter includes 2 m (6.5 ft) USB, 20-HIM-H10, and 22-HIM-H10 cables	1203-USB

(1) For use only with DPI External Communications Kits 20-XCOMM-DC-BASE.

Other Options

Description	Cat. No.
DriveGuard Safe Torque Off Board	20A-DG01
5V/12V Encoder(1)	20A-ENC-1
115V AC Interface	AK-M9-115VAC-1
Frame E Flange Gasket	AK-M9-GASKET1-E4
Service Connection Board(2)	SK-M9-SCB1

(1) Drive is not CE EMC certified when the encoder interface option is installed.
(2) Provides temporary DPI/HIM connection for NEMA/UL Type 1 and Flange drives with cover removed.

Terminators

Description(1)	Cat. No.
for use with 3.7 kW (5 HP) and below drives	1204-TFA1
for use with 1.5 kW (2 Hp) and up drives	1204-TFB2

(1) For selection information, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001, Appendix A.

Reflected Wave Reduction Modules

Description(1)	Cat. No.
17 A with Common Mode Choke	1204-RWC-17-A
9 A without Choke, Book Mount(2)	1204-RWR2-09-B
9 A without Choke, Stack Mount(2)	1204-RWR2-09-C

(1) For selection information, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001, Appendix A.
(2) 1321-RWR products replace existing 1204-RWR products, 1204-RWRC modules (RWR and Common Mode Choke assembly) are still available.

Reflective Wave Reduction Devices

480V, 60 Hz, Three-phase (1)		
Drive Cat. No.	**kW (Hp)**	**RWR Filter Cat. No.**
20AD1P1-ND	0.37 (0.5)	–
20AD2P1-ND	0.75 (1.0)	–
20AD3P4-ND	1.5 (2.0)	–
20AD5P0-ND	2.2 (3.0)	–
20AD8P0-ND	4.0 (5.0)	1321-RWR8-DP
20AD011-ND	5.5 (7.5)	1321-RWR12-DP
20AD014-ND	7.5 (10)	1321-RWR18-DP
20AD022-ND	11 (15)	1321-RWR25-DP
20AD027-ND	15 (20)	1321-RWR35-DP
20AD034-ND	18.5 (25)	1321-RWR35-DP
20AD040-ND	22 (30)	1321-RWR45-DP
20AD052-ND	30 (40)	1321-RWR55-DP
20AD065-ND	37 (50)	1321-RWR80-DP

600V, 60 Hz, Three-phase (1)		
Drive Cat. No.	**kW (Hp)**	**RWR Filter Cat. No.**
20AE0P9-ND	0.37 (0.5)	–
20AE1P7-ND	0.75 (1.0)	–
20AE2P7-ND	1.5 (2.0)	–
20AE3P9-ND	2.2 (3.0)	–
20AE6P1-ND	4.0 (5.0)	1321-RWR8-EP
20AE9P0-ND	5.5 (7.5)	1321-RWR12-EP
20AE011-ND	7.5 (10)	1321-RWR18-EP
20AE017-ND	11 (15)	1321-RWR25-EP
20AE022-ND	15 (20)	1321-RWR35-EP
20AE027-ND	18.5 (25)	1321-RWR45-EP
20AE032-ND	22 (30)	1321-RWR55-EP
20AE041-ND	30 (40)	1321-RWR80-EP
20AE052-ND	37 (50)	1321-RWR100-EP

(1) 1321-RWR devices are used at the output of the drive to reduce dv/dt and motor terminal peak voltages

Isolation Transformers

For installations that have specific types of AC supply configurations or require drive protection due to AC line disturbances, isolation transformers are available. The isolation transformers are IP32, NEMA/UL Type 3R Standalone, 4...6% Nominal Impedance.

Motor Rating		240V, 60 Hz, Three-phase, 240V Primary, and 240V Secondary	460V, 60 Hz, Three-phase, 460V Primary, and 460V Secondary	575V, 60 Hz, Three-phase, 575V Primary, and 575V Secondary
kW	**Hp**	**Cat. No.**	**Cat. No.**	**Cat. No.**
0.25	0.33	–	1321-3TW005-BB	–
0.37	0.5	–	1321-3TW005-BB	1321-3TW005-CC
0.55	0.75	–	1321-3TW005-BB	–
0.75	1.0	–	1321-3TW005-BB	1321-3TW005-CC
1.1	1.5	–	1321-3TW005-BB	–
1.5	2.0	–	1321-3TW005-BB	1321-3TW005-CC
2.2	3.0	–	1321-3TW005-BB	1321-3TW005-CC
4.0	5.0	1321-3TW007-AA	1321-3TW007-BB	1321-3TW007-CC
5.5	7.5	1321-3TW011-AA	1321-3TW011-BB	1321-3TW011-CC
7.5	10	1321-3TW014-AA	1321-3TW014-BB	1321-3TW014-CC
11	15	1321-3TW020-AA	1321-3TW020-BB	1321-3TW020-CC
15	20	1321-3TW027-AA	1321-3TW027-BB	1321-3TW027-CC
18.5	25	1321-3TW034-AA	1321-3TW034-BB	1321-3TW034-CC
22	30	–	1321-3TW040-BB	1321-3TW040-CC
30	40	–	1321-3TW051-BB	1321-3TW051-CC
37	50	–	1321-3TH063-BB	1321-3TH063-CC

Input Line Reactors and Output Line Reactors

For impedance matching, protection from AC line disturbances or motor protection, reactors are available for both the input and output sides of the drive.

240V, 60 Hz, Three-phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor (1)		Output Line Reactor (1)	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AB2P2	Heavy-Duty	0.33	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20AB2P2	Normal-Duty	0.5	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20AB4P2	Heavy-Duty	0.75	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20AB4P2	Normal-Duty	1	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20AB6P8	Heavy-Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-A	1321-3RA8-A
20AB6P8	Normal-Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R8-A	1321-3RA8-A
20AB9P6	Heavy-Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R12-A	1321-3RA12-A
20AB9P6	Normal-Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R12-A	1321-3RA12-A
20AB015	Heavy-Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R18-A	1321-3RA18-A
20AB015	Normal-Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R18-A	1321-3RA18-A
20AB022	Heavy-Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R25-A	1321-3RA25-A
20AB022	Normal-Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R25-A	1321-3RA25-A
20AB028	Heavy-Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R35-A	1321-3RA35-A
20AB028	Normal-Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R35-A	1321-3RA35-A
20AB042	Heavy-Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R45-A	1321-3RA45-A
20AB042	Normal-Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R45-A	1321-3RA45-A
20AB054	Heavy-Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R55-A	1321-3RA55-A
20AB054	Normal-Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R55-A	1321-3RA55-A
20AB070	Heavy-Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R80-A	1321-3RA80-A
20AB070	Normal-Duty	25	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

240V, 60 Hz, Three-phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor (1)		Output Line Reactor (1)	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AB2P2	Heavy-Duty	0.33	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20AB2P2	Normal-Duty	0.5	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20AB4P2	Heavy-Duty	0.75	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20AB4P2	Normal-Duty	1	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20AB6P8	Heavy-Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20AB6P8	Normal-Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20AB9P6	Heavy-Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20AB9P6	Normal-Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20AB015	Heavy-Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20AB015	Normal-Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20AB022	Heavy-Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20AB022	Normal-Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20AB028	Heavy-Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R35-B	1321-3RA35-B
20AB028	Normal-Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20AB042	Heavy-Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20AB042	Normal-Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20AB054	Heavy-Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20AB054	Normal-Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20AB070	Heavy-Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20AB070	Normal-Duty	25	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

480V, 60 Hz, Three-phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor [1]		Output Line Reactor [1]	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AD1P1	Heavy Duty	0.33	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20AD1P1	Normal Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20AD2P1	Heavy Duty	0.75	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20AD2P1	Normal Duty	1	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20AD3P4	Heavy Duty	1.5	1321-3R4-C	1321-3RA4-C	1321-3R4-B	1321-3RA4-B
20AD3P4	Normal Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20AD5P0	Heavy Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R8-C	1321-3RA8-C
20AD5P0	Normal Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AD8P0	Heavy Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-B	1321-3RA8-B
20AD8P0	Normal Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20AD011	Heavy Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20AD011	Normal Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20AD014	Heavy Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20AD014	Normal Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20AD022	Heavy Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20AD022	Normal Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20AD027	Heavy Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20AD027	Normal Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R25-B	1321-3RA25-B
20AD034	Heavy Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20AD034	Normal Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20AD040	Heavy Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20AD040	Normal Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20AD052	Heavy Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20AD052	Normal Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20AD065	Heavy Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20AD065	Normal Duty	50	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

480V, 60 Hz, Three-phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor [1]		Output Line Reactor [1]	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AD1P1	Heavy Duty	0.33	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20AD1P1	Normal Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20AD2P1	Heavy Duty	0.75	1321-3R2-C	1321-3RA2-C	1321-3R2-B	1321-3RA2-B
20AD2P1	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20AD3P4	Heavy Duty	1.5	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20AD3P4	Normal Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20AD5P0	Heavy Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20AD5P0	Normal Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20AD8P0	Heavy Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-C	1321-3RA8-C
20AD8P0	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AD011	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20AD011	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20AD014	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20AD014	Normal Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20AD022	Heavy Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R25-C	1321-3RA25-C
20AD022	Normal Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20AD027	Heavy Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20AD027	Normal Duty	20	1321-3R35-C[2]	1321-3RA35-C[2]	1321-3R25-C	1321-3RA25-C
20AD034	Heavy Duty	20	1321-3R35-C[2]	1321-3RA35-C[2]	1321-3R35-C	1321-3RA35-C
20AD034	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20AD040	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R45-C	1321-3RA45-C
20AD040	Normal Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20AD052	Heavy Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20AD052	Normal Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
20AD065	Heavy Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R80-C	1321-3RA80-C
20AD065	Normal Duty	50	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.
(2) 4% impedance.

600V, 60 Hz, Three-phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor (1)		Output Line Reactor (1)	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AE0P9	Heavy Duty	0.33	1321-3R1-C	1321-3RA1-C	1321-3R1-B	1321-3RA1-B
20AE0P9	Normal Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R1-B	1321-3RA1-B
20AE1P7	Heavy Duty	0.5	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20AE1P7	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20AE2P7	Heavy Duty	1	1321-3R2-A	1321-3RA2-A	1321-3R4-D	1321-3RA4-D
20AE2P7	Normal Duty	2	1321-3R4-C	1321-3RA4-C	1321-3R4-D	1321-3RA4-D
20AE3P9	Heavy Duty	2	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20AE3P9	Normal Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20AE6P1	Heavy Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R8-C	1321-3RA8-C
20AE6P1	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AE9P0	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20AE9P0	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20AE011	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-B	1321-3RA12-B
20AE011	Normal Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20AE017	Heavy Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20AE017	Normal Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20AE022	Heavy Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20AE022	Normal Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20AE027	Heavy Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R35-C	1321-3RA35-C
20AE027	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20AE032	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-B	1321-3RA35-B
20AE032	Normal Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20AE041	Heavy Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20AE041	Normal Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20AE052	Heavy Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20AE052	Normal Duty	50	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

600V, 60 Hz, Three-phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor (1)		Output Line Reactor (1)	
			IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)	IP00 (NEMA / UL Type Open)	IP11 (NEMA / UL Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20AE0P9	Heavy Duty	0.33	1321-3R1-A	1321-3RA1-A	1321-3R1-B	1321-3RA1-B
20AE0P9	Normal Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R1-B	1321-3RA1-B
20AE1P7	Heavy Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20AE1P7	Normal Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R2-C	1321-3RA2-C
20AE2P7	Heavy Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R4-D(2)	1321-3RA4-D(2)
20AE2P7	Normal Duty	2	1321-3R4-D(2)	1321-3RA4-D(2)	1321-3R4-D(2)	1321-3RA4-D(2)
20AE3P9	Heavy Duty	2	1321-3R4-D(2)	1321-3RA4-D(2)	1321-3R4-D	1321-3RA4-D
20AE3P9	Normal Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20AE6P1	Heavy Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20AE6P1	Normal Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20AE9P0	Heavy Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R12-C(2)	1321-3RA12-C(2)
20AE9P0	Normal Duty	7.5	1321-3R12-C(2)	1321-3RA12-C(2)	1321-3R12-C(2)	1321-3RA12-C(2)
20AE011	Heavy Duty	7.5	1321-3R12-C(2)	1321-3RA12-C(2)	1321-3R12-C	1321-3RA12-C
20AE011	Normal Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20AE017	Heavy Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20AE017	Normal Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20AE022	Heavy Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R25-C(2)	1321-3RA25-C(2)
20AE022	Normal Duty	20	1321-3R25-C(2)	1321-3RA25-C(2)	1321-3R25-C(2)	1321-3RA25-C(2)
20AE027	Heavy Duty	20	1321-3R25-C(2)	1321-3RA25-C(2)	1321-3R35-C(2)	1321-3RA35-C(2)
20AE027	Normal Duty	25	1321-3R35-C(2)	1321-3RA35-C(2)	1321-3R35-C(2)	1321-3RA35-C(2)
20AE032	Heavy Duty	25	1321-3R35-C(2)	1321-3RA35-C(2)	1321-3R35-C(2)	1321-3RA35-C(2)
20AE032	Normal Duty	30	1321-3R35-C(2)	1321-3RA35-C(2)	1321-3R35-C(2)	1321-3RA35-C(2)
20AE041	Heavy Duty	30	1321-3R35-C(2)	1321-3RA35-C(2)	1321-3R45-C	1321-3RA45-C
20AE041	Normal Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20AE052	Heavy Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20AE052	Normal Duty	50	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C

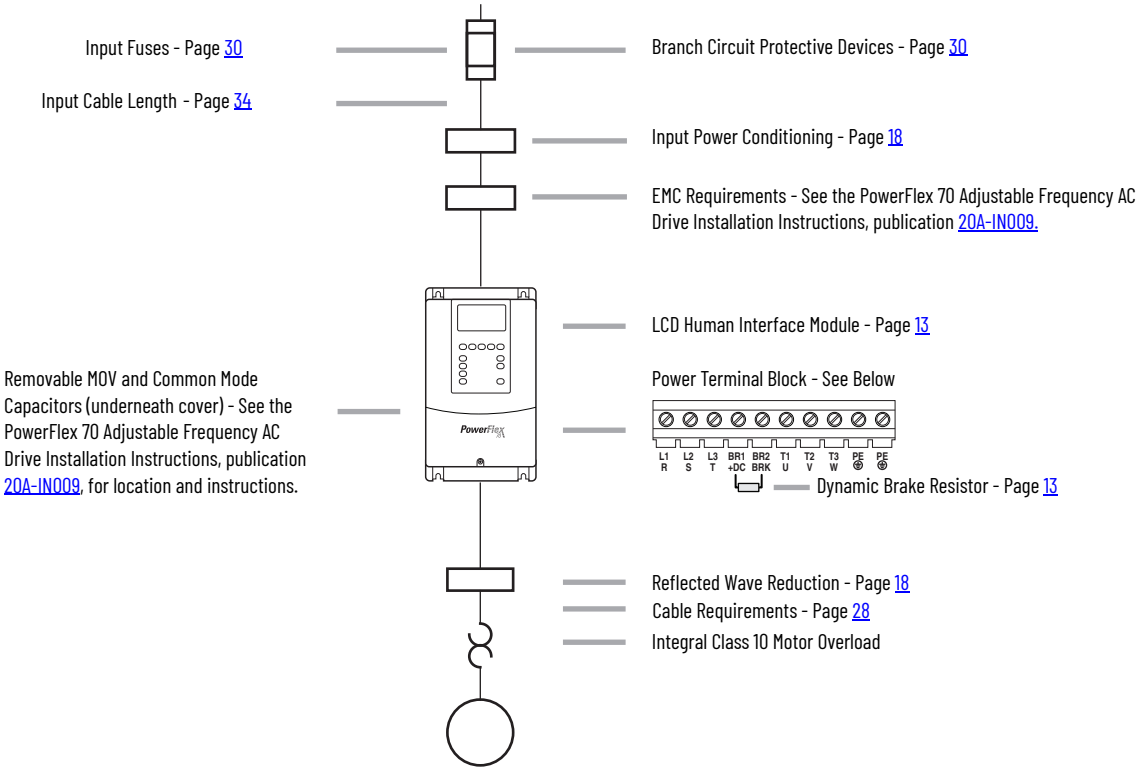
(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.
(2) 4% impedance.

Installation Power Wiring

The PowerFlex 70 has the following built in protective features to help simplify installation:

- Ground fault protection during startup and running helps verify reliability
- Electronic motor overload protection increases motor life
- Removable MOV to ground and common mode capacitors to ground verify compatibility with ungrounded systems. These devices must be disconnected if the drive is installed on an ungrounded, high-resistance, or B phase grounded distribution system. These devices must also be disconnected if a regenerative unit is used as a bus supply or brake.
- 6 kV transient protection increased robustness for 380...480V system voltages

There are many other factors that must be considered for optimal performance in any given application. The following block diagram highlights the primary installation considerations. Consult Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for detailed recommendations on input power conditioning, dynamic braking, reflected wave protection, and motor cables types.



Terminal Blocks

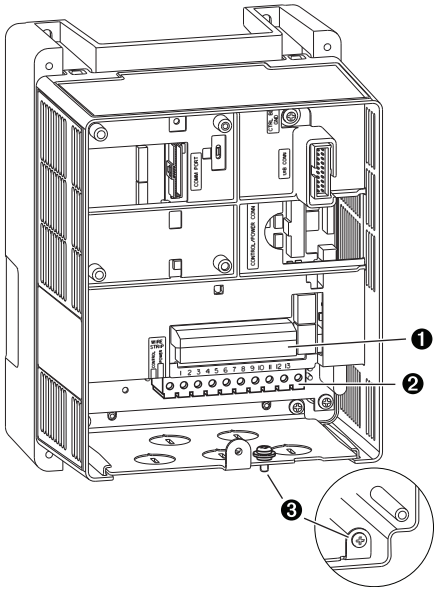
Terminal Block Specifications

No.	Name	Description	Frame	Wire Size Range[1]		Torque	
				Max, mm^2 (AWG)	Min, mm^2 (AWG)	Max, N•m (lb•in)	Recommended, N•m (lb•in)
❶	I/O terminal block	Signal and control connections	All	1.5 (16)	0.05 (30)	0.55 (4.9)	0.5 (4.4)
❷	Power terminal block	Input power and motor connections	A, B, and C	3.5 (12)	0.3 (22)	0.66 (5.5)	0.6 (5)
			D	8.4 (8)	0.8 (18)	1.7 (15)	1.4 (12)
			E	25.0 (3)	2.5 (14)	2.71 (24)	2.71 (24)
❸	SHLD terminal	Terminating point for wiring shields	All	—	—	1.6 (14)	1.6 (14)

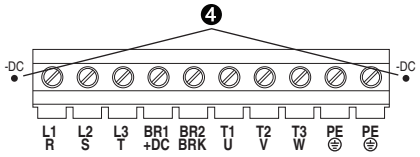
(1) These are the maximum/minimum sizes that the terminal block accepts, not recommendations.

Terminal	Description	Notes
BR1 BR2	DC brake (+) DC brake (–)	dB resistor connection - **Important:** Do not connect both an internal and external dB resistor simultaneously. This can violate the minimum allowed dB resistance and cause drive damage.
+DC –DC	DC bus (+) DC bus (–)	❹ Test point on Frames A...D on the left or right of the power terminal block. Frame E has a dedicated terminal.
PE	PE ground	—
U, V, W	U (T1), V (T2), W (T3)	To the motor
R, S, T	R (L1), S (L2), T (L3)	AC line input power

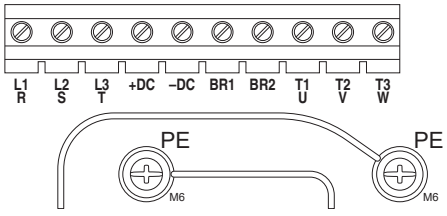
Typical Terminal Block Location



Power Terminals

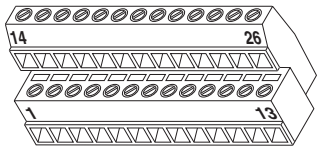


Frames A...D



Frame E

Control Terminals

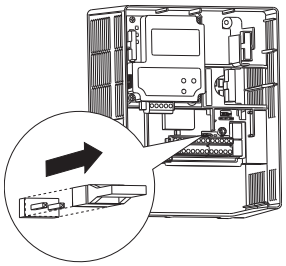


No.	Signal	Factory Default	Description	Related Parameters
1	Digital In 1	Stop – CF (CF = clear fault)	11.2 mA at 24V DC 19.2V min on state 3.2V max off state Important: Use only 24V DC, not suitable for 115V AC circuitry.(3) Inputs can be wired as sink or source.	361...366
2	Digital In 2	Start		
3	Digital In 3	Auto/Man		
4	Digital In 4	Speed Sel 1		
5	Digital In 5	Speed Sel 2		
6	Digital In 6	Speed Sel 3		
7	24V Common	–	Drive supplied power for digital In1...6 inputs only. Not intended for use on circuits outside of the drive. See examples beginning on page 27. 150 mA max load.	
8	Digital In Common	–		
9	+24V DC	–		
10	+10V Pot Reference	–	2 kΩ min load.	
11	Digital Out 1 – N.O.(1)	NOT Fault	Max Resistive Load 250V AC / 30V DC 50VA / 60 Watts Min DC Load 10 µA, 10 mV DC Max Inductive Load 250V AC / 30V DC 25VA / 30 Watts	380...387
12	Digital Out 1 Common			
13	Digital Out 1 – N.C.(1)	Fault		
14	Analog In 1 (– Volts)	(2) Voltage – Reads value at 14 & 15	Non-isolated, 0...10V, 10 bit, 100 kΩ input impedance.(4)	320...327
15	Analog In 1 (+ Volts)			
16	Analog In 1 (– Current)		Non-isolated, 4...20 mA, 10 bit, 100 Ω input impedance.(4)	
17	Analog In 1 (+ Current)			
18	Analog In 2 (– Volts)	(2) Voltage – Reads value at 18 & 19	Isolated, bipolar, differential, 0...10V unipolar (10 bit) or ±10V bipolar (10 bit and sign), 100 kΩ input impedance.(5)	
19	Analog In 2 (+ Volts)			
20	Analog In 2 (– Current)		Isolated, 4...20mA, 10 bit and sign, 100 Ω input impedance.(5)	
21	Analog In 2 (+ Current)			
22	10V Pot Common Analog Out (– Volts) Analog Out (– Current)	(2) Output Freq	0...10V, 10 bit, 10 kΩ (2 kΩ min) load. 0...20 mA, 10 bit, 400 Ω max load.(6) Referenced to chassis ground. Common if internal 10V supply (terminal 10) is used.	340...344
23	Analog Out (+ Volts) Analog Out (+ Current)			
24	Digital Out 2 – N.O.(1)	Run	See description at Numbers 11...13.	380...387
25	Digital Out 2 Common			
26	Digital Out 2 – N.C.(1)	NOT Run		

(1) Contacts shown in unpowered state. Any relay that is programmed as Fault or Alarm is energized (pick up) when power is applied to the drive and de-energize (drop out) when a fault or alarm exists. Relays selected for other functions are energized only when that condition exists and are de-energize when that condition is removed.
(2) These inputs/outputs are dependent on a number of parameters. For information on related parameters, see publication, 20A-UM001.
(3) For use with 115V AC circuitry. A 115V AC interface option (AK-M9-115VAC-1) must be used
(4) Differential isolation - external source must be less than 10V with respect to PE.
(5) Differential isolation - external source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.
(6) Analog output current is only available with enhanced control drives.

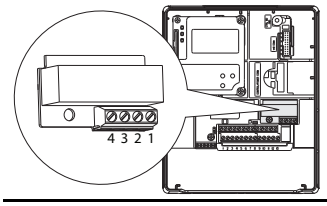
Hardware Enable Circuitry

By default, you can program a digital input as an enable input. Drive software interprets the status of this input. If the application requires the drive to be disabled without software interpretation, a hardware enable configuration can be used. To set up a hardware enable configuration, use the following procedure:



1. Remove the drive cover.
2. On the main control board, locate and remove the enable jumper (ENBL JMP).
3. Wire the enable input to Digital In 6.
4. Verify that 366 [Digital In6 Sel] is set to option 1 Enable.

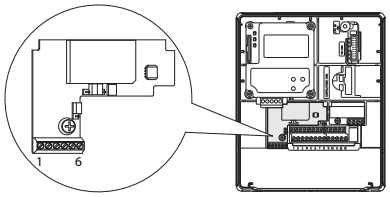
Safe Torque Off Board Terminal Block

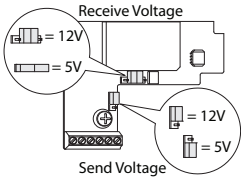


No.	Signal	Description
1	Monitor - N.C.	Normally closed contacts for monitoring relay status. Max resistive load: 250V AC / 30V DC / 50V AC / 60 W Max inductive load: 250V AC / 30V DC / 25V AC/ 30 W
2	Common - N.C.	
3	+24V DC	Connections for user-supplied power to energize coil.
4	24V common	

For detailed connection examples, refer to the DriveGuard Safe Torque Off Option (Series B) for PowerFlex 40P and PowerFlex 70 Enhanced Control AC Drives User Manual, publication PFLEX-UM003.

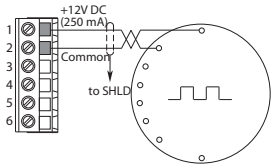
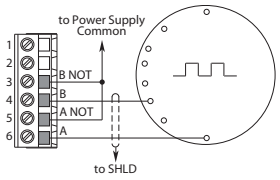
Encoder Interface Terminal Block

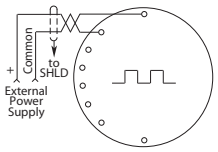
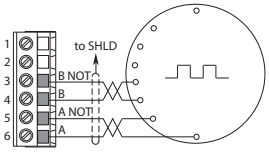


No.	Signal	Description	Jumper Settings
1	5...12V power(1)	Internal power source 250 mA (isolated)	
2	Power return		
3	Encoder B (NOT)	Single channel or quadrature B input.	
4	Encoder B		
5	Encoder A (NOT)	Single channel or quadrature A input.	
6	Encoder A		

(1) Jumper selectable +5...12V is available on 20A-ENC-1 encoder boards.

Sample Encoder Wiring

I/O	Connection Example
Encoder Power – Internal Drive Power Internal (drive) 12V DC, 250 mA	
Encoder Signal – Single-Ended, Dual Channel	

I/O	Connection Example
Encoder Power – External Power Source	
Encoder Signal – Differential, Dual Channel	

EMC Filters

Description	Factory-installed (Position 13)
Internal 3-phase 200...480 filter	A

The following two tables provide the catalog number codes for EMC filters, and the current ratings and voltages where filters are used. These tables are also provided in the Catalog Number Explanation on page 6.

Emission Class	
Code	**Rating**
A	Filtered
N	Not Filtered

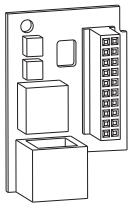
Emission Class by Frame Current Rating (A...E) and Voltage					
	A(1)(2)	**B(2)**	**C**	**D**	**E**
240V	A or N	A or N	A	A	A
400V	A or N	A or N	A	A	A
480V	A or N	A or N	A	A	A
600V	N	N	N	N	A

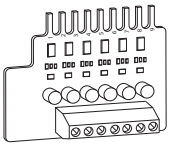
(1) If a filter is used with a Frame A current rating, the drive with internal filter is supplied in the B Frame to accommodate the additional size.
(2) "A or N" indicates that filtering is optional.

Other Options

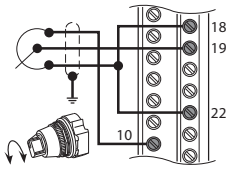
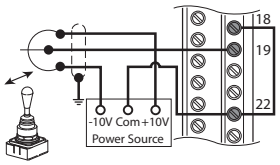
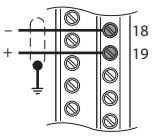
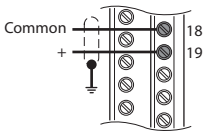
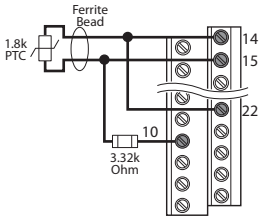
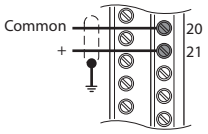
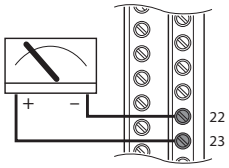
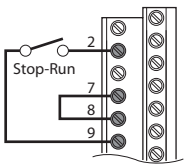
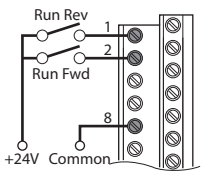
Description	Catalog No.
	User-installed
Service connection board(1)	SK-M9-SCB1
115V AC interface card	AK-M9-115VAC-1
Frame E flange gasket	AK-M9-GASKET1-E4

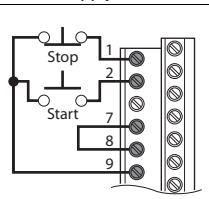
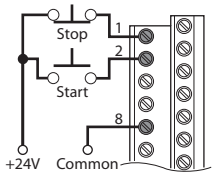
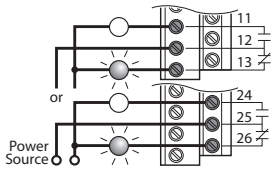
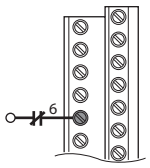
(1) Provides temporary DPI/HIM connection for NEMA 1 and flange drives with cover removed.


Service Connection Board
SK-M9-SCB1


115V Interface Card
AK-M9-115VAC-1

I/O Wiring Examples

Input/Output	Connection Example	Required Parameter Settings
Potentiometer Unipolar Speed Reference 10 kΩ Pot. Recommended (2 kΩ min)		Select Speed Reference source: Param. 090 = 1 "Analog In 2" Adjust Scaling: Param. 091, 092, 322, 323 Check Results: Param. 016
Joystick Bipolar Speed Reference ±10V Input		Set Direction Mode: Param. 190 = 1 "Bipolar" Adjust Scaling: Param. 091, 092, 325, 326 Check Results: Param. 017
Analog Input Bipolar Speed Reference ±10V Input		Adjust Scaling: Param. 091, 092, 325, 326 Check Results: Param. 017
Analog Input Unipolar Speed Reference 0V...+10V Input		Adjust Scaling: Param. 091, 092, 325, 326 Check Results: Param. 017
Analog Input, PTC PTC OT set > 5V PTC OT cleared < 4V PTC Short < 0.2V		Set Fault Config 1: Param. 238, Bit #7 = 1 "Enabled" Set Alarm Config 1: Param. 259, Bit #11 = 1 "Enabled"
Analog Input Unipolar Speed Reference 4...20 mA Input		Configure Input for Current: Param. 320, Bit #1 = 1 "Current" Adjust Scaling: Param. 091, 092, 325, 326 Check Results: Param. 017
Analog Output Unipolar 0V ...+10V Output. Can Drive a 2 kΩ load (25 mA short circuit limit)		Select Source Value: Param. 342 Adjust Scaling: Param. 343, 344
2-Wire Control Nonreversing	Internal Supply 	Disable Digital Input 1: Param. 361 = 0 "Not Used" Set Digital Input 2: Param. 362 = 7 "Run"
2-Wire Control Reversing	External Supply 	Set Digital Input 1: Param. 361 = 8 "Run Forward" Set Digital Input 2: Param. 362 = 9 "Run Reverse"

Input/Output	Connection Example	Required Parameter Settings
3-Wire Control	Internal Supply 	Use factory default parameter settings.
3-Wire Control	External Supply 	Use factory default parameter settings.
Digital Output Form C Relays Energized in Normal State.		Select Source: Param. 380, 384
Enable Input Shown in enabled state.		Configure with parameter 366 For dedicated hardware Enable: Remove Enable Jumper (ENBL JMP) on the Main Control Board.

Cable Recommendations

Cable Types Acceptable for 200...600V Installations

Various cable types are acceptable for drive installations. For many installations, unshielded cable is adequate, provided it can be separated from sensitive circuits. As an approximate guide, allow a spacing of 0.3 m (1 ft) for every 10 m (32.8 ft) of length. In all cases, long parallel runs must be avoided. Do not use cable with an insulation thickness less than or equal to 15 mils (0.4 mm/0.015 in.). Use copper wire only. Wire gauge requirements and recommendations are based on 75 °C (167 °F). Do not reduce wire gauge when using higher temperature wire. See 208/240V AC Three-phase Input Drive Ratings and Input Protection Devices on page 30.

Unshielded

The following wire types are acceptable for drive installation in dry environments, as long as adequate free air space and/or conduit fill rate limits are provided: Thermoplastic High Heat-resistant Nylon-coated (THHN), Thermoplastic Heat and Water-resistant Nylon-coated (THWN), or similar wire. The wire must have a minimum insulation thickness of 15 mils (0.4 mm/0.015 in.) and cannot have large variations in insulation concentricity.

IMPORTANT Do not use THHN or similarly coated wire in wet areas.

Shielded/Armored Cable

Shielded cable has the general benefits of multi-conductor cable. It also has the benefit of a copper braided shield that can contain much of the noise that a typical AC Drive generates. Use shielded cable for installations with sensitive equipment such as weigh scales, capacitive proximity switches, and other devices that can be affected by electrical noise in the distribution system. Applications with large numbers of drives in a similar location, imposed EMC regulations, or a high degree of communications/networking are also good candidates for shielded cable.

Shielded cable can also help reduce shaft voltage and induced bearing currents for some applications. In addition, the increased impedance of shielded cable can help extend the distance that the motor can be from the drive without the addition of motor protective devices, such as terminator networks. See Reflected Wave in Wiring and Grounding Guidelines for PWM AC Drives, publication DRIVES-IN001.

Consider the general specifications of the environment of the installation, including temperature, flexibility, moisture characteristics, and chemical resistance. A braided shield can be included. If included, the braided shield is to be specified by the cable manufacturer as having coverage of at least 75%. An additional foil shield can greatly improve noise containment.

A good example of recommended cable is Belden 295*xx* (*xx* determines gauge). This cable has four Cross-linked Polyethylene (XLPE) insulated conductors with a 100% coverage foil and an 85% coverage copper braided shield (with drain wire) surrounded by a Polyvinyl Chloride (PVC) jacket.

Other types of shielded cable are available, but the use of these types can limit the allowable cable length. For example, some of the newer cables bundle four conductors of THHN wire and wrap them tightly with a foil shield. This type of construction can greatly increase the cable charging current that is required and reduce the overall drive performance. Unless specified in the individual distance tables as tested with the drive, these cables are not recommended and their performance against the lead length limits is not known.

Recommended Shielded Wire

Location	Rating/Type	Description
Standard (option 2)	Tray rated 600V, 90 °C (194 °F) RHH/RHW-2 Anixter OLF-7*xxxxx* or equivalent	Three tinned copper conductors with XLPE insulation. 5 mil single helical copper tape (25% overlap min) with three bare copper grounds in contact with the shield. PVC jacket.
Class I and II; Division I and II	Tray rated 600V, 90 °C (194 °F) RHH/RHW-2 Anixter 7V-7*xxxx*-3G or equivalent	Three bare copper conductors with XLPE insulation and impervious corrugated continuously welded aluminum armor. Black sunlight resistant PVC jacket overall. Three copper grounds on #10 AWG and smaller.

ATTENTION: To avoid a possible shock hazard that is caused by induced voltages, unused wires in the conduit must be grounded at both ends. Also, if a drive sharing a conduit is being serviced or installed, disable all of the drives that are using that conduit. Disabling all of the drives that are using that conduit helps minimize the possible shock hazard from cross coupled motor leads.

Maximum Motor Cable Lengths

For information on maximum motor cable lengths, see the Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001.

Power Ratings and Branch Circuit Protection

See the tables in this section for power ratings and branch circuit protection information.

Single-phase Input Power

The PowerFlex 70 drive is typically used with a three-phase input supply. Single-phase operation of the drive is rated under the UL 508C listing. Rockwell Automation has verified that single-phase operation can be performed with output current that is derated by 50% of the three-phase ratings that are identified in the tables in this section.

208/240V AC Three-phase Input Drive Ratings and Input Protection Devices

Cat.No.	Frame(1)	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range(4)(5)			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min(6)	Max(7)	Min(6)	Max(7)	Max(8)	Max(8)	Available Catalog Numbers(9)			Minimum Enclosure Volume (in.3)(10)
208V AC Input																		
20AB2P2	A	0.5	0.33	2.9	1.1	2.5	2.7	3.7	6	6	6	10	15	7	140M-C2E-B40	140M-D8E-B40	–	3441
20AB4P2	A	1	0.75	5.6	2	4.8	5.5	7.4	10	10	10	17.5	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AB6P8	B	2	1.5	10	3.6	7.8	10.3	13.8	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AB9P6	B	3	2	14	5.1	11	12.1	16.5	20	25	20	40	40	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB015	C	5	3	16	5.8	17.5	19.2	26.6	20	35	20	70	70	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	3441
20AB022	D	7.5	5	23.3	8.3	25.3	27.8	37.9	30	50	30	100	100	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AB028	D	10	7.5	29.8	10.7	32.2	37.9	50.6	40	70	40	125	125	50	–	–	140M-F8E-C32	5098
20AB042	D	15	10	39.8	14.3	43	55.5	74	60	100	60	175	175	70	–	–	140M-F8E-C45	5098
20AB054	E	20	15	57.5	20.7	62.1	72.4	96.6	80	125	80	200	200	100	–	–	–	–
20AB070	E	25	20	72.3	26.0	78.2	93.1	124	90	175	90	300	300	100	–	–	–	–
240V AC Input																		
20AB2P2	A	0.5	0.33	2.5	1.1	2.2	2.4	3.3	3	4.5	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	3441
20AB4P2	A	1	0.75	4.8	2	4.2	4.8	6.4	6	9	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AB6P8	B	2	1.5	8.7	3.6	6.8	9	12	15	15	15	25	25	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AB9P6	B	3	2	12.2	5.1	9.6	10.6	14.4	20	20	20	35	35	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB015	C	5	3	13.9	5.8	15.3	17.4	23.2	20	30	20	60	60	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB022	D	7.5	5	19.9	8.3	22	24.4	33	25	45	25	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AB028	D	10	7.5	25.7	10.7	28	33	44	35	60	35	110	110	50	–	–	140M-F8E-C32	5098
20AB042	D	15	10	38.7	16.1	42	46.2	63	50	90	50	150	150	50	–	–	140M-F8E-C45	5098
20AB054	E	20	15	49.8	20.7	54	63	84	60	100	60	200	200	100	–	–	–	–
20AB070	E	25	20	64.5	26.8	70	81	108	90	150	90	275	275	100	–	–	–	–

See page 33 for notes.

400/480V AC Three-phase Input Drive Ratings and Input Protection Devices

Cat.No.	Frame(1)	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range(4)(5)			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min(6)	Max(7)	Min(6)	Max(7)	Max(8)	Max(8)	Available Catalog Numbers(9)			Minimum Enclosure Volume (in.3)(10)
400V AC Input																		
20AC1P3	A	0.37	0.25	1.6	1.1	1.3	1.4	1.9	3	3	3	5	15	3	140M-C2E-B16	–	–	3441
20AC2P1	A	0.75	0.55	2.5	1.8	2.1	2.4	3.2	4	6	4	8	15	7	140M-C2E-B25	140M-D8E-B25	–	3441
20AC3P5	A	1.5	1.1	4.3	3	3.5	4.5	6	6	6	6	12	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AC5P0	B	2.2	1.5	6.5	4.5	5	5.5	7.5	10	10	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AC8P7	B	4	3	11.3	7.8	8.7	9.9	13.2	15	17.5	15	30	30	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441

400/480V AC Three-phase Input Drive Ratings and Input Protection Devices (Continued)

Cat.No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
20AC011	C	5.5	4	10.5	7.6	11.5	13	17.4	15	25	15	45	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AC015	C	7.5	5.5	15.1	10.4	15.4	17.2	23.1	20	30	20	60	60	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AC022	D	11	7.5	21.9	15.2	22	24.2	33	30	45	30	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AC030	D	15	11	30.3	21	30	33	45	40	60	40	120	120	50	–	–	140M-F8E-C32	5098
20AC037	D	18.5	15	35	24.3	37	45	60	50	80	50	125	140	50	–	–	140M-F8E-C45	5098
20AC043	D	22	18.5	40.7	28.2	43	56	74	60	90	60	150	160	70	–	–	–	–
20AC060	E	30	22	56.8	39.3	60	66	90	80	125	80	225	240	80	–	–	–	–
20AC072	E	37	30	68.9	47.8	72	90	120	90	150	90	250	280	100	–	–	–	–
480V AC Input																		
20AD1P1	A	0.5	0.33	1.3	1.1	1.1	1.2	1.6	3	3	3	4	15	3	140M-C2E-B16	–	–	3441
20AD2P1	A	1	0.75	2.4	2	2.1	2.4	3.2	3	6	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	3441
20AD3P4	A	2	1.5	3.8	3.2	3.4	4.5	6	6	6	6	12	15	7	140M-C2E-B40	140M-D8E-B40	–	3441
20AD5P0	B	3	2	5.6	4.7	5	5.5	7.5	10	10	10	20	20	15	140M-C2E-B63	140M-D8E-B63	–	3441
20AD8P0	B	5	3	9.8	8.4	8	8.8	12	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AD011	C	7.5	5	9.4	7.9	11	12.1	16.5	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AD014	C	10	7.5	12.4	10.4	14	16.5	22	20	30	20	50	50	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AD022	D	15	10	19.9	16.6	22	24.2	33	25	45	25	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AD027	D	20	15	24.8	20.6	27	33	44	35	60	35	100	100	50	–	–	140M-F8E-C32	5098
20AD034	D	25	20	31.2	25.9	34	40.5	54	40	70	40	125	125	50	–	–	140M-F8E-C45	5098
20AD040	D	30	25	36.7	30.5	40	51	68	50	90	50	150	150	50	–	–	140M-F8E-C45	5098
20AD052	E	40	30	47.7	39.7	52	60	80	60	110	60	200	200	70	–	–	–	–
20AD065	E	50	40	59.6	49.6	65	78	104	80	125	80	250	250	100	–	–	–	–

See page 33 for notes.

600V AC Three-phase Input Drive Ratings and Input Protection Devices

Cat.No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
600V AC Input																		
20AE0P9	A	0.5	0.33	1.3	1.3	0.9	1.1	1.4	3	3	3	3.5	15	3	140M-C2E-B16	–	–	3441
20AE1P7	A	1	0.75	1.9	2	1.7	2	2.6	3	6	3	6	15	3	140M-C2E-B25	140M-D8E-B25	–	3441
20AE2P7	A	2	1.5	3	3.1	2.7	3.6	4.8	4	6	4	10	15	7	140M-C2E-B40	140M-D8E-B40	-	3441
20AE3P9	B	3	2	4.4	4.5	3.9	4.3	5.9	6	8	6	15	15	7	-	140M-D8E-B63	-	3441
20AE6P1	B	5	3	7.5	7.8	6.1	6.7	9.2	10	12	10	20	20	15	-	140M-D8E-C10	140M-F8E-C10	3441
20AE9P0	C	7.5	5	7.7	8	9	9.9	13.5	10	20	10	35	35	15	-	140M-D8E-C10	140M-F8E-C10	3441
20AE011	C	10	7.5	9.8	10.1	11	13.5	18	15	20	15	40	40	15	-	140M-D8E-C16	140M-F8E-C16	3441
20AE017	D	15	10	15.3	15.9	17	18.7	25.5	20	35	20	60	60	30	-	-	140M-F8E-C20	5098
20AE022	D	20	15	20	20.8	22	25.5	34	25	45	25	80	80	30	-	-	140M-F8E-C25	5098
20AE027	D	25	20	24.8	25.7	27	33	44	35	60	35	100	100	50	-	-	140M-F8E-C25	5098
20AE032	D	30	25	29.4	30.5	32	40.5	54	40	70	40	125	125	50	-	-	140M-F8E-C32	5098
20AE041	E	40	30	37.6	39.1	41	48	64	50	90	50	150	150	100	-	-	-	-
20AE052	E	50	40	47.7	49.6	52	61.5	82	60	110	60	200	200	100	-	-	-	-

See page 33 for notes.

208/240V AC Single-phase Input Drive Ratings and Input Protection Devices

Cat.No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
208V AC Input																		
20AB2P2	A	0.5	0.33	2.9	0.6	1.3	1.6	1.9	6	6	6	10	15	7	140M-C2E-B40	140M-D8E-B40	–	3441
20AB4P2	A	1	0.75	5.6	1	2.4	2.8	3.7	10	10	10	17.5	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AB6P8	B	2	1.5	10	1.8	3.9	5.2	6.9	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AB9P6	B	3	2	14	2.6	5.5	6.1	8.3	20	25	20	40	40	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB015	C	5	3	16	2.9	8.6	9.6	13.3	20	35	20	70	70	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	3441
20AB022	D	7.5	5	23.3	4.2	12.7	13.9	19.0	30	50	30	100	100	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AB028	D	10	7.5	29.8	5.4	16.1	19	25.3	40	70	40	125	125	50	–	–	140M-F8E-C32	5098
20AB042	D	15	10	39.8	7.2	21.5	27.8	37	60	100	60	175	175	70	–	–	140M-F8E-C45	5098
20AB054	E	20	15	57.5	10.4	31.1	36.2	48.3	80	125	80	200	200	100	–	–	–	–
20AB070	E	25	20	72.3	13.0	39.1	46.6	62	90	175	90	300	300	100	–	–	–	–
240V AC Input																		
20AB2P2	A	0.5	0.33	2.5	0.6	1.1	1.2	1.7	3	4.5	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	3441
20AB4P2	A	1	0.75	4.8	1	2.1	2.4	3.2	6	9	6	15	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AB6P8	B	2	1.5	8.7	1.8	3.4	4.5	6	15	15	15	25	25	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AB9P6	B	3	2	12.2	2.6	4.8	5.3	7.2	20	20	20	35	35	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB015	C	5	3	13.9	2.9	7.7	8.7	11.6	20	30	20	60	60	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AB022	D	7.5	5	19.9	4.2	11	12.2	16.5	25	45	25	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AB028	D	10	7.5	25.7	5.4	14	16.5	22	35	60	35	110	110	50	–	–	140M-F8E-C32	5098
20AB042	D	15	10	38.7	8.1	21	23.1	31.5	50	90	50	150	150	50	–	–	140M-F8E-C45	5098
20AB054	E	20	15	49.8	10.4	27	31.5	42	60	100	60	200	200	100	–	–	–	–
20AB070	E	25	20	64.5	13.4	35	40.5	54	90	150	90	275	275	100	–	–	–	–

See page 33 for notes.

400/480V AC Single-phase Input Drive Ratings and Input Protection Devices

Cat.No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
400V AC Input																		
20AC1P3	A	0.37	0.25	1.6	0.6	0.7	0.7	1.0	3	3	3	5	15	3	140M-C2E-B16	–	–	3441
20AC2P1	A	0.75	0.55	2.5	0.9	1.1	1.2	1.6	4	6	4	8	15	7	140M-C2E-B25	140M-D8E-B25	–	3441
20AC3P5	A	1.5	1.1	4.3	1.5	1.8	2.3	3	6	6	6	12	15	7	140M-C2E-B63	140M-D8E-B63	–	3441
20AC5P0	B	2.2	1.5	6.5	2.3	2.5	2.8	3.8	10	10	10	20	20	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AC8P7	B	4	3	11.3	3.9	4.4	5.0	6.6	15	17.5	15	30	30	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AC011	C	5.5	4	11	3.8	5.8	6.5	8.7	15	25	15	45	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AC015	C	7.5	5.5	15.1	5.2	7.7	8.6	11.6	20	30	20	60	60	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AC022	D	11	7.5	21.9	7.6	11	12.1	16.5	30	45	30	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AC030	D	15	11	30.3	10.5	15	16.5	22.5	40	60	40	120	120	50	–	–	140M-F8E-C32	5098
20AC037	D	18.5	15	35	12.2	18.5	22.5	30	50	80	50	125	140	50	–	–	140M-F8E-C45	5098
20AC043	D	22	18.5	40.7	14.1	21.5	28	37	60	90	60	150	160	70	–	–	–	–
20AC060	E	30	22	56.8	19.7	30	33	45	80	125	80	225	240	80	–	–	–	–
20AC072	E	37	30	68.9	23.9	36	45	60	90	150	90	250	280	100	–	–	–	–
480V AC Input																		
20AD1P1	A	0.5	0.33	1.3	0.6	0.6	0.6	0.8	3	3	3	4	15	3	140M-C2E-B16	–	–	3441
20AD2P1	A	1	0.75	2.4	1	1.1	1.2	1.6	3	6	3	8	15	3	140M-C2E-B25	140M-D8E-B25	–	3441

400/480V AC Single-phase Input Drive Ratings and Input Protection Devices (Continued)

Cat.No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
20AD3P4	A	2	1.5	3.8	1.6	1.7	2.3	3	6	6	6	12	15	7	140M-C2E-B40	140M-D8E-B40	–	3441
20AD5P0	B	3	2	5.6	2.4	2.5	2.6	3.8	10	10	10	20	20	15	140M-C2E-B63	140M-D8E-B63	–	3441
20AD8P0	B	5	3	9.8	4.2	4	4.4	6	15	15	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	3441
20AD011	C	7.5	5	9.5	4	5.5	6.1	8.3	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AD014	C	10	7.5	12.5	5.2	7	8.3	11	20	30	20	50	50	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	3441
20AD022	D	15	10	19.9	8.3	11	12.1	16.5	25	45	25	80	80	30	–	140M-D8E-C25	140M-F8E-C25	5098
20AD027	D	20	15	24.8	10.3	13.5	16.5	22	35	60	35	100	100	50	–	–	140M-F8E-C32	5098
20AD034	D	25	20	31.2	13	17	20.3	27	40	70	40	125	125	50	–	–	140M-F8E-C45	5098
20AD040	D	30	25	36.7	19.9	20	25.5	34	50	90	50	150	150	50	–	–	140M-F8E-C45	5098
20AD052	E	40	30	47.7	12.8	26	30	40	60	110	60	200	200	70	–	–	–	–
20AD065	E	50	40	59.6	24.8	32.5	39	52	80	125	80	250	250	100	–	–	–	–

See page 33 for notes.

600V AC Single-phase Input Drive Ratings and Input Protection Devices

Cat. No.	Frame[1]	Hp Rating		Input Ratings		Output Current Rating [A]			Dual Element Time Delay Fuse		Non-time Delay Fuse		Circuit Breaker (2)	Motor Circuit Protector (3)	140M Motor Protector with Adjustable Current Range[4][5]			
		ND	HD	Amps	kVA	Cont.	60 s	3 s	Min[6]	Max[7]	Min[6]	Max[7]	Max[8]	Max[8]	Available Catalog Numbers[9]			Minimum Enclosure Volume (in.^{3})[10]
600V AC Input																		
20AE0P9	A	0.5	0.33	1.3	0.7	0.5	0.6	0.7	3	3	3	3.5	15	3	140M-C2E-B16	–	–	3441
20AE1P7	A	1	0.75	1.9	1	0.9	1	1.3	3	6	3	6	15	3	140M-C2E-B25	140M-D8E-B25	–	3441
20AE2P7	A	2	1.5	3	1.6	1.4	1.8	2.4	4	6	4	10	15	7	140M-C2E-B40	140M-D8E-B40	–	3441
20AE3P9	B	3	2	4.4	2.3	2	2.2	3	6	8	6	15	15	7	–	140M-D8E-B63	–	3441
20AE6P1	B	5	3	7.5	3.9	3.1	3.4	4.6	10	12	10	20	20	15	–	140M-D8E-C10	140M-F8E-C10	3441
20AE9P0	C	7.5	5	7.7	4	4.5	5	6.8	10	20	10	35	35	15	–	140M-D8E-C10	140M-F8E-C10	3441
20AE011	C	10	7.5	9.8	5.1	5.5	6.8	9	15	20	15	40	40	15	–	140M-D8E-C16	140M-F8E-C16	3441
20AE017	D	15	10	15.3	8	8.5	9.4	12.8	20	35	20	60	60	30	–	–	140M-F8E-C20	5098
20AE022	D	20	15	20	10.4	11	12.8	17	25	45	25	80	80	30	–	–	140M-F8E-C25	5098
20AE027	D	25	20	24.8	12.9	13.5	16.5	22	35	60	35	100	100	50	–	–	140M-F8E-C25	5098
20AE032	D	30	25	29.4	15.3	16	20.3	27	40	70	40	125	125	50	–	–	140M-F8E-C32	5098
20AE041	E	40	30	37.6	19.6	20.5	24	32	50	90	50	150	150	100	–	–	–	–
20AE052	E	50	40	47.7	24.8	26	30.8	41	60	110	60	200	200	100	–	–	–	–

(1) For IP66 (NEMA / UL Type 4X/12) enclosures, drives listed as Frame A increase to Frame B and drives listed as Frame C increase to Frame D.
(2) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(3) Motor Circuit Protector - instantaneous trip circuit breaker. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(4) Bulletin 140M with adjustable current range must have the current trip set to the minimum range that the device does not trip.
(5) Manual Self-Protected (Type E) Combination Motor Controller, UL Listed for 208V Wye or Delta, 240V Wye or Delta, 480V Y/277 or 600V Y/347. Not UL Listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
(6) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.
(7) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(8) Maximum allowable rating by US NEC. Exact size must be chosen for each installation.
(9) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers can vary.
(10) 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 that is specified in this column. Application-specific thermal considerations can require a larger enclosure.

Mounting

This section includes information for mounting the drives.

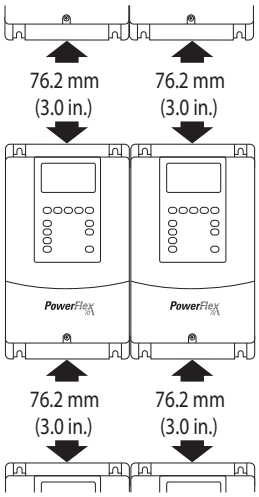
Maximum Surrounding Air Temperature

Enclosure Rating	Temperature Range
Open Type, IP 20, NEMA / UL Type 1 and flange mount	0...50 °C (32...122 °F)
IP 66, NEMA / UL Type 4X/12	0...40 °C (32...104 °F)
IP 54, NEMA / UL Type 12	0...40 °C (32...104 °F)

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

Minimum Mounting Clearances

Specified vertical clearance requirements are intended to be from the drive to the closest object that can restrict airflow through the drive heatsink and chassis. The drive must be mounted in a vertical orientation as shown, and must make full contact with the mounting surface. Do not use standoffs or spacers. In addition, inlet air temperature must not exceed the product specification.



Clearances apply to all PowerFlex 70 Drives:
- Panel Mount
- Flange Mount
- NEMA Type 4X/12

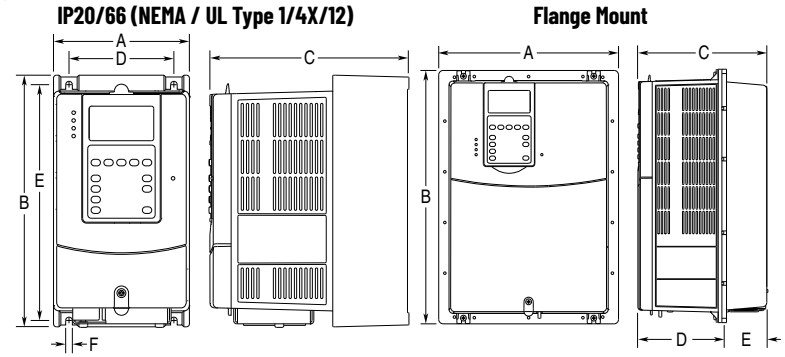
PowerFlex 70 Frames Output Power

Output Power		Frame Size							
kW ND (HD)	Hp ND (HD)	208...240V AC Input			400...480V AC Input			600V AC Input	
		Not Filtered	*Filtered*	*IP66 (4X/12)*	*Not Filtered*	*Filtered*	*IP66 (4X/12)*	*Not Filtered*	*Filtered*
0.37 (0.25)	0.5 (0.33)	A	B	B	A	B	B	A	–
0.75 (0.55)	1 (0.75)	A	B	B	A	B	B	A	–
1.5 (1.1)	2 (1.5)	B	B	B	A	B	B	A	–
2.2 (1.5)	3 (2)	B	B	B	B	B	B	B	–
4 (3)	5 (3)	–	C	D	B	B	B	B	–
5.5 (4)	7.5 (5)	–	D	D	–	C	D	C	–
7.5 (5.5)	10 (7.5)	–	D	D	–	C	D	C	–
11 (7.5)	15 (10)	–	D	D	–	D	D	D	–
15 (11)	20 (15)	–	E	E	–	D	D	D	–
18.5 (15)	25 (20)	–	E	E	–	D	D	–	–
22 (18.5)	30 (25)	–	–	–	–	D	D	–	–
30 (22)	40 (30)	–	–	–	–	E	E	–	–
37 (30)	50 (40)	–	–	–	–	E	E	–	–

Approximate Dimensions and Weights

This section provides the approximate dimensions for the drives.

Frames A...E



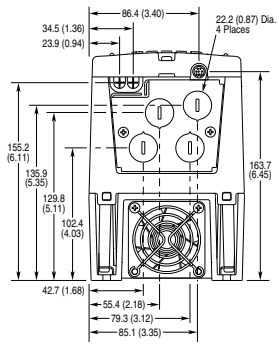
Frame Dimensions, mm (in.)

Frame Size	Dimension						Weight [3] kg (lb)
	A	B	C	D	E	F	
	IP20, NEMA / UL Type 1						
A	122.4 (4.82)	225.7 (8.89)	179.8 (7.08)	94.2 (3.71)	211.6 (8.33)	5.8 (0.23)	2.71 (6.0)
B	171.7 (6.76)	234.6 (9.24)	179.8 (7.08)	122.7 (4.83)	220.2 (8.67)	5.8 (0.23)	3.60 (7.9)
C	185.0 (7.28)	300.0 (11.81)	179.8 (7.08)	137.6 (5.42)	285.6 (11.25)	5.8 (0.23)	6.89 (15.2)
D	219.9 (8.66)	350.0 (13.78)	179.8 (7.08)	169.0 (6.65)	335.6 (13.21)	5.8 (0.23)	9.25 (20.4)
E [1]	280.3 (11.04)	555.8 (21.88)	207.1 (8.15)	200.0 (7.87)	491.0 (19.33)	6.9 (0.27)	18.60 (41.0) [1]
	IP66, NEMA / UL Type 4X/12						
B	171.7 (6.76)	239.8 (9.44)	203.3 (8.00)	122.7 (4.83)	220.2 (8.67)	5.8 (0.23)	3.61 (8.0)
D	219.9 (8.66)	350.0 (13.78)	210.7 (8.29)	169.0 (6.65)	335.6 (13.21)	5.8 (0.23)	9.13 (20.1)
E [1][2]	280.3 (11.04)	555.8 (21.88)	219.8 (8.65)	200.0 (7.87)	491.0 (19.33)	6.9 (0.27)	18.60 (41.0) [1]
	Flange Mount						
A	156.0 (6.14)	225.8 (8.89)	178.6 (7.03)	123.0 (4.84)	55.6 (2.19)	–	2.71 (6.0)
B	205.2 (8.08)	234.6 (9.24)	178.6 (7.03)	123.0 (4.84)	55.6 (2.19)	–	3.60 (7.9)
C	219.0 (8.62)	300.0 (11.81)	178.6 (7.03)	123.0 (4.84)	55.6 (2.19)	–	6.89 (15.2)
D	248.4 (9.78)	350.0 (13.78)	178.6 (7.03)	123.0 (4.84)	55.6 (2.19)	–	9.25 (20.4)
E	280.3 (11.04)	555.8 (21.88)	207.1 (8.15)	117.2 (4.61)	89.9 (3.54)	–	18.60 (41.0)

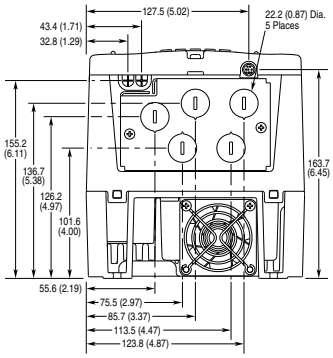
(1) IP20 and IP66 frame E drives are manufactured with a flange-like heatsink with mounting holes.
(2) Frame E is also available in IP54 NEMA/UL Type 12 as a wall/machine mount.
(3) Weights include HIM and standard I/O.

IP20, NEMA / UL Type 1 Bottom View Dimensions, mm (in.)

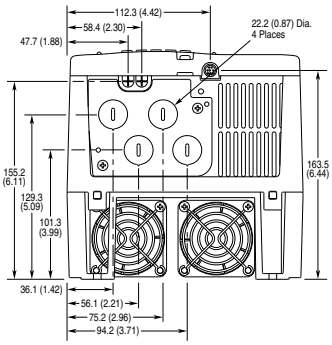
Frame A(1)



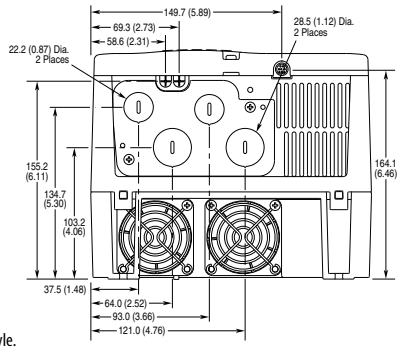
Frame B (1)



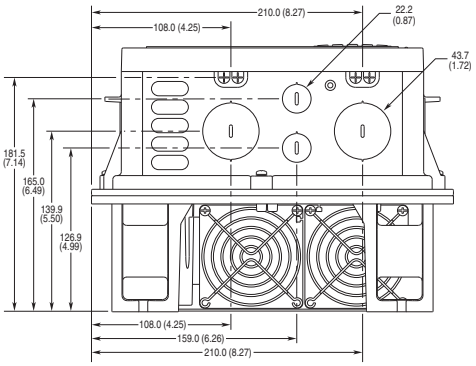
Frame C



Frame D



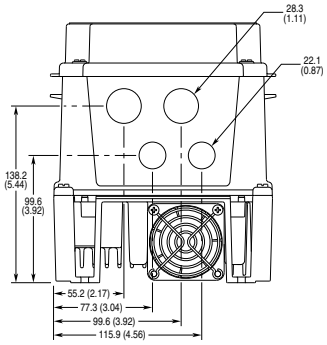
Frame E(2)



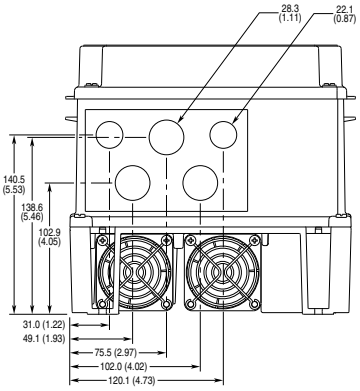
(1) Fan existence is dependent on drive rating and package style.
(2) Flange style heatsink on NEMA1.

IP 66 (NEMA / UL Type 4X/12) Bottom View Dimensions, mm (in.)

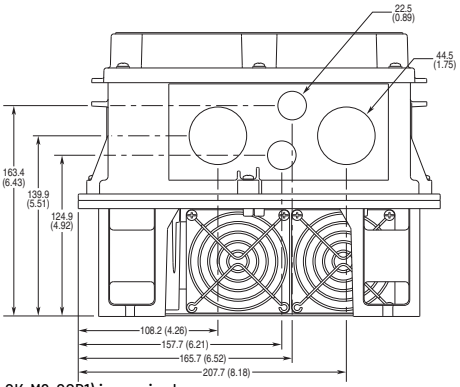
Frame B (1)



Frame D (1)



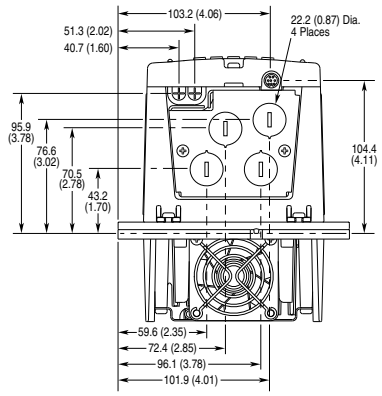
Frame E (1)(2)



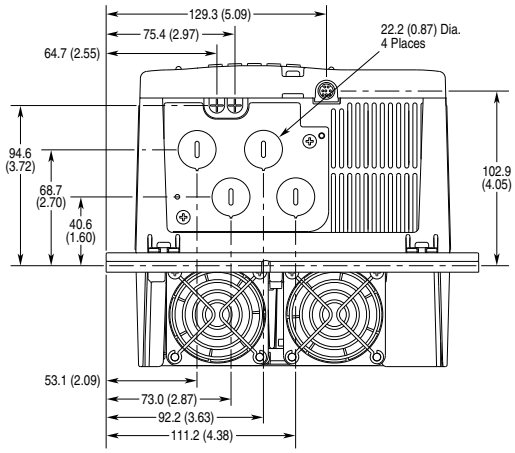
(1) DPI Port 2 is not accessible from outside of the drive standard. A service connection board (catalog number SK-M9-SCB1) is required.
(2) Frame E is also available in IP54 NEMA/UL Type 12 as a wall/machine mount.

Flange Mount Bottom View Dimensions, mm (in.)

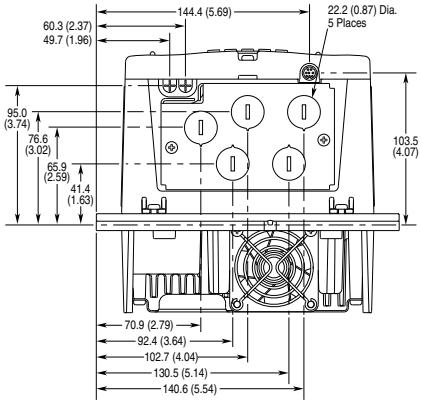
Frame A



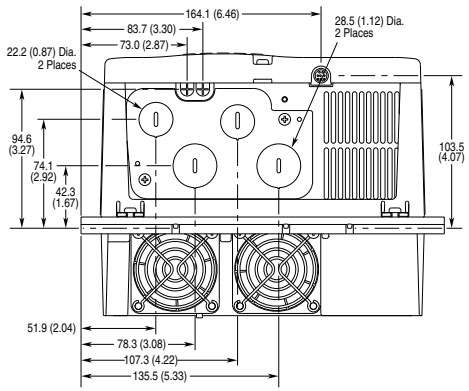
Frame C



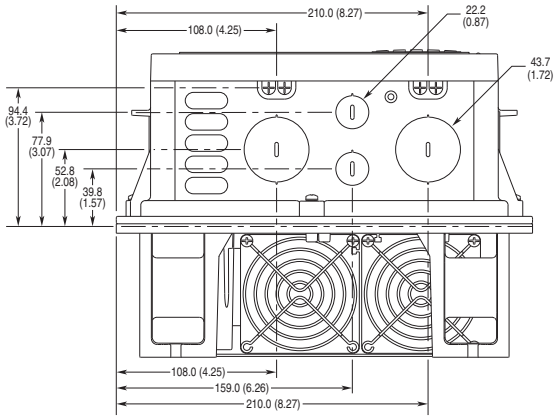
Frame B



Frame D

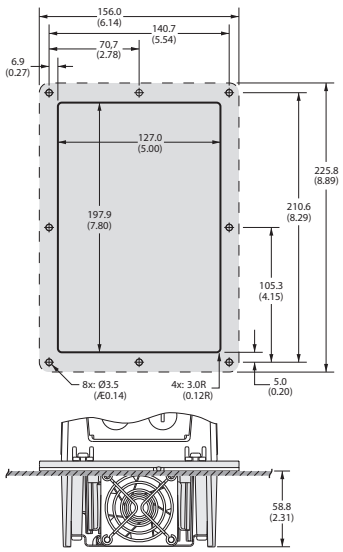


Frame E

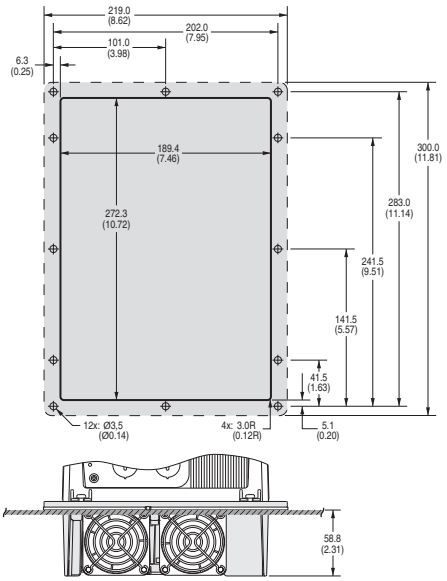


Cutout Dimensions, mm (in.)

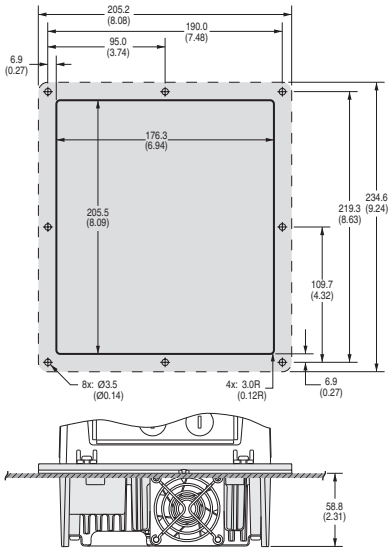
Frame A



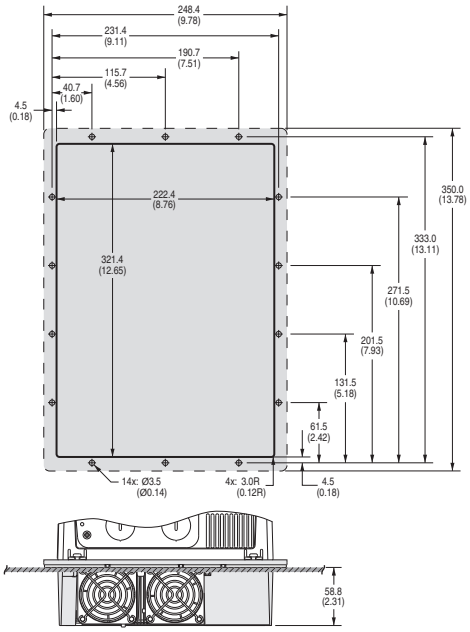
Frame C



Frame B

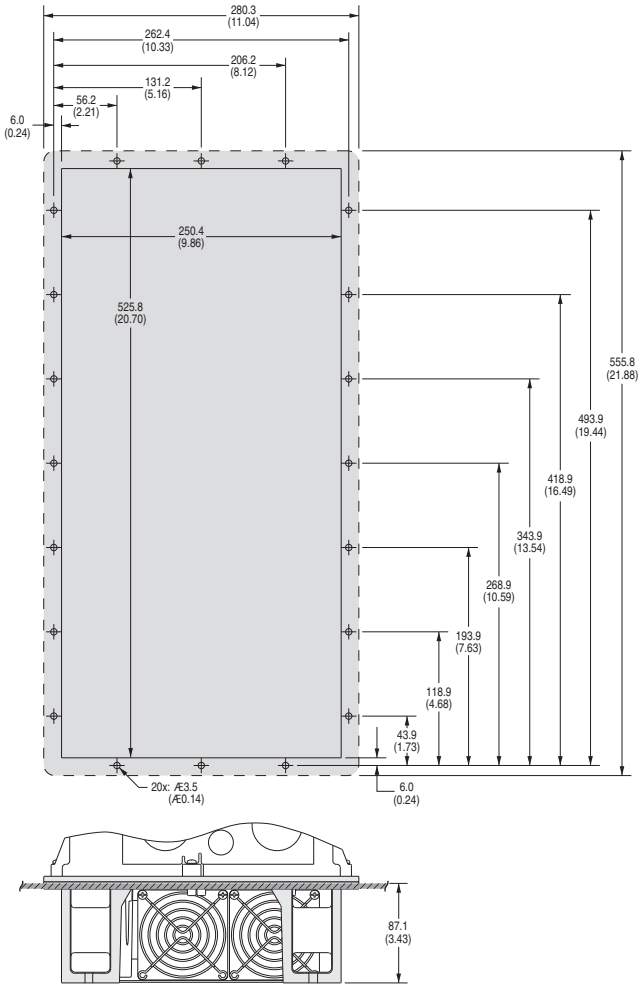


Frame D



Cutout Dimensions, mm (in.) (continued)

Frame E



Standard Drive Certifications and Specifications

The tables in this section provide certification information and technical specifications.

Certifications[1]

Certifications	Description	Frames	
		A...E 240...480V	**A...E** 600V
ABS	American Bureau of Shipping MA Certificate 08-HS303172A-3-PDA for auxiliary services on AB Classed vessels and offshore platforms	X	X
RCM	Certified by Rockwell Automation to be in conformity with the requirements of the applicable Australian legislation and standards that are referenced here: IEC 61800-3	X	
c-UL-us	Listed to UL508C and CAN/CSA C22.2 No. 274-13 Configured drives can be listed to UL508A	X	X
CE	Certified by Rockwell Automation to be in conformity with the essential requirements of the applicable European Directives. The following standards have been applied:	–	–
	2014/35/EU (Low Voltage Directive) EN 61800-5-1 Electronic Equipment for Use in Power Installations	X	X
	2014/30/EU (EMC Directive) EN 61800-3 Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods	X	
EAC	Low Voltage TR CU 004/2011 EMC TR CU 020/2011	X	X
Efficiency Class	Ecodesign regulation (EU) 2019/1781, IE2 efficiency class, refer to PowerFlex AC Drive Performance Specifications per Ecodesign Regulation (EU) 2019/1781, publication PFLEX-TD003 for additional information.	X	X
SEMI F47	SEMI F47 compliance, 480V units were tested.	X	
Functional Safety	TÜV Rheinland Certificate 01/205/0665.02/21 Safe Torque Off (STO) complies with the requirements of the relevant standards (Cat. 3 / PLd according to EN ISO 13849-1, SIL CL 2 according to EN ISO 13849-1, and SIL 2 according to EN 62061 / IEC 61508.	X	
Korean KC Registration	**R-R-RAA-Drive** See the certificate of registration for specific drive catalog numbers that have this certification.[2]	X	X
Lloyd's Register	Lloyd's Register Type Approval Certificate 08/60014 (E1) (marine certification) (for drives manufactured before June 5, 2018)	X	
Morocco	Compliance to NM EN 61800-5-1	X	X
Plenum Rating	Listed to UL508C Suitable for installation in a compartment handling conditioned air. [2]		
Trentec	Tested by Trentec to be compliant with AC156 Acceptance Criteria for Seismic Qualification Testing of Nonstructural Components and 2003 International Building Code for worst-case seismic level for USA excluding site class F	X	X
UKCA	Compliance to EN 61800-3, EN 61800-5-1, EN IEC 63000	X	X
Designed to Meet Applicable Requirements	IEC 61800-2 – Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency AC power drive systems	X	X
	NEMA ICS 7.1 – Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems	X	X
	NFPA 70 – US National Electric Code	X	X
	NSF – Type 4X enclosure NSF Listed to meet Criteria C2 for splash and non-food zones	X	X

(1) See the Rockwell Automation Product Certification page for current certifications, rok.auto/certifications.
(2) Flange mount enclosure, Frames A...D only.

Specifications

Category	Specification					
	Drive	**200... 208V**	**240V**	**380/400**	**480V**	**600V**
	AC input overvoltage trip	247V AC	285V AC	475V AC	570V AC	690V AC
	AC input undervoltage trip	120V AC	138V AC	233V AC	280V AC	345V AC
	Bus overvoltage trip	405V DC	405V DC	810V DC	810V DC	1013V DC
	Bus undervoltage output shutoff	153V DC	153V DC	305V DC	437V DC	437V DC
	Bus undervoltage fault level	160V DC	160V DC	300V DC	300V DC	375V DC
	Bus voltage nom	281V DC	324V DC	540V DC	648V DC	810V DC
	All Drives					
Protection	Heatsink thermistor	Monitored by microprocessor overtemp trip				
	Drive overcurrent trip: • Software current limit • Hardware current limit • Instantaneous current limit	• 20...160% of rated current • 200% of rated current (typical) • 220...300% of rated current (dependent on drive rating)				
	Line transients	Up to 6000 volts peaks per IEEE C62.41-1991				
	Control logic noise immunity	Showering arc transients up to 1500V peak				
	Power ride-through	15 ms at full load				
	Logic control ride-through	0.5 s min, 2 s typ				
	Ground fault trip	Phase-to-ground on drive output				
	Short circuit trip	Phase-to-phase on drive output				
Environment	Altitude	1000 m (3300 ft) max without derating				
	Maximum surrounding air temperature without derating: • IP20, NEMA / UL Type 1 • flange mount • IP66, NEMA / UL Type 4X/12 (indoor)	• 0...50 °C (32...122 °F) • 0...50 °C (32...122 °F) • 0...40 °C (32...104 °F)				
	Cooling fan operation: • Frames A and C • Frames B, D, and E	• Fan operates when power is applied. • Fan operates when power is applied and in Run condition.				
	Storage temperature (all const.)	-40...+70 °C (-40...+158 °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 immediately, store the drive where it is not exposed to a corrosive atmosphere.				
	Relative humidity	5...95% non-condensing				
	Shock	15 g peak for 11 ms duration (±1.0 ms)				
	Vibration	0.152 mm (0.006 in.) displacement, 1 g peak				
	Pollution degree of the surrounding environment: • Pollution degree 1 and 2 • Pollution degree 3 and 4 See Pollution Degree Ratings According to EN 61800-5-1 for descriptions of pollution degree rating.	• All enclosures are acceptable for pollution degree 1 and 2. • An enclosure that meets or exceeds IP54, NEMA / UL Type 12, is required for pollution degree 3 and 4.				

Pollution Degree Ratings According to EN 61800-5-1

Pollution Degree	Description
1	One of the following is true: • No pollution occurs. • Only dry non-conductive pollution occurs, and has no influence.
2	Normally only non-conductive pollution occurs. Occasionally a temporary conductivity, caused by condensation, is expected when the drive is out of operation.
3	At least one of the following is true: • Conductive pollution occurs. • Dry non-conductive pollution occurs and becomes conductive due to condensation.
4	The pollution generates persistent conductivity that is caused, for example, by conductive dust, rain, or snow.

Specifications

Category	Specification	
Electrical	Voltage tolerance	-10% of minimum, +10% of maximum. See the PowerFlex 70 Adjustable Frequency AC Drives User Manual, publication 20A-UM001, for Full Power and Operating Range.
	Input frequency tolerance	47...63 Hz
	Input phases	Three-phase input provides full rating for all drives. Single-phase operation provides 50% of rated current.
	Displacement power factor (all drives)	0.98 across speed range.
	Efficiency	97.5% at rated amps, line volts nom.
	Short circuit rating max	200,000 amps symmetrical.
	Short circuit current rating max (by using the recommended fuse or circuit breaker type)	Maximum short circuit current rating to match specified fuse/circuit breaker capability.
	Drive to motor power ratio: • Minimum • Maximum	 • Recommended not less than 1:2 ratio • Recommended not greater than 2:1 ratio
Control	Method	Sine coded PWM with programmable carrier frequency. Ratings apply to all drives.
	Carrier frequency	2, 3, 4, 5, 6, 7, 8, 9, and 10 kHz Standard. 2, 4, 8, and 12 kHz EC. Drive rating based on 4 kHz.
	Output voltage range	0 to rated motor voltage
	Output frequency range	0...400 Hz Standard. 0...500 Hz EC.
	Frequency accuracy: • Digital input • Analog input	 • Within ±0.01% of set output frequency. • Within ±0.4% of maximum output frequency.
	Frequency control - speed regulation	with slip compensation (Volts per Hertz mode) 0.5% of base speed across 40:1 speed range 40:1 operating range 10 rad/sec bandwidth
		with slip compensation (Sensorless Vector mode) 0.5% of base speed across 80:1 speed range 80:1 operating range 20 rad/sec bandwidth
		with feedback (Sensorless Vector mode) EC 0.001% of base speed across 40:1 speed range 0.1% of base speed across 80:1 speed range 80:1 operating range 20 rad/sec bandwidth
	Speed control - speed regulation	without feedback (Vector Control mode) EC 0.1% of base speed across 120:1 speed range 120:1 operating range 30 rad/sec bandwidth
		with feedback (Vector Control mode) EC 0.001% of base speed across 120:1 speed range 1000:1 operating range 125 rad/sec bandwidth
	Torque regulation	without feedback +/-10% EC
		with feedback +/-5% EC
	Selectable motor control	Sensorless Vector with full tuning. Standard VHz with full custom capability and vector control.
	Stop modes	Multiple programmable stop modes including - Ramp, Coast, DC-Brake, Fast Brake, Ramp to Hold, and S-curve.
	Accel/Decel	Two independently programmable accel and decel times. Each time can be programmed from 0...3600 seconds in 0.1 second increments
	Intermittent overload	110% Overload capability for up to 1 minute 150% Overload capability for up to 3 seconds
	Current limit capability	Proactive current limit programmable from 20...160% of rated output current. Independently programmable proportional and integral gain.
	Motor overload protection	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 E59272.

Specifications (Continued)

Category	Specification	
Encoder	Type	Incremental, dual channel
	Supply	5V/12V Configurable ±5%
	Quadrature	90° ±27°
	Duty cycle	50% +10%
	Requirements[1]	Encoders must be line driver type, quadrature (dual-channel), or pulse (single-channel), single-ended or differential and capable of supplying 10 mA min per channel. The encoder interface board accepts 5V or 12V DC square-wave with a high state voltage of 3.5V DC min (5V mode), and 7.0V DC min (12V mode). Low state voltage max is 1V DC (for both 5V and 12V modes). Input frequency max is 250 kHz.

(1) Drive is not CE EMC certified when the encoder interface option is installed.

Watts Loss (rated load, speed, and PWM) [1]

Voltage	ND Hp	External Watts	Internal Watts	Total Watts Loss
208V	0.5	12.2	19.2	31.4
	1.0	30.7	20.5	51.2
	2.0	44.6	22.6	67.2
	3.0	67.3	25.4	92.7
	5.0	141.3	33.2	174.5
	7.5	205.7	34.2	239.9
	10	270.4	48.1	318.5
	15	385.6	40.3	425.9
	20	494.6	44.9	539.5
	25	650.7	51.6	702.3
240V	0.5	12.2	19.2	31.4
	1.0	30.7	20.5	51.2
	2.0	44.6	22.6	67.2
	3.0	67.3	25.4	92.7
	5.0	141.3	33.2	174.5
	7.5	205.7	34.2	239.9
	10	270.4	48.1	318.5
	15	385.6	40.3	425.9
	20	494.6	44.9	539.5
	25	650.7	51.6	702.3
400V	0.37	11.5	17.9	29.4
	0.75	27.8	19.5	47.3
	1.5	43.6	21.6	65.2
	2.2	64.6	24.0	88.6
	4.0	99.5	28.2	127.7
	5.5	140.0	27.8	167.8
	7.5	193.3	32.0	225.3
	11	305.4	34.2	339.6
	15	432.9	42.9	475.8
	18.5	363.8	40.5	404.3
	22	396.8	41.5	438.3
	30	500.8	50.0	550.8
	37	632.0	57.7	689.7
400V (cont.)	0.5	11.5	17.9	29.4
	1.0	27.8	19.5	47.3
	2.0	43.6	21.6	65.2
	3.0	64.6	24.0	88.6
	5.0	99.5	28.2	127.7
	7.5	140.0	27.8	167.8
	10	193.3	32.0	225.3
	15	305.4	34.2	339.6
	20	432.9	42.9	475.8
	25	363.8	40.5	404.3
	30	396.8	41.5	438.3
	40	500.8	50.0	550.8
	50	632.0	57.7	689.7
480V	0.5	11.5	17.9	29.4
	1.0	27.8	19.5	47.3
	2.0	43.6	21.6	65.2
	3.0	64.6	24.0	88.6
	5.0	99.5	28.2	127.7
	7.5	140.0	27.8	167.8
	10	193.3	32.0	225.3
	15	305.4	34.2	339.6
	20	432.9	42.9	475.8
	25	363.8	40.5	404.3
	30	396.8	41.5	438.3
	40	500.8	50.0	550.8
	50	632.0	57.7	689.7
600V	0.5	11.5	17.9	29.4
	1.0	27.8	19.5	47.3
	2.0	43.6	21.6	65.2
	3.0	64.6	24.0	88.6
	5.0	99.5	28.2	127.7
	7.5	140.0	27.8	167.8
	10	193.3	32.0	225.3
	15	305.4	34.2	339.6
	20	432.9	42.9	475.8
	25	281.4	42.4	323.8
	30	311.9	43.4	355.3
	40	389.9	51.8	441.7
	50	501.4	59.9	561.3

(1) Worst case condition including Enhanced Control board, HIM, and Communication Module.

Voltage Tolerance

This section provides information to help you determine the voltage tolerance for your drive installation.

Voltage Tolerance[1]

Drive Rating	Line Voltage nom	Motor Voltage nom	Drive Full Power Range	Drive Operating Range
200...240	200	200[2]	200...264	180...264
	208	208	208...264	
	240	230	230...264	
380...480	380	380[2]	380...528	342...528
	400	400	400...528	
	480	460	460...528	
500...600	600	575[2]	575...660	432...660

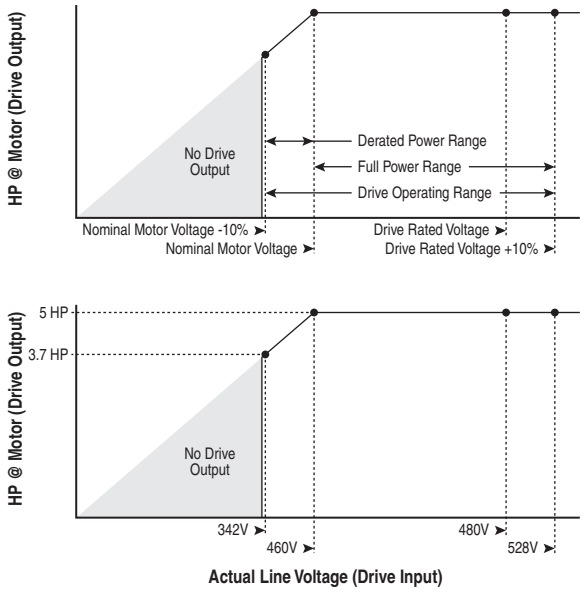
(1) Drive full power range = Nominal motor voltage to drive rated voltage +10%. Rated current is available across the entire drive full power range.
(2) Drive operating range = Lowest nominal motor voltage -10% to drive rated voltage +10%. Drive output is linearly derated when actual line voltage is less than the nominal motor voltage.

EXAMPLE:

Calculate the maximum power of a 5 Hp, 460V motor connected to a 480V rated drive supplied with 342V actual line voltage input.

- Actual Line Voltage / Nominal Motor Voltage = 74.3%
- 74.3% × 5 Hp = 3.7 Hp
- 74.3% × 60 Hz = 44.6 Hz

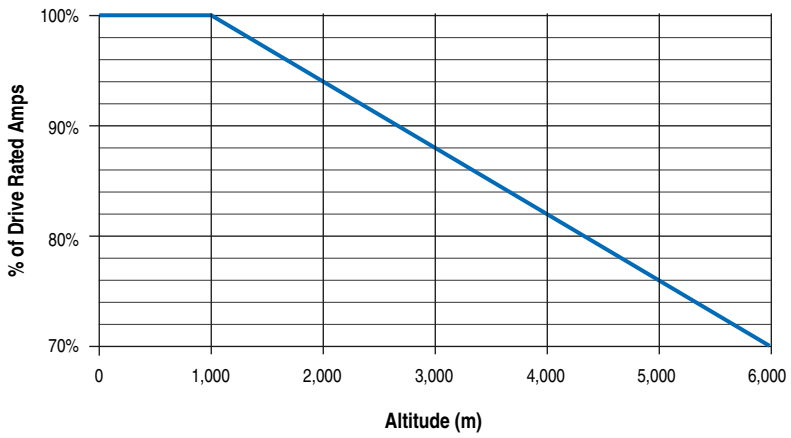
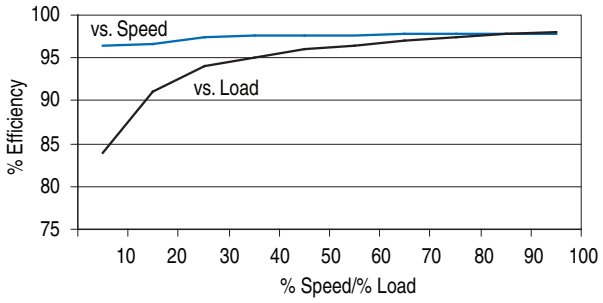
At 342V actual line voltage, the maximum power the 5 Hp, 460V motor can produce is 3.7 Hp at 44.6 Hz.



Derating Guidelines

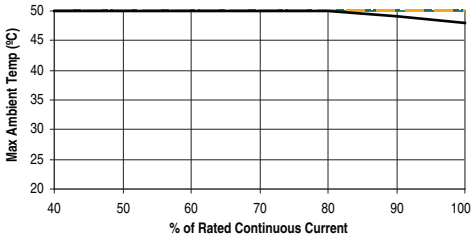
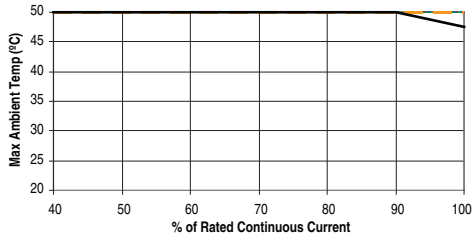
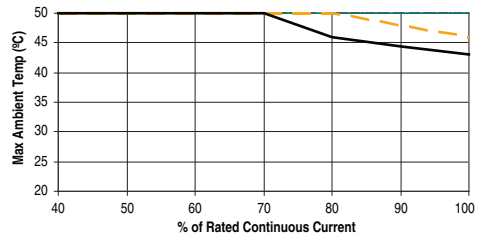
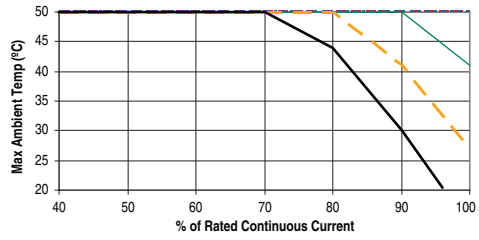
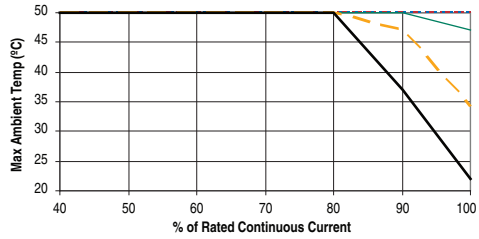
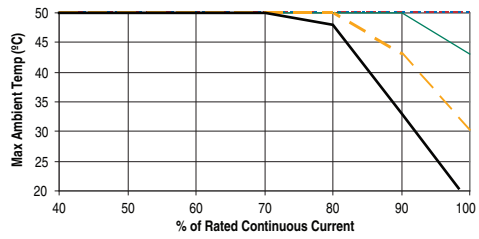
Follow these guidelines for derating your drive installation.

Altitude and Efficiency

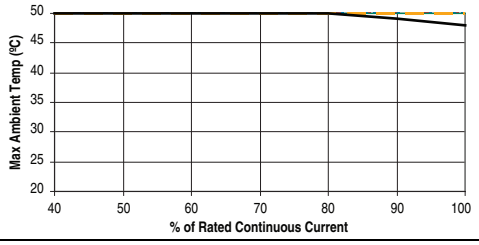
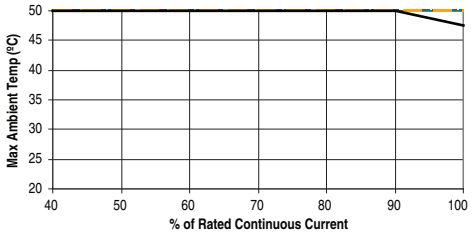
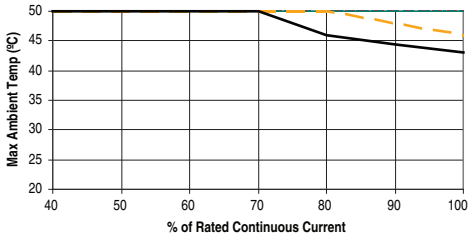
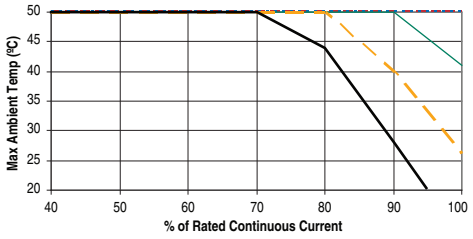
Frame	Type	Derate
All	Altitude	
	Efficiency (typical)	

Ambient Temperature/Load

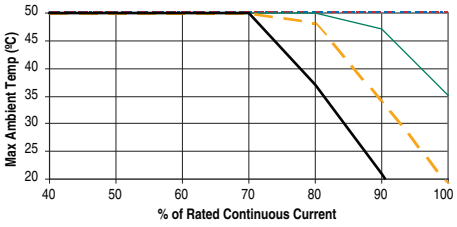
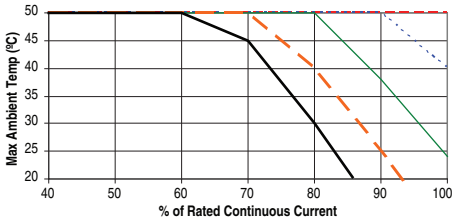
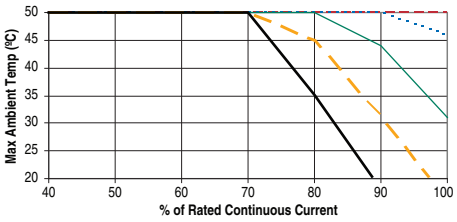
240V AC

PowerFlex 70 Power Rating		Derating
ND Hp	HD Hp	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
240 Volts		
0.5...3.0	0.33...2.0	None
5.0	3.0	
7.5	5.0	
10	7.5	
15	10	
20	15	
25	20	

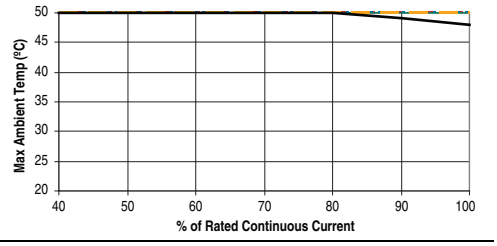
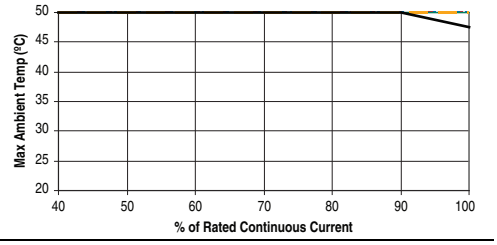
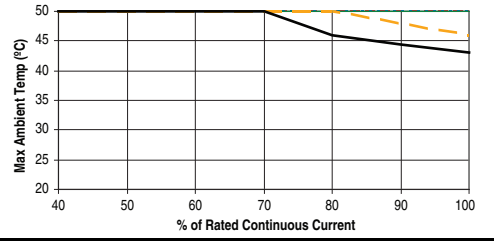
400V AC

PowerFlex 70 Power Rating		Derating
ND kW	HD kW	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
400 Volts		
0.37...5.5	0.25...4.0	None
7.5	5.5	
11	7.5	
15	11	
18.5	15	

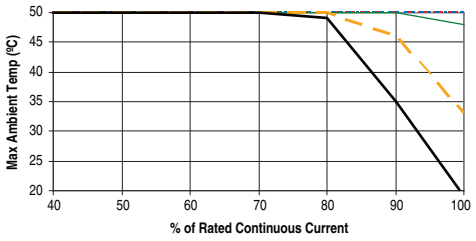
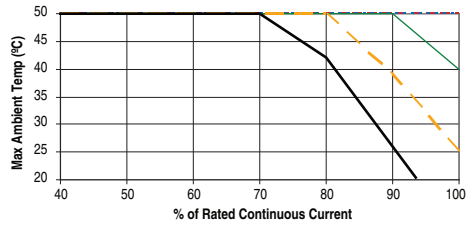
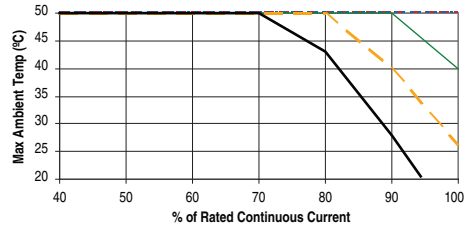
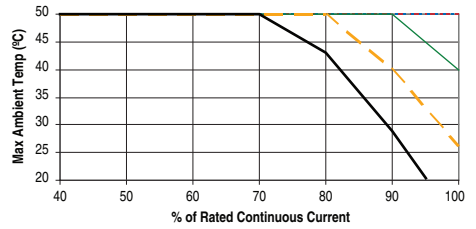
400V AC (Continued)

PowerFlex 70 Power Rating		Derating
ND kW	HD kW	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
400 Volts		
22	18.5	
30	22	
37	30	

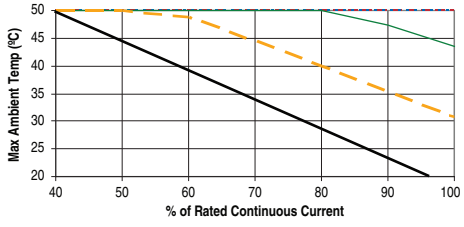
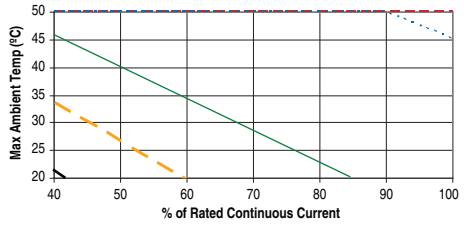
480V AC

PowerFlex 70 Power Rating		Derating
ND Hp	HD Hp	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
480 Volts		
0.5...7.5	0.33...5.0	None
10	7.5	
15	10	
20	15	

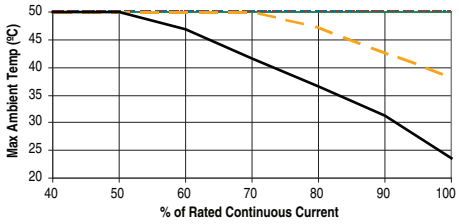
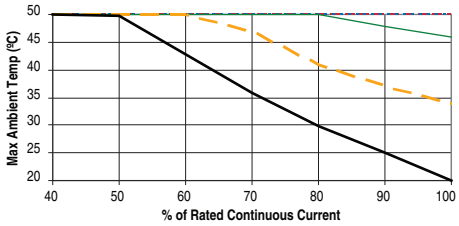
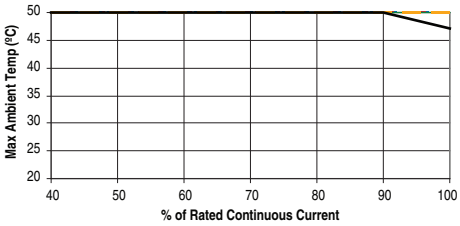
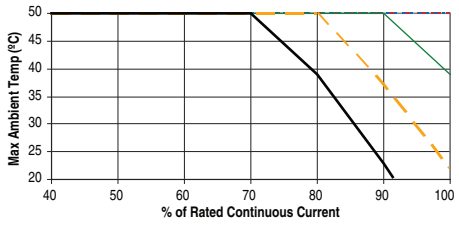
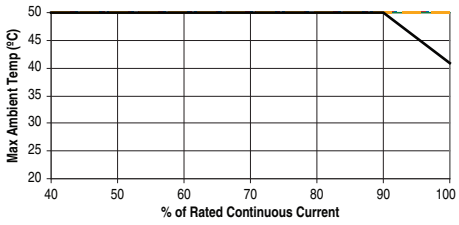
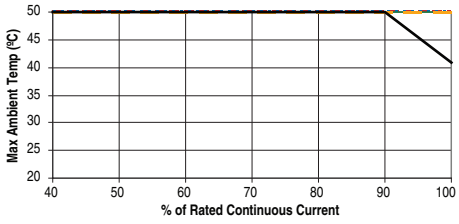
480V AC (Continued)

PowerFlex 70 Power Rating		Derating
ND Hp	HD Hp	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
480 Volts		
25	20	
30	25	
40	30	
50	40	

600V AC

PowerFlex 70 Power Rating		Derating
ND Hp	HD Hp	2 kHz 4 kHz 6 kHz 8 kHz 10 kHz
600 Volts		
0.5...5.0	0.33...3.0	None
7.5	5.0	
10	7.5	

600V AC (Continued)

PowerFlex 70 Power Rating		Derating
ND Hp	HD Hp	2 kHz, 4 kHz, 6 kHz, 8 kHz, 10 kHz
600 Volts		
15	10	
20	15	
25	20	
30	25	
40	30	
50	40	

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Preventive Maintenance of Industrial Control and Drive System Equipment, publication DRIVES-TD001	Provides a guide to performing preventive maintenance.
PowerFlex 70 Adjustable Frequency AC Drive User Manual, publication 20A-UM001	Provides the basic information that is needed to start up and troubleshoot the PowerFlex® 70 Adjustable Frequency AC Drive.
PowerFlex 70 EC and 700 VC Reference Manual, publication PFLEX-RM004	Provides detailed drive information including operation, parameter descriptions, and programming.
PowerFlex 70 and 700 Adjustable Frequency AC drives Reference Manual, publication PFLEX-RM001	Provides detailed information for specifications and dimensions, operation, and dynamic brake selection for the drive.
PowerFlex 70 Adjustable Frequency AC Drive Installation Instructions, publication 20A-IN009	Provides the five basic steps that are needed to install and perform a basic start up of the PowerFlex 70 drive.
Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001	Provides the basic information that is needed to properly wire and ground Pulse Width Modulated (PWM) AC drives.
Communication adapter options, publications 20COMM-UM*xxx*	Provides the information to install the communication option kit based on the 20-COMM-X that is chosen. By searching the specific COMM card, a detailed description of the card features and parameters can be explored. These communication cards are optional and vary depending on configuration.
PowerFlex DriveGuard Safe Torque Off User Manual - Series B. publication PFLEX-UM003	Provides compatibility information for using the DriveGuard® Safe Torque Off option, with PowerFlex 40P or PowerFlex 70 drives and other safety components.
Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-AT003	Provides basic information for enclosure systems and environmental/ location considerations (to help protect against environmental contaminants), and power and grounding considerations that are needed to properly install AC drives.
Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control, publication SGI-1.1	Provides general guidelines for the application, installation, and maintenance of solid-state control.
Guarding Against Electrostatic Damage, publication 8000-4.5.2	Provides practices for guarding against Electrostatic damage (ESD)
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.

You can view or download publications at rok.auto/literature.

You can access declarations of conformity, certificates, and other certification details at: rok.auto/certifications.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, and product notification updates.	rok.auto/support
Knowledgebase	Access Knowledgebase articles.	rok.auto/knowledgebase
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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