



PowerFlex® 700 User Manual


This document provides updated information for the PowerFlex 700 User Manual (publication 20B-UM001x-EN-P). Included is updated/ corrected information for all drives, new information about Common Bus (DC input) drives and additional drive ratings. Place this document with your User Manual for further reference.

Parameter Changes

Page 3-10. Description has been updated.

004	[Torque Current]	Default:	Read Only
	Based on the motor, the amount of current that is in phase with the fundamental voltage component.	Min/Max: Units:	Drive Rating × -2/+2 0.1 Amps

Page 3-18. Description has been updated.

422	Vector [Pulse In Scale]	Default:	64
	 Sets the scale factor/gain for the Pulse Input when P423 is set to "Pulse Input." Calculate for the desired speed command as follows: for Hz, [Pulse In Scale] = $\frac{\text{Input Pulse Rate (Hz)}}{\text{Desired Cmd. (Hz)}}$ for RPM, [Pulse In Scale] = $\frac{\text{Input Pulse Rate (Hz)}}{\text{Desired Cmd. (RPM)}} \times \frac{120}{[\text{Motor Poles}]}$	Min/Max: Units:	2/20000 1

Page 3-26. New parameter added.

139	Vector [PI BW Filter]	Default:	0.0 Radians	137
	Provides filter for Process PI error signal. The output of this filter is displayed in [PI Error Meter]. Zero will disable the filter.	Min/Max: Units:	0.0/240.0 Radians 0.1 Radians	

Page 3-28. The Default value was updated.

151	[PWM Frequency]	Default:	4 kHz 2 kHz (Frames 4-6, 600/690VAC)
	Sets the carrier frequency for the PWM output. Drive derating may occur at higher carrier frequencies. For derating information, refer to . . .	Min/Max: Units:	2/10 kHz 1 kHz

Pages 3-42. Min/Max value for parameters 476-487 is now ± 32767 .

Alarms

The following alarm is new.

Alarm	No.	Type ⁽¹⁾	Description
TB Ref Cflct Vector			Terminal Block Reference Conflict prevents the drive from starting. The conflict occurs when you select "Auto/Manual" (factory default for [Digital In3 Sel], parameter 363) and also reprogrammed [TB Man Ref Sel], parameter 96. The use of an analog input for this function is "exclusive," meaning that no other use for the selected analog input may be programmed. If parameter 96 was reprogrammed to "Analog In 2" as the manual speed reference, you must reprogram all of the other factory default uses for that input. If "Analog In 1" is selected, you must verify that another speed ref source has also been programmed for Analog Input 1. These may include parameters 90, 93, 117, 128 and 179. To remove the drive inhibit, either reprogram the selections for references to an Analog Input or deactivate the "Auto/Manual" Function by reprogramming [Digital In3 Sel] to another function or "Unused."

⁽¹⁾ See User Manual for a description of alarm types.

Specifications

The Voltage Tolerance specification has been updated.

Category	Specification					
Electrical	Voltage Tolerance:	Voltage Class	Nominal Line Voltage	Typical Motor Voltage	Drive Input Voltage	
					Operating Range	Full Power Range ⁽¹⁾
		200	200	200	180-264	200-264
			208	208		208-264
			240	230		230-264
		400	380	380	342-528	380-528
			400	400		400-528
			480	460		460-528
		600	600	575	432-660	575-660
		600/690	690	690	432-759	575-759 ⁽²⁾

⁽¹⁾ Rated current is available across the entire range. The drive will output rated HP from nominal motor voltage to nominal drive voltage +10%. Below nominal motor voltage input (230,460,575), the drives output HP will be derated linearly with the input voltage. Example: a 5 HP, 480V drive operated at 342V will produce linearly increasing HP up to 3.7 HP @ 44.6 Hz (342/460*60). This point becomes the effective above 44.6 Hz, if the load demands more power, current will increase and/or speed will decrease.

⁽²⁾ 690V must be neutral-grounded (grounded-Y) Only.

Common Bus (DC Input) Additions

The following material pertains to Common Bus (DC Input) drives only.

Cooling Fan Voltage

Common Bus drives require user supplied 120 or 240V AC to power the cooling fans. The power source is connected between “0 VAC” and the terminal corresponding to your source voltage (see [Figure 1](#)).

Table A Fan VA ratings (DC Input Only)

Frame	Rating (120V or 240V)
5	100 VA
6	138 VA

Power Terminal Block Specifications

Common Bus drives have additional terminals for the fan power supply. Refer to [Figure 1](#) for terminal identification.

No.	Name	Frame	Description	Wire Size Range ⁽¹⁾		Torque	
				Maximum	Minimum	Maximum	Recommended
4	Fan Terminal Block	5-6	User Supplied Fan Voltage	4.0 mm ² (10 AWG)	0.5 mm ² (22 AWG)	0.6 N-m (5.3 lb.-in.)	0.6 N-m (5.3 lb.-in.)

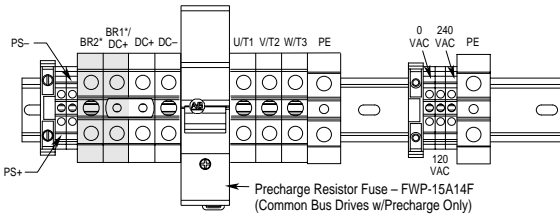
⁽¹⁾ Maximum/minimum sizes that the terminal block will accept - these are not recommendations.

Important Common Bus (DC Input) Application Notes

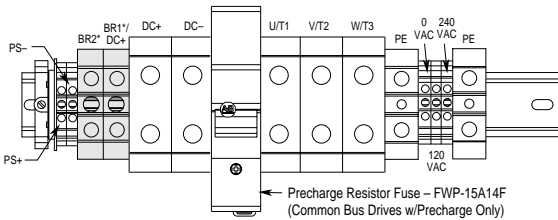
1. If drives without internal precharge are used (Frames 5 & 6 only), then:
 - a) precharge capability must be provided in the system to guard against possible damage, and
 - b) disconnect switches Must Not be used between the input of the drive and a common DC bus without the use of an external precharge device.
2. If drives with internal precharge (Frames 0-6) are used with a disconnect switch to the common bus, then:
 - a) an auxiliary contact on the disconnect must be connected to a digital input of the drive. The corresponding input (parameter 361-366) must be set to option 30, “Precharge Enable.” This provides the proper precharge interlock, guarding against possible damage to the drive when connected to a common DC bus.
 - b) the drive must have firmware version 2.002 or above (Standard & Vector Control).

Figure 1 Power Terminal Block – Common Bus (DC Input) Drives

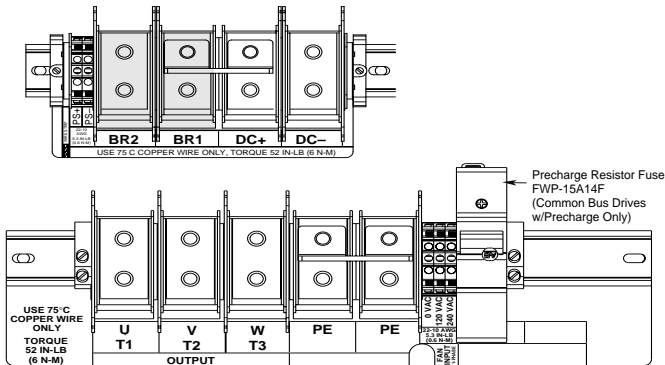
Frame 5 – 75 HP



Frame 5 – 100 HP



Frame 6



Catalog Number Explanation

Refer to the following page for updated explanation. Special attention should be directed to “Note 5,” explaining that Vector Control drives utilize DPI Only.

Drive, Fuse & Circuit Breaker Ratings

Tables have been updated to include new ratings. Refer to pages [6-11](#). New tables have been added for Common Bus (DC Input) drives on page [12](#). Updated Frame Reference table is on page [14](#).

Catalog Number Explanation

20B	D	2P1	A	3	A	Y	N	A	R	A	0
Drive	Voltage Rating	Rating	Enclosure	HIM	Documentation	Brake	Brake Resistor	Emission	Comm Slot	I/O	Feedback

Code	Type	Code	Enclosure	Code	Type	Code	w/Resistor	Code	Type
20B	700	A	IP 20, NEMA Type 1	A	User Manual	Y	Yes ⁽¹⁾	0	None
		N	Open	N	No Manual	N	No	1	Encoder, 12V

Code	Voltage	Ph.	Prechg	Code	Operator Interface	Code	w/Brake IGBT⁽²⁾	Code	CE Filter	CM Choke	Code	Control	I/O Volts
B	240V AC	3	-	0	Blank Cover	A	Yes	A	Yes	Yes	A	Std.	24V DC/AC
C	400V AC	3	-	2	Digital LCD	N	No	B	Yes	No	B	Std.	115V AC
D	480V AC	3	-	3	Full Numeric LCD						C	Vector ⁽⁵⁾	24V DC/AC
E	600V AC ⁽³⁾	3	-	4	Analog LCD						D	Vector ⁽⁵⁾	115V AC
F	690V AC	3	-	5	Prog. Only LCD						N	Std.	None
H	540V DC ⁽⁴⁾	-	N										
J	650V DC ⁽⁴⁾	-	N										
P	540V DC ⁽⁴⁾	-	Y										
R	650V DC ⁽⁴⁾	-	Y										

208/240V 60Hz Input

208V		240V	
Code	Amps	Amps	kW (HP)
P22	2.5	2.2	0.37 (0.5)
4P2	4.8	4.2	0.75 (1.0)
6P8	7.8	6.8	1.5 (2.0)
9P6	11	9.6	2.2 (3.0)
015	17.5	15.3	4.0 (5.0)
022	25.3	22	5.5 (7.5)
028	32.2	28	7.5 (10)
042	48.3	42	11 (15)
052	56	52	15 (20)
070	78.2	70	18.5 (25)
080	92	80	22 (30)
104	120	104	30 (40)
130	130	130	37 (50)
154	177	154	45 (60)
192	221	192	55 (75)

400/480V 60Hz Input

400V		480V	
Code	Amps	Amps	kW (HP)
1P1	1.3	1.1	0.37 (0.5)
2P1	2.1	2.1	0.75 (1.0)
3P4	3.5	3.4	1.5 (2.0)
5P0	5	5	2.2 (3.0)
8P0	8.7	8	4.0 (5.0)
011	11.5	11	5.5 (7.5)
014	15.4	14	7.5 (10)
022	22	22	11 (15)
027	30	27	15 (20)
034	37	34	18.5 (25)
040	43	40	22 (30)
052	56	52	30 (40)
065	72	65	37 (50)
077	85	77	45 (60)
096	105	96	55 (75)
125	125	125	75 (100)
140	140	140	75 (100)
156	170	156	90 (125)
180	205	180	110 (150)

600V 60Hz Input⁽³⁾

600V	
Code	kW (HP)
0P9	0.9 0.37 (0.5)
1P7	1.7 0.75 (1.0)
2P7	2.7 1.5 (2.0)
3P9	3.9 2.2 (3.0)
6P1	6.1 4.0 (5.0)
9P0	9.0 5.5 (7.5)
011	11 7.5 (10)
017	17 11 (15)
022	22 15 (20)
027	27 18.5 (25)
032	32 22 (30)
041	41 30 (40)
052	52 37 (50)
062	62 45 (60)
077	77 55 (75)
099	99 75 (100)
125	125 90 (125)
144	144 110 (150)

690V 60Hz Input

690V		
Code	Amps	kW (HP)
052	52	45 (50)
060	60	55 (60)
082	82	75 (75)
098	98	90 (100)

Code Version

C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
R	RIO
S	RS-485
N	None

⁽¹⁾ Not available for Frame 3 drives or larger.⁽²⁾ Brake IGBT is standard on Frames 0-3 and optional on Frames 4-6.⁽³⁾ Note: CE Certification testing has not been performed on 600V class drives.⁽⁴⁾ Frames 5 & 6 Only.⁽⁵⁾ Vector Control Option utilizes DPI only.

Table B 208 Volt AC Input Protection Devices (See [page 11](#) for Notes)

Drive Catalog Number	Frame	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾	140M Motor Starter with Adjustable Current Range ⁽⁵⁾⁽⁶⁾			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾	Available Catalog Numbers ⁽⁷⁾			
208 Volt AC Input																		
20BB2P2	0	0.5	0.33	1.9	0.7	2.5	2.8	3.8	3	6	3	10	15	3	140M-C2E-B25	140M-D8E-B25	-	-
20BB4P2	0	1	0.75	3.7	1.3	4.8	5.6	7.0	6	10	6	17.5	15	7	140M-C2E-B63	140M-D8E-B63	-	-
20BB6P8	1	2	1.5	6.8	2.4	7.8	10.4	13.8	10	15	10	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	-
20BB9P6	1	3	2	9.5	3.4	11	12.1	17	12	20	12	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	-
20BB015	1	5	3	15.7	5.7	17.5	19.3	26.3	20	35	20	70	70	30	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	-
20BB022	1	7.5	5	23.0	8.3	25.3	27.8	38	30	50	30	100	100	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140M-CMN-2500
20BB028	2	10	7.5	29.6	10.7	32.2	38	50.6	40	70	40	125	125	50	-	-	140M-F8E-C32	140M-CMN-4000
20BB042	3	15	10	44.5	16.0	48.3	53.1	72.5	60	100	60	175	175	70	-	-	140M-F8E-C45	140M-CMN-6300
20BB052	3	20	15	51.5	17.1	56	64	86	80	125	80	200	200	100	-	-	-	140M-CMN-6300
20BB070	4	25	20	72	25.9	78.2	93	124	90	175	90	300	300	100	-	-	-	140M-CMN-9000
20BB080	4	30	25	84.7	30.5	92	117	156	110	200	110	350	350	150	-	-	-	140M-CMN-9000
20BB104	5	-	30	84.7	30.5	92	138	175	125	200	125	350	300	150	-	-	-	140M-CMN-9000
		40	-	113	40.7	120	132	175	150	250	150	475	350	150	-	-	-	-
20BB130	5	-	40	98	35.3	104	156	175	125	225	125	400	300	150	-	-	-	-
		50	-	122	44.1	130	143	175	175	275	175	500	375	250	-	-	-	-
20BB154	6	-	50	141	50.9	150	225	300	200	300	200	500	450	250	-	-	-	-
		60	-	167	60.1	177	195	266	225	350	225	500	500	250	-	-	-	-
20BB192	6	-	60	167	60.1	177	266	308	225	350	225	500	500	250	-	-	-	-
		75	-	208	75.0	221	243	308	300	450	300	600	600	400	-	-	-	-

Table C 240 Volt AC Input Protection Devices (See [page 11](#) for Notes)

Drive Catalog Number	Frame	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾	140M Motor Starter with Adjustable Current Range ⁽⁵⁾⁽⁶⁾			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾	Available Catalog Numbers ⁽⁷⁾			
240 Volt AC Input																		
20BB2P2	0	0.5	0.33	1.7	0.7	2.2	2.4	3.3	3	6	3	10	15	3	140M-C2E-B25	140M-D8E-B25	-	-
20BB4P2	0	1	0.75	3.3	1.4	4.2	4.8	6.4	5	8	5	15	15	7	140M-C2E-B63	140M-D8E-B63	-	-
20BB6P8	1	2	1.5	5.9	2.4	6.8	9	12	10	15	10	25	25	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	-
20BB9P6	1	3	2	8.3	3.4	9.6	10.6	14.4	12	20	12	35	35	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	-
20BB015	1	5	3	13.7	5.7	15.3	16.8	23	20	30	20	60	60	30	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	-
20BB022	1	7.5	5	19.9	8.3	22	24.2	33	25	50	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140M-CMN-2500
20BB028	2	10	7.5	25.7	10.7	28	33	44	35	60	35	100	100	50	-	-	140M-F8E-C32	140M-CMN-4000
20BB042	3	15	10	38.5	16.0	42	46.2	63	50	90	50	150	150	50	-	-	140M-F8E-C45	140M-CMN-6300
20BB052	3	20	15	47.7	19.8	52	63	80	60	100	60	200	200	100	-	-	-	140M-CMN-6300
20BB070	4	25	20	64.2	26.7	70	78	105	90	150	90	275	275	100	-	-	-	140M-CMN-9000
20BB080	4	30	25	73.2	30.5	80	105	140	100	180	100	300	300	100	-	-	-	140M-CMN-9000
20BB104	5	-	30	73	30.5	80	120	160	100	175	100	300	300	100	-	-	-	140M-CMN-9000
		40	-	98	40.6	104	115	175	125	225	125	400	300	150	-	-	-	-
20BB130	5	-	40	98	40.6	104	156	175	125	225	125	400	300	150	-	-	-	-
		50	-	122	50.7	130	143	175	175	275	175	500	375	250	-	-	-	-
20BB154	6	-	50	122	50.7	130	195	260	175	275	175	500	375	250	-	-	-	-
		60	-	145	60.1	154	231	308	200	300	200	600	450	250	-	-	-	-
20BB192	6	-	60	145	60.1	154	231	308	200	300	200	600	450	250	-	-	-	-
		75	-	180	74.9	192	211	288	225	400	225	600	575	250	-	-	-	-

Table D 400 Volt AC Input Protection Devices (See page 11 for Notes)

Drive Catalog Number	Frame	kW Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾	140M Motor Starter with Adjustable Current Range ⁽⁵⁾⁽⁶⁾			
		ND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾	Available Catalog Numbers ⁽⁷⁾			
400 Volt AC Input																		
20BC1P3	0	0.37	0.25	1.1	0.77	1.3	1.4	1.9	3	3	3	6	15	3	140M-C2E-B16	-	-	-
20BC2P1	0	0.75	0.55	1.8	1.3	2.1	2.4	3.2	3	6	3	8	15	3	140M-C2E-B25	140M-D8E-B25	-	-
20BC3P5	0	1.5	0.75	3.2	2.2	3.5	4.5	6.0	6	7	6	12	15	7	140M-C2E-B40	140M-D8E-B40	-	-
20BC5P0	0	2.2	1.5	4.6	3.2	5.0	5.5	7.5	6	10	6	20	20	7	140M-C2E-B63	140M-D8E-B63	-	-
20BC8P7	0	4	2.2	7.9	5.5	8.7	9.9	13.2	15	17.5	15	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	-
20BC011	0	5.5	4	10.8	7.5	11.5	13	17.4	15	25	15	45	45	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	-
20BC015	1	7.5	5.5	14.4	10.0	15.4	17.2	23.1	20	30	20	60	60	20	140M-C2E-C20	140M-D8E-C20	140M-F8E-C20	-
20BC022	1	11	7.5	20.6	14.3	22	24.2	33	30	45	30	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	-
20BC030	2	15	11	28.4	19.7	30	33	45	35	60	35	120	120	50	-	-	140M-F8E-C32	-
20BC037	2	18.5	15	35.0	24.3	37	45	60	45	80	45	125	125	50	-	-	140M-F8E-C45	-
20BC043	3	22	18.5	40.7	28.2	43	56	74	60	90	60	150	150	60	-	-	-	-
20BC056	3	30	22	53	36.7	56	64	86	70	125	70	200	200	100	-	-	-	-
20BC072	3	37	30	68.9	47.8	72	84	112	90	150	90	250	250	100	-	-	-	-
20BC085 ⁽⁸⁾	4	-	37	68.9	47.8	72	108	144	90	175	90	275	300	100	-	-	-	-
		45	-	81.4	56.4	85	94	128	110	200	110	300	300	150	-	-	-	-
20BC105	5	-	45	81.4	56.4	85	128	170	110	175	110	300	300	150	-	-	-	-
		55	-	100.5	69.6	105	116	158	125	225	125	400	300	150	-	-	-	-
20BC125	5	-	45	91.9	63.7	96	144	168	125	200	125	375	375	150	-	-	-	-
		55	-	121.1	83.9	125	138	163	150	275	150	500	375	250	-	-	-	-
20BC140	6	-	55	111	76	105	158	210	150	225	150	400	300	150	-	-	-	-
		75	-	149	103	140	154	210	200	300	200	550	400	250	-	-	-	-
20BC170	6	-	75	136	103	140	210	280	200	300	200	550	400	250	-	-	-	-
		90	-	164	126	170	187	255	250	375	250	600	500	250	-	-	-	-
20BC205 ⁽⁹⁾	6	-	90	164	126	170	255	313	250	375	250	600	500	250	-	-	-	-
		110	-	199	148	205	220	289	250	450	250	600	600	400	-	-	-	-

Table E 480 Volt AC Input Protection Devices (See [page 11](#) for Notes)

Drive Catalog Number	Frame	HP Rating		Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾	140M Motor Starter with Adjustable Current Range ⁽⁵⁾⁽⁶⁾			
		IND	HD	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾	Available Catalog Numbers ⁽⁷⁾			
480 Volt AC Input																		
20BD1P1	0	0.5	0.33	0.9	0.7	1.1	1.2	1.6	3	3	3	6	15	3	140M-C2E-B16	-	-	-
20BD2P1	0	1	0.75	1.6	1.4	2.1	2.4	3.2	3	6	3	8	15	3	140M-C2E-B25	-	-	-
20BD3P4	0	2	1.5	2.6	2.2	3.4	4.5	6.0	4	8	4	12	15	7	140M-C2E-B40	140M-D8E-B40	-	-
20BD5P0	0	3	2	3.9	3.2	5.0	5.5	7.5	6	10	6	20	20	7	140M-C2E-C63	140M-D8E-B63	-	-
20BD8P0	0	5	3	6.9	5.7	8.0	8.8	12	10	15	10	30	30	15	140M-C2E-C10	140M-D8E-C10	140M-F8E-C10	-
20BD011	0	7.5	5	9.5	7.9	11	12.1	16.5	15	20	15	40	40	15	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	-
20BD014	1	10	7.5	12.5	10.4	14	16.5	22	17.5	30	17.5	50	50	20	140M-C2E-C16	140M-D8E-C16	140M-F8E-C16	-
20BD022	1	15	10	19.9	16.6	22	24.2	33	25	50	25	80	80	30	140M-C2E-C25	140M-D8E-C25	140M-F8E-C25	140-CMN-2500
20BD027	2	20	15	24.8	20.6	27	33	44	35	60	35	100	100	50	-	-	140M-F8E-C32	140-CMN-4000
20BD034	2	25	20	31.2	25.9	34	40.5	54	40	70	40	125	125	50	-	-	140M-F8E-C45	140-CMN-4000
20BD040	3	30	25	36.7	30.5	40	51	68	50	90	50	150	150	50	-	-	140M-F8E-C45	140-CMN-4000
20BD052	3	40	30	47.7	39.7	52	60	80	60	110	60	200	200	70	-	-	-	140M-CMN-6300
20BD065	3	50	40	59.6	49.6	65	78	104	80	125	80	250	250	100	-	-	-	140M-CMN-9000
20BD077	4	-	50	59.6	49.6	65	98	130	80	125	80	250	250	100	-	-	-	140M-CMN-9000
		60	-	72.3	60.1	77	85	116	100	170	100	300	300	100	-	-	-	140M-CMN-9000
20BD096	5	-	60	72.3	60.1	77	116	154	100	170	100	300	300	100	-	-	-	140M-CMN-9000
		75	-	90.1	74.9	96	106	144	125	200	125	350	350	125	-	-	-	-
20BD125	5	-	75	90.1	74.9	96	144	168	125	200	125	350	350	125	-	-	-	-
		100	-	117	97.6	125	138	163	150	250	150	500	375	150	-	-	-	-
20BD140	6	-	75	90	75	105	158	210	125	225	125	400	300	125	-	-	-	-
		100	-	131	109	140	154	210	175	300	175	550	400	250	-	-	-	-
20BD156	6	-	100	131	109	125	188	250	175	250	175	500	375	250	-	-	-	-
		125	-	147	122	156	172	234	200	350	200	600	450	250	-	-	-	-
20BD180	6	-	125	147	122	156	234	312	200	350	200	600	450	250	-	-	-	-
		150	-	169	141	180	198	270	225	400	225	600	500	250	-	-	-	-

Table F 600 Volt AC Input Protection Devices (See [page 11](#) for Notes)

Drive Catalog Number	Frame	HP Rating		PWM Freq.	Temp.	Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾
		ND	HD	kHz	°C	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾
600 Volt AC Input																
20BE0P9	0	0.5	0.3	4	50	0.7	0.7	0.9	1.1	1.4	1	3	1	3	15	3
20BE1P7	0	1	0.5	4	50	1.3	1.4	1.7	2	2.6	2	4	2	6	15	3
20BE2P7	0	2	1	4	50	2.1	2.1	2.7	3.6	4.8	3	6	3	10	15	3
20BE3P9	0	3	2	4	50	3.0	3.1	3.9	4.3	5.9	6	9	6	15	15	7
20BE6P1	0	5	3	4	50	5.3	5.5	6.1	6.7	9.2	9	12	9	20	20	15
20BE9P0	0	7.5	5	4	50	7.8	8.1	9	9.9	13.5	10	20	10	35	30	15
20BE011	1	10	7.5	4	50	9.9	10.2	11	13.5	18	15	25	15	40	40	15
20BE017	1	15	10	4	50	15.4	16.0	17	18.7	25.5	20	40	20	60	50	20
20BE022	2	20	15	4	50	20.2	21.0	22	25.5	34	30	50	30	80	80	30
20BE027	2	25	20	4	50	24.8	25.7	27	33	44	35	60	35	100	100	50
20BE032	3	30	25	4	50	29.4	30.5	32	40.5	54	40	70	40	125	125	50
20BE041	3	40	30	4	50	37.6	39.1	41	48	64	50	90	50	150	150	100
20BE052	3	50	40	4	50	47.7	49.6	52	61.5	82	60	110	60	200	200	100
20BE062	4	60	50	2	50	58.2	60.5	62	78	104	80	125	80	225	225	100
20BE077	5	75	–	2	50	72.3	75.1	77	85	116	90	150	90	300	300	100
		–	60	2	50	58.2	60.5	63	94	126	90	125	90	250	250	100
20BE099	5	100	–	2	40	92.9	96.6	99	109	126	125	200	125	375	375	150
		–	75	2	40	72.3	75.1	77	116	138	100	175	100	300	300	100
20BE125	6	125	–	2	50	117	122	125			150	250	150	375	375	250
		–	100	2	50	92.9	96.6	125			125	250	125	375	375	250
20BE144	6	150	–	2		135	141	144			175	300	175	400	400	250
		–	125	2		117	122	144			150	300	150	400	400	250

Table G 690 Volt AC Input Protection Devices (See [page 11](#) for Notes)

Drive Catalog Number	Frame	kW Rating		PWM Freq.	Temp.	Input Ratings		Output Amps			Dual Element Time Delay Fuse		Non-Time Delay Fuse		Circuit Breaker ⁽³⁾	Motor Circuit Protector ⁽⁴⁾
		ND	HD	kHz	°C	Amps	kVA	Cont.	1 Min.	3 Sec.	Min. ⁽¹⁾	Max. ⁽²⁾	Min. ⁽¹⁾	Max. ⁽²⁾	Max. ⁽¹⁰⁾	Max. ⁽¹⁰⁾
690 Volt AC Input																
20BF052	5	45	–	4	50	46.9	56.1	52	57	78	60	110	60	175	175	–
		–	37.5	4	50	40.1	48.0	46	69	92	50	90	50	150	150	–
20BF060	5	55	–	4	50	57.7	68.9	60	66	90	80	125	80	225	225	–
		–	45	4	50	46.9	56.1	52	78	104	60	110	60	175	175	–
20BF082	5	75	–	2	50	79.0	94.4	82	90	123	100	200	100	375	375	–
		–	55	2	50	57.7	68.9	60	90	120	80	125	80	225	225	–
20BF098	5	90	–	2	40	94.7	113	98	108	127	125	200	125	375	375	–
		–	75	2	40	79.0	94.4	82	123	140	100	200	100	375	375	–

Notes:

- (1) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.
- (2) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.
- (3) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings shown are maximum.
- (4) Motor Circuit Protector - instantaneous trip circuit breaker. For US NEC minimum size is 125% of motor FLA. Ratings shown are maximum.
- (5) Bulletin 140M with adjustable current range should have the current trip set to the minimum range that the device will not trip.
- (6) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/ 347. Not UL listed for use on 480V or 600V Delta/Delta systems.
- (7) The AIC ratings of the Bulletin 140M Motor Protector may vary. See publication 140M-SG001B-EN-P.
- (8) 20BC085 current rating is limited to 45 degrees C ambient.
- (9) 20BC205 current rating is limited to 40 degrees C ambient.
- (10) Maximum allowable rating by US NEC. Exact size must be chosen for each installation.

Table H 540 Volt DC Input Protection Devices

Drive Catalog Number	Frame	kW Rating		DC Input Ratings		Output Amps			Fuse	Bussmann Style Fuse
		ND	HD	Amps	kW	Cont.	1 Min.	3 Sec.		
540 Volt DC Input										
20BC1P3	1	0.37	0.25	1.3	0.7	1.3	1.4	1.9	3	BUSSMANN_JKS-3
20BC2P1	1	0.75	0.55	2.1	1.1	2.1	2.4	3.2	6	BUSSMANN_JKS-6
20BC3P5	1	1.5	0.75	3.7	2.0	3.5	4.5	6.0	8	BUSSMANN_JKS-8
20BC5P0	1	2.2	1.5	5.3	2.9	5.0	5.5	7.5	10	BUSSMANN_JKS-10
20BC8P7	1	4	3.0	9.3	5.0	8.7	9.9	13.2	20	BUSSMANN_JKS-20
20BC011	1	5.5	4	12.6	6.8	11.5	13	17.4	25	BUSSMANN_JKS-25
20BC015	1	7.5	5.5	16.8	9.1	15.4	17.2	23.1	30	BUSSMANN_JKS-30
20BC022	1	11	7.5	24	13	22	24.2	33	45	BUSSMANN_JKS-45
20BC030	2	15	11	33.2	17.9	30	33	45	60	BUSSMANN_JKS-60
20BC037	2	18.5	15	40.9	22.1	37	45	60	80	BUSSMANN_JKS-80
20BC043	3	22	18.5	47.5	25.7	43	56	74	90	BUSSMANN_JKS-90
20BC056	3	30	22	61.9	33.4	56	64	86	110	BUSSMANN_JKS-110
20BC072	3	37	30	80.5	43.5	72	84	112	150	BUSSMANN_JKS-150
20BC085	4	–	37	80.5	43.5	72	108	144	150	BUSSMANN_JKS-150
		45	–	95.1	51.3	85	94	128	200	BUSSMANN_JKS-200
20BH105 ⁽¹⁾	5	–	45	95.1	51.3	85	128	170	200	BUSSMANN_JKS-200
		55	–	117.4	63.4	105	116	158	200	BUSSMANN_JKS-200
20BH125 ⁽¹⁾	5	–	45	91.9	63.7	96	144	168	150	
		55	–	139.8	75.5	125	138	163	225	BUSSMANN_JKS-225
20BH140 ⁽¹⁾	6	–	55	117.4	63.4	105	158	210	200	BUSSMANN_JKS-200
		75	–	158.4	85.6	140	154	210	300	BUSSMANN_JKS-300
20DH170 ⁽¹⁾	6	–	75	158.4	85.6	140	210	280	300	BUSSMANN_JKS-300
		90	–	192.4	103.9	170	187	255	350	BUSSMANN_JKS-350
20DH205 ⁽¹⁾	6	–	90	192.4	103.9	170	255	313	350	BUSSMANN_JKS-350
		110	–	232	125.3	205	220	289	400	BUSSMANN_JKS-400

(1) Also applies to *P* voltage class.

Table I 650 Volt DC Input Protection Devices

Drive Catalog Number	Frame	kW Rating		DC Input Ratings		Output Amps			Fuse	Bussmann Style Fuse
		ND	HD	Amps	kW	Cont.	1 Min.	3 Sec.		
650 Volt DC Input										
20BD1P1	0	0.5	0.33	1.0	0.6	1.1	1.2	1.6	6	BUSSMANN_JKS-6
20BD2P1	0	1	0.75	1.9	1.2	2.1	2.4	3.2	6	BUSSMANN_JKS-6
20BD3P4	0	2	1.5	3.0	2.0	3.4	4.5	6.0	6	BUSSMANN_JKS-6
20BD5P0	0	3	2	4.5	2.9	5.0	5.5	7.5	10	BUSSMANN_JKS-10
20BD8P0	0	5	3	8.1	5.2	8.0	8.8	12	15	BUSSMANN_JKS-15
20BD011	0	7.5	5	11.1	7.2	11	12.1	16.5	20	BUSSMANN_JKS-20
20BD014	1	10	7.5	14.7	9.5	14	16.5	22	30	BUSSMANN_JKS-30
20BD022	1	15	10	23.3	15.1	22	24.2	33	45	BUSSMANN_JKS-45
20BD027	2	20	15	28.9	18.8	27	33	44	60	BUSSMANN_JKS-60
20BD034	2	25	20	36.4	23.6	34	40.5	54	70	BUSSMANN_JKS-70
20BD040	3	30	25	42.9	27.8	40	51	68	80	BUSSMANN_JKS-80
20BD052	3	40	30	55.7	36.1	52	60	80	100	BUSSMANN_JKS-100
20BD065	3	50	40	69.7	45.4	65	78	104	150	BUSSMANN_JKS-150
20BR077 ⁽¹⁾	4	–	50	67.9	45.4	65	98	130	150	BUSSMANN_JKS-150
	4	60	–	84.5	54.7	77	85	116	150	BUSSMANN_JKS-150
20BR096 ⁽¹⁾	5	–	60	84.5	54.7	77	116	154	150	BUSSMANN_JKS-150
	5	75	–	105.3	68.3	96	106	144	200	BUSSMANN_JKS-200
20BR125 ⁽¹⁾	5	–	75	105.3	68.3	96	144	168	200	BUSSMANN_JKS-200
	5	100	–	137.1	88.9	125	138	163	250	BUSSMANN_JKS-250
20BR156 ⁽¹⁾	6	–	100	137.1	88.9	125	188	250	250	BUSSMANN_JKS-250
	6	125	–	171.2	110.9	156	172	234	300	BUSSMANN_JKS-300
20BR180 ⁽¹⁾	6	–	125	171.2	110.9	156	234	312	300	BUSSMANN_JKS-300
	6	150	–	204.1	132.2	180	198	270	400	BUSSMANN_JKS-400

(1) Also applies to *P* voltage class.

Table J PowerFlex 700 Frames

Frame	AC Input								DC Input			
	208/240		400V		480V		600V		540V		650V	
	ND HP	HD HP	ND kW	HD kW	ND HP	HD HP	ND HP	HD HP	ND HP	HD HP	ND HP	HD HP
0	0.5	0.33	0.37	0.25	0.5	0.33	-	-	0.37	0.25	0.5	0.33
	1	0.75	0.75	0.55	1	0.75	-	-	0.75	0.55	1	0.75
	-	-	1.5	0.75	2	1.5	-	-	1.5	0.75	2	1.5
	-	-	2.2	1.5	3	2	-	-	2.2	1.5	3	2
	-	-	4	2.2	5	3	-	-	4	2.2	5	3
-	-	5.5	4	7.5	5	-	-	5.5	4	7.5	5	
1	2	1.5	7.5	5.5	10	7.5	10	7.5	7.5	5.5	10	7.5
	3	2	11	7.5	15	10	15	10	11	7.5	15	10
	5	3	-	-	-	-	-	-	-	-	-	-
	7.5	5	-	-	-	-	-	-	-	-	-	-
2	10	7.5	15	11	20	15	20	15	15	11	20	15
	-	-	18.5	15	25	20	25	20	18.5	15	25	20
3	15	10	22	18.5	30	25	30	25	22	18.5	30	25
	20	15	30	22	40	30	40	30	30	22	40	30
	-	-	37	30	50	40	50	40	37	30	50	40
4	25	20	45	37	60	50	60	50	45	37	60	50
	30	25	-	-	-	-	-	-	-	-	-	-
5	40	30	55	45	75	60	75	60	55	45	75	60
	50	40	-	-	100	75	100	75	-	-	100	75
6	60	50	75	55	125	100	-	-	75	55	125	100
	75	60	90	75	150	125	-	-	90	75	150	125
	-	-	110	90	-	-	-	-	110	90	-	-

Notes:



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