



PowerFlex[®] 400 Submittal

Submittal Date:

Project Name:

Project Location:

Consulting Engineer:

Contractor:

Contractor PO #:

Distributor Name:

Distributor Contact:

Distributor Reference #:

Note: This is general submittal information. Reference product installation and/or user manual for detailed instructions.

Catalog Number Explanation

PowerFlex 400 Standard Product

3.0 – 50HP @ 200 to 240VAC
 3.0 – 350HP @ 380 to 480VAC

Catalog Number Explanation – Standard Product

1-3		4	5	6-8		9	10	11	12
22C		-	D	038		A	1	0	3
<i>a</i>			<i>b</i>	<i>c</i>		<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>

a

Drive	
Code	Type
22C	PowerFlex 400

b

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

c1

Rating			
200...240V Input			
Code	Amps	kW (Hp)	Frame
012	12	2.2 (3.0)	C
017	17.5	3.7 (5.0)	C
024	24	5.5 (7.5)	C
033	33	7.5 (10)	C
049	49	11 (15)	D
065	65	15 (20)	D
075	75	18.5 (25)	D
090	90	22 (30)	D
120	120	30 (40)	E
145	145	37 (50)	E

c2

Rating			
380...480V Input			
Code	Amps	kW (Hp)	Frame
6P0	6.0	2.2 (3.0)	C
010	10.5	4.0 (5.0)	C
012	12	5.5 (7.5)	C
017	17	7.5 (10)	C
022	22	11 (15)	C
030	30	15 (20)	C
038	38	18.5 (25)	D
045	45.5	22 (30)	D
060	60	30 (40)	D
072	72	37 (50)	E
088	88	45 (60)	E
105	105	55 (75)	E
142	142	75 (100)	E
170	170	90 (125)	F
208	208	110 (150)	F
260	260	132 (200)	G
310	310	160 (250)	G
370	370	200 (300)	H
460	460	250 (350)	H

d

Enclosure	
Code	Enclosure
N	Panel Mount - IP20, NEMA/UL Type Open *
A	Panel Mount - IP30, NEMA/UL Type 1 Ⓢ
F	Flange Mount - IP20, NEMA/UL Type Open ‡

* Frame C drives only available with IP20, NEMA/UL Type Open enclosure. Field installed conversion kit available to achieve IP30, NEMA/UL Type 1 rating.
 Ⓢ Frame D, E and F drives only available with IP30, NEMA/UL Type 1 enclosure.
 ‡ Frame C drives only.

e

HIM	
Code	Interface Module
1	Fixed Keypad

f

Emission Class	
Code	Rating
0	Not Filtered

g

Version	
Code	Version
3	RS485

Catalog Number Explanation

PowerFlex 400 Packaged Product

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Catalog Number Explanation – Packaged Product

1-3			4	5	6-8		9	Position Number						15	16	17	18	19+
23C			-	D	038		A	1	0	3	N	N	B	A	N	N	-LR	
a			b	c	d		e	f	g	h	i	j	k	l	m	n		
a																		
Drive																		
Code	Type																	
23C	PowerFlex 400																	
b																		
Voltage Rating																		
Code	Voltage																Ph.	
X	208V ac																3	
D	460V ac																3	
c1																		
Rating																		
208V, 60Hz Input																		
Code	Amps *	kW (Hp)																Frame
012	12	2.2 (3.0)																C
017	16.6	3.7 (5.0)																C
024	24	5.5 (7.5)																C
033	30.6	7.5 (10)																C
049	46.2	11 (15)																D
065	64	15 (20)																D
075	75	18.5 (25)																D
090	88	22 (30)																D
120	114	30 (40)																E
145	143	37 (50)																E
* Configured drive amp ratings may differ from stand-alone drive ratings. Configured drives sized per NEC motor amps.																		
c2																		
Rating																		
460V, 60Hz Input																		
Code	Amps *	kW (Hp)																Frame
0P0	4.8	2.2 (3.0)																C
010	7.6	4.0 (5.0)																C
012	11	5.5 (7.5)																C
017	14	7.5 (10)																C
022	21	11 (15)																C
030	27	15 (20)																C
038	34	18.5 (25)																D
045	40	22 (30)																D
060	52	30 (40)																D
072	65	37 (50)																E
088	77	45 (60)																E
105	96	55 (75)																E
142	124	75 (100)																E
170	156	90 (125)																F
208	180	110 (150)																F
260	240	132 (200)																G
310	302	160 (250)																G
370	361	200 (300)																H
460	414	250 (350)																H
* Configured amp ratings may differ from stand-alone drive ratings. Configured drives sized per NEC motor amps.																		
d																		
Enclosure																		
Code	Enclosure																	
A	NEMA/UL Type 1																	
H	NEMA/UL Type 12 with Fan and Filter																	
X	NEMA/UL Type 3R ‡																	
E	NEMA/UL Type 4 ‡																	
‡ Designed for maximum ambient temperature of 40° C with no direct sunlight exposure.																		
e																		
HIM																		
Code	Interface Module																	
1	Fixed Keypad																	
f																		
Emission Class																		
Code	Rating																	
0	Not Filtered																	
g																		
Version																		
Code	Version																	
3	RS485																	
B	BACnet Adapter																	
C	ControlNet Adapter																	
D	DeviceNet Adapter																	
E	EtherNet/IP Adapter																	
L	LonWorks Adapter																	
P	PROFIBUS DP Adapter																	
h																		
Code	Rating																	
N	Reserved																	
i																		
Code	Rating																	
N	Reserved																	
j																		
Package																		
Code	Description																	
A	Main Input Disconnect																	
B	3 Contactor Full Feature Bypass with Disconnect																	
C	3 Contactor Basic Bypass with Disconnect -																	
M	Main Input Circuit Breaker †																	
N	3 Contactor Full Feature Bypass with Circuit Breaker †																	
† Available only with NEMA/UL Type 1 enclosure (Position d = A).																		
‡ Available with all ratings in NEMA/UL Type 12, 3R, or 4 enclosures (Position d = H, X, or E) and 180-250 kW (250-350 Hp) ratings in NEMA/UL Type 1 enclosures (Position d = A).																		
k																		
Control																		
Code	Description																	
A	Single Motor																	
l																		
Code	Rating																	
N	Reserved																	
m																		
Code	Rating																	
N	Reserved																	
n																		
Options																		
Code	Description																	
-LR	3% Input Line Reactor §																	
-E5	Space Heater - Local Power †																	
§ 3% Input Line Reactor not available for all package styles. Consult product selection tables for additional detail.																		
† Available with NEMA/UL Type 3R and 4 enclosure only.																		

Drive Ratings

PowerFlex 400 Standard Product

3.0 – 50HP @ 200 to 240VAC
3.0 – 350HP @ 380 to 480VAC

Drive Ratings										
Catalog Number	Output Rating		Input Rating			Branch Circuit Protection				Estimated Power Dissipation
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses	140M Motor Protectors(1)(2)	Contactors	Min. Enclosure Volume(3) (in. ³)	IP 20 Open Watts
200 – 240V AC – 3-Phase Input, 0 – 230V 3-Phase Output										
22C-B012N103	2.2 (3)	12.0	180-265	6.5	15.5	20	140M-F8E-C16	100-C23	5098	146
22C-B017N103	3.7 (5)	17.5	180-265	8.8	21	30	140M-F8E-C25	100-C37	5098	207
22C-B024N103	5.5 (7.5)	24.0	180-265	10.9	26.1	35	140M-F8E-C32	100-C37	5098	266
22C-B033N103	7.5 (10)	33.0	180-265	14.4	34.6	45	140M-F8E-C45	100-C45	5098	359
22C-B049A103	11 (15)	49.0	180-265	21.3	51	70	--	100-C60	--	488
22C-B065A103	15 (20)	65.0	180-265	28.3	68	90	--	100-C85	--	650
22C-B075A103	18.5 (25)	75.0	180-265	32.5	78	100	--	100-D95	--	734
22C-B090A103	22 (30)	90.0	180-265	38.3	92	125	--	100-D110	--	778
22C-B120A103	30 (40)	120.0	180-265	51.6	124	175	--	100-D180	--	1055
22C-B145A103	37 (50)	145.0	180-265	62.4	150	200	--	100-D180	--	1200
380 – 480V AC – 3-Phase Input, 0 – 460V 3-Phase Output										
22C-D6P0N103	2.2 (3)	6.0	340-528	6.3	7.5	10	140M-D8E-C10	100-C09	5098	105
22C-D010N103	4.0 (5)	10.5	340-528	10.9	13	20	140M-D8E-C16	100-C16	5098	171
22C-D012N103	5.5 (7.5)	12.0	340-528	11.9	14.2	20	140M-D8E-C16	100-C23	5098	200
22C-D017N103	7.5 (10)	17.0	340-528	15.3	18.4	25	140M-D8E-C20	100-C23	5098	267
22C-D022N103	11 (15)	22.0	340-528	19.2	23	30	140M-F8E-C32	100-C30	5098	329
22C-D030N103	15 (20)	30.0	340-528	25.8	31	40	140M-F8E-C32	100-C37	5098	435
22C-D038A103	18.5 (25)	38.0	340-528	33.3	40	50	140M-F8E-C45	100-C60	9086	606
22C-D045A103	22 (30)	45.5	340-528	39.1	47	60	--	100-C60	--	738
22C-D060A103	30 (40)	60.0	340-528	53.3	64	80	--	100-C85	--	764
22C-D072A103	37 (50)	72.0	340-528	60.7	73	100	--	100-C85	--	1019
22C-D088A103	45 (60)	88.0	340-528	74.9	90	125	--	100-D110	--	1245
22C-D105A103	55 (75)	105.0	340-528	89	107	150	--	100-D140	--	1487
22C-D142A103	75 (100)	142.0	340-528	124.8	150	200	--	100-D180	--	2043
22C-D170A103	90 (125)	170.0	340-528	142	170	250	--	100-D250	--	2617
22C-D208A103	110 (150)	208.0	340-528	167	200	250	--	100-D250	--	3601
22C-D260A103	132 (200)	260.0	340-528	196	235	300	--	100-D300	--	3711
22C-D310A103	160 (250)	310.0	340-528	242	290	400	--	100-D420	--	4208
22C-D370A103	200 (300)	370.0	340-528	304	365	500	--	100-D420	--	4916
22C-D460A103	250 (350)	460.0	340-528	387	465	600	--	100-D630	--	6167

- (1) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers may vary. See [Bulletin 140M Motor Protection Circuit Breakers Application Ratings](#).
- (2) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/347. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
- (3) When using a Manual Self-Protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

Drive Ratings

PowerFlex 400 Packaged Product – Main Input Disconnect / Circuit Breaker

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Drive Ratings								
Catalog Number	Output Rating		Input Rating			Branch Circuit Protection		Estimated Power Dissipation
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses (j = A)	Circuit Breaker (j = M)	Watts
208V AC – 3-Phase Input, 0 – 208V 3-Phase Output								
23C-X012d103NNjANN	2.2 (3)	12	187-229	5.6	15.5	20	15	146
23C-X017d103NNjANN	3.7 (5)	16.8	187-229	7.3	20.2	20	30	207
23C-X024d103NNjANN	5.5 (7.5)	24	187-229	9.5	26.1	35	40	266
23C-X033d103NNjANN	7.5 (10)	30.8	187-229	11.7	32.3	40	50	359
23C-X049d103NNjANN	11 (15)	46.2	187-229	17.3	48	80	75	488
23C-X065d103NNjANN	15 (20)	64	187-229	22.7	62.8	100	100	650
23C-X075d103NNjANN	18.5 (25)	75	187-229	28.1	78	125	125	734
23C-X090d103NNjANN	22 (30)	88	187-229	32.5	90	150	150	778
23C-X120d103NNjANN	30 (40)	114	187-229	42.5	118	200	200	1055
23C-X145d103NNjANN	37 (50)	143	187-229	53.3	148	250	225	1200
480V AC – 3-Phase Input, 0 – 460V 3-Phase Output								
23C-D6P0d103NNjANN	2.2 (3)	4.8	414-500	4.8	6	10	15	105
23C-D010d103NNjANN	4 (5)	7.6	414-500	7.2	9.4	15	15	171
23C-D012d103NNjANN	5.5 (7.5)	11	414-500	10.4	13	20	20	200
23C-D017d103NNjANN	7.5 (10)	14	414-500	12.1	15.2	20	25	267
23C-D022d103NNjANN	11 (15)	21	414-500	17.5	22	35	35	329
23C-D030d103NNjANN	15 (20)	27	414-500	22.3	28	35	50	435
23C-D038d103NNjANN	18.5 (25)	34	414-500	28.4	35.7	60	60	606
23C-D045d103NNjANN	22 (30)	40	414-500	32.9	41.3	70	70	738
23C-D060d103NNjANN	30 (40)	52	414-500	44.2	55.5	80	80	764
23C-D072d103NNjANN	37 (50)	65	414-500	52.6	66	100	100	1019
23C-D088d103NNjANN	45 (60)	77	414-500	62.8	78.8	150	125	1245
23C-D105d103NNjANN	55 (75)	96	414-500	77.9	97.8	175	150	1487
23C-D142d103NNjANN	75 (100)	124	414-500	104.4	131	200	200	2043
23C-D170d103NNjANN	90 (125)	156	414-500	124.3	156	250	250	2617
23C-D208d103NNjANN	110 (150)	180	414-500	137.9	173.1	350	250	3601
23C-D260d103NNjANN	132 (200)	240	414-500	172.8	216.9	400	300	3711
23C-D310d103NNMANN	160 (250)	302	414-500	225.1	282.5	--	500	4208
23C-D370d103NNMANN	200 (300)	361	414-500	283.7	356.1	--	600	4916
23C-D460d103NNMANN	250 (350)	414	414-500	333.4	418.5	--	700	6167

"d" = Enclosure. Valid selections are: "A" = NEMA/UL Type 1, "H" = NEMA/UL Type 12 with Fan and Filter, "X" = NEMA/UL Type 3R, "E" = NEMA/UL Type 4.
 "J" = Package. Valid selections are: "A" = Main Input Disconnect, "M" = Main Input Circuit Breaker.

Drive Ratings

PowerFlex 400 Packaged Product – 3 Contactor Full Feature Bypass

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Drive Ratings								
Catalog Number	Output Rating		Input Rating			Branch Circuit Protection		Estimated Power Dissipation
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses (j = A)	Circuit Breaker (j = M)	Watts
208V AC – 3-Phase Input, 0 – 208V 3-Phase Output								
23C-X012d103NNBANN	2.2 (3)	12	187-229	5.6	15.5	20	15	156
23C-X017d103NNBANN	3.7 (5)	16.8	187-229	7.3	20.2	20	30	217
23C-X024d103NNBANN	5.5 (7.5)	24	187-229	9.5	26.1	35	40	276
23C-X033d103NNBANN	7.5 (10)	30.8	187-229	11.7	32.3	40	50	369
23C-X049d103NNBANN	11 (15)	46.2	187-229	17.3	48	80	75	498
23C-X065d103NNBANN	15 (20)	64	187-229	22.7	62.8	100	100	660
23C-X075d103NNBANN	18.5 (25)	75	187-229	28.1	78	125	125	744
23C-X090d103NNBANN	22 (30)	88	187-229	32.5	90	150	150	788
23C-X120d103NNBANN	30 (40)	114	187-229	42.5	118	200	200	1065
23C-X145d103NNBANN	37 (50)	143	187-229	53.3	148	250	225	1210
480V AC – 3-Phase Input, 0 – 460V 3-Phase Output								
23C-D6P0d103NNjANN	2.2 (3)	4.8	414-500	4.8	6	10	15	115
23C-D010d103NNjANN	3.7 (5)	7.6	414-500	7.2	9.4	15	15	181
23C-D012d103NNjANN	5.5 (7.5)	11	414-500	10.4	13	20	20	210
23C-D017d103NNjANN	7.5 (10)	14	414-500	12.1	15.2	20	25	277
23C-D022d103NNjANN	11 (15)	21	414-500	17.5	22	35	35	339
23C-D030d103NNjANN	15 (20)	27	414-500	22.3	28	35	50	445
23C-D038d103NNjANN	18.5 (25)	34	414-500	28.4	35.7	60	60	616
23C-D045d103NNjANN	22 (30)	40	414-500	32.9	41.3	70	70	748
23C-D060d103NNjANN	30 (40)	52	414-500	44.2	55.5	80	80	774
23C-D072d103NNjANN	37 (50)	65	414-500	52.6	66	100	100	1029
23C-D088d103NNjANN	45 (60)	77	414-500	62.8	78.8	150	125	1255
23C-D105d103NNjANN	55 (75)	96	414-500	77.9	97.8	175	150	1497
23C-D142d103NNjANN	75 (100)	124	414-500	104.4	131	200	200	2053
23C-D170d103NNjANN	90 (125)	156	414-500	124.3	156	250	250	2627
23C-D208d103NNjANN	110 (150)	180	414-500	137.9	173.1	350	250	3611
23C-D260d103NNjANN	132 (200)	240	414-500	172.8	216.9	400	300	3721
23C-D310d103NNNANN	160 (250)	302	414-500	225.1	282.5	--	500	4218
23C-D370d103NNNANN	200 (300)	361	414-500	283.7	356.1	--	600	4926
23C-D460d103NNNANN	250 (350)	414	414-500	333.4	418.5	--	700	6176

"d" = Enclosure. Valid selections are: "A" = NEMA/UL Type 1, "H" = NEMA/UL Type 12 with Fan and Filter, "X" = NEMA/UL Type 3R, "E" = NEMA/UL Type 4.
 "J" = Package. Valid selections are: "B" = 3 Contactor Full Feature Bypass with Disconnect, "N" = 3 Contactor Full Feature Bypass with Circuit Breaker.

Drive Ratings

PowerFlex 400 Packaged Product – 3 Contactor Basic Bypass

3.0 – 100HP @ 460VAC

Drive Ratings								
Catalog Number	Output Rating		Input Rating			Branch Circuit Protection		Estimated Power Dissipation
	<i>kW (HP)</i>	<i>Amps</i>	<i>Voltage Range</i>	<i>kVA</i>	<i>Amps</i>	<i>Fuses</i>	<i>140M Motor Protector</i>	<i>Watts</i>
480V AC – 3-Phase Input, 0 – 460V 3-Phase Output								
23C-D6P0A103NNCANN	2.2 (3)	4.8	414-500	4.8	6	-	140M-C2E-B63	115
23C-D010A103NNCANN	4 (5)	7.6	414-500	7.2	9.4	-	140M-D8E-C10	181
23C-D012A103NNCANN	5.5 (7.5)	11	414-500	10.4	13	-	140M-D8E-C16	210
23C-D017A103NNCANN	7.5 (10)	14	414-500	12.1	15.2	-	140M-D8E-C16	277
23C-D022A103NNCANN	11 (15)	21	414-500	17.5	22	-	140M-D8E-C25	339
23C-D030A103NNCANN	15 (20)	27	414-500	22.3	28	-	140M-D8E-C32	445
23C-D038A103NNCANN	18.5 (25)	34	414-500	28.4	35.7	-	140M-D8E-C45	616
23C-D045A103NNCANN	22 (30)	40	414-500	32.9	41.3	-	140-CMN-4000	748
23C-D060A103NNCANN	30 (40)	52	414-500	44.2	55.5	-	140-CMN-6300	774
23C-D072A103NNCANN	37 (50)	65	414-500	52.6	66	-	140-CMN-9000	1029
23C-D088A103NNCANN	45 (60)	77	414-500	62.8	78.8	150	-	1255
23C-D105A103NNCANN	55 (75)	96	414-500	77.9	97.8	175	-	1497
23C-D142A103NNCANN	75 (100)	124	414-500	104.4	131	200	-	2053

Drive Specification

PowerFlex 400 Standard Product

3.0 – 50HP @ 200 to 240VAC
3.0 – 350HP @ 380 to 480VAC

Category	Specification	
Agency Certification		Listed to UL508C and CAN/CSA-22.2 Listed to UL508C for plenums
		Certified to AS/NZS, 1997 Group 1, Class A
		Marked for all applicable European Directives EMC Directive (89/336) EN 61800-3, EN 50081-1, EN 50082-2 Low Voltage Directive (73/23/EEC) EN 50178, EN 60204
Protection	Bus Overvoltage Trip:	200-240V AC Input: 405V DC bus voltage (equivalent to 290V AC incoming line) 380-480V AC Input: 810V DC bus voltage (equivalent to 575V AC incoming line)
	Bus Undervoltage Trip:	200-240V AC Input: 210V DC bus voltage (equivalent to 150V AC incoming line) 380-480V AC Input: 390V DC bus voltage (equivalent to 275V AC incoming line)
	Power Ride-Thru:	100 milliseconds
	Logic Control Ride-Thru:	0.5 seconds minimum, 2 seconds typical
	Electronic Motor Overload Protection:	Provides class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A) (2). UL 508C File 29572.
	Overcurrent:	200% hardware limit, 300% instantaneous fault
	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 IP20, Open Type: IP30, Nema Type 1, UL Type 1:	-10 to 50 degrees C (14 to 122 degrees F) -10 to 45 degrees C (14 to 113 degrees F)
	Cooling Method:	Fan: all drive ratings
	Storage Temperature:	-40 to 85 degrees C (-40 to 185 degrees F)
	Atmosphere:	Important: Drive must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to corrosive atmosphere.
	Relative Humidity:	0 to 95% non-condensing
	Shock (operating):	15G peak for 11ms duration (±1.0ms)
	Vibration (operating):	1G peak, 5 to 2000 Hz
	Seismic Rating:	Meets the seismic requirements of the 2003 International Building Code as specified by AC156.
	Electrical	Voltage Tolerance:
Frequency Tolerance:		48-63 Hz
Input Phases		Three-phase input provides full rating.
Displacement Power Factor		0.98 across entire speed range
Efficiency:		97.5% at rated amps, nominal line voltage
Transistor Type:		Isolated Gate Bipolar (IGBT)
Internal DC Bus Choke: 200-240V AC Input: 380-480V AC Input:		11-37kW (15-50 HP) Panel Mount 11-110kW (15-150 HP) Panel Mount
Internal AC Input Line Reactor: 380-480V AC Input:	132-250kW (200-350 HP) Panel Mount	

Drive Specification PowerFlex 400 Standard Product - Continued

Control	Method:		Sinusoidal PWM, Volts/Hertz
	Carrier Frequency: Frames C and D Frame E, F, G, H		2-10 kHz, Drive rating based on 4kHz 2-8 kHz, Drive rating based on 4kHz
	Frequency Accuracy: Digital Input: Analog Input: Analog Output:		Within $\pm 0.05\%$ of set output frequency Within 0.5% of maximum output frequency (10-bit resolution) $\pm 2\%$ of full scale (10-bit resolution)
	Speed Regulation – Open Loop with Slip Compensation		$\pm 1\%$ of base speed across a 60:1 speed range
	Output Frequency:		0 – 320 Hz (programmable)
	Stop Modes:		Multiple programmable stop modes including: Ramp, Coast, DC-Brake, Ramp-to-Hold and S-Curve.
	Accel/Decel:		Two independently programmable accel and decel times. Each time may be programmed from 0 – 600 seconds in 0.1 second increments.
	Intermittent Overload:		110% Overload capability for up to 1 minute
	Electronic Motor Overload Protection:		Provides class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A) (2). UL 508C File 29572.
Control Inputs	Digital:	Quantity:	(3) Semi-programmable (4) Programmable
		Type: Source Mode (SRC): Sink Mode (SNK):	18-24V = ON, 0-6V = OFF 0-6V = ON, 18-24V = OFF
	Analog:	Quantity:	(1) Isolated, -10 to 10V or 4-20mA (1) Non-Isolated, 0 to 10V or 4-20mA
		Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog: External Pot:	10-bit 100k ohm input impedance 250 ohm input impedance 1-10k ohms, 2 Watt minimum
Control Outputs	Relay:	Quantity:	(2) Programmable Form C
		Specification: Resistive Rating: Inductive Rating:	3.0A at 30V DC, 3.0A at 125V AC, 3.0A at 240V AC 0.5A at 30V DC, 0.5A at 125V AC, 0.5A at 240V AC
	Opto:	Quantity:	(1) Programmable
		Specification:	30V DC, 50mA Non-inductive
	Analog:	Quantity: Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog:	(2) Non-Isolated, 0-10V or 4-20mA 10-bit 1k ohm minimum 525 ohm maximum
Keypad	Display:	Integral 2 line by 16 character LCD with (5) LED Indicators	
	Languages:	English, Francais, Espanol, Italiano, Deutsch, Portugues, Nederlands	
Communication	Type:	Serial (RS485)	
	Supported Protocols (Standard):	Drive Serial Interface (DSI) Modbus RTU Metasys N2 P1 FLN	
	Supported Protocols (Optional):	BACNet LonWorks DeviceNet EtherNet/IP ControlNet PROFIBUS DP	
	Software (Optional):	Windows Based Pocket PC/Windows Mobile 2003	

Drive Specification

PowerFlex 400 Packaged Product

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Category	Specification	
Agency Certification		UL508C
		CSA 22.2
Protection	Bus Overvoltage Trip:	200-240V AC Input: 405V DC bus voltage (equivalent to 290V AC incoming line) 380-480V AC Input: 810V DC bus voltage (equivalent to 575V AC incoming line)
	Bus Undervoltage Trip:	200-240V AC Input: 210V DC bus voltage (equivalent to 150V AC incoming line) 380-480V AC Input: 390V DC bus voltage (equivalent to 275V AC incoming line)
	Power Ride-Thru:	100 milliseconds
	Logic Control Ride-Thru:	0.5 seconds minimum, 2 seconds typical
	Electronic Motor Overload Protection:	I ² t Protection – 110% for 60 seconds (provides Class 10 protection)
	Overcurrent:	200% hardware limit, 300% instantaneous fault
	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	0 to 40 degrees C (32 to 104 degrees F)
	Cooling Method:	Fan: all drive ratings
	Storage Temperature:	-40 to 85 degrees C (-40 to 185 degrees F)
	Atmosphere:	Important: Drive must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to corrosive atmosphere.
	Relative Humidity:	0 to 95% non-condensing
	Seismic Rating:	Meets the seismic requirements of the 2003 International Building Code as specified by AC156.
Electrical	Voltage Tolerance:	208V ±10% 460V ±10%
	Frequency Tolerance:	48-63 Hz
	Input Phases:	Three-phase input provides full rating.
	Displacement Power Factor:	0.98 across entire speed range
	Efficiency:	97.5% at rated amps, nominal line voltage
	Transistor Type:	Isolated Gate Bipolar (IGBT)
	Internal DC Bus Choke: 200-240V AC Input: 380-480V AC Input:	11-37kW (15-50 HP) Panel Mount 11-110kW (15-150 HP) Panel Mount
	Internal AC Input Line Reactor: 380-480V AC Input:	132-250kW (200-350 HP) Panel Mount

Drive Specification PowerFlex 400 Packaged Product - Continued

Control	Method:		Sinusoidal PWM, Volts/Hertz
	Carrier Frequency: Frames C and D Frame E, F, G, H		2-10 kHz, Drive rating based on 4kHz 2-8 kHz, Drive rating based on 4kHz
	Frequency Accuracy: Digital Input: Analog Input: Analog Output:		Within $\pm 0.05\%$ of set output frequency Within 0.5% of maximum output frequency (10-bit resolution) $\pm 2\%$ of full scale (10-bit resolution)
	Speed Regulation – Open Loop with Slip Compensation		$\pm 1\%$ of base speed across a 60:1 speed range
	Output Frequency:		0 – 320 Hz (programmable)
	Stop Modes:		Multiple programmable stop modes including: Ramp, Coast, DC-Brake, Ramp-to-Hold and S-Curve.
	Accel/Decel:		Two independently programmable accel and decel times. Each time may be programmed from 0 – 600 seconds in 0.1 second increments.
	Intermittent Overload:		110% Overload capability for up to 1 minute
	Electronic Motor Overload Protection:		Class 10 protection with speed sensitive response (drive). Class 20 protection -electronic (bypass).
Control Inputs	Digital:	Quantity:	(3) Semi-programmable (4) Programmable
		Type: Source Mode (SRC): Sink Mode (SNK):	18-24V = ON, 0-6V = OFF 0-6V = ON, 18-24V = OFF
	Analog:	Quantity:	(1) Isolated, -10 to 10V or 4-20mA (1) Non-Isolated, 0 to 10V or 4-20mA
		Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog: External Pot:	10-bit 100k ohm input impedance 250 ohm input impedance 1-10k ohms, 2 Watt minimum
Control Outputs	Relay:	Quantity:	(2) Programmable Form C
		Specification: Resistive Rating: Inductive Rating:	3.0A at 30V DC, 3.0A at 125V AC, 3.0A at 240V AC 0.5A at 30V DC, 0.5A at 125V AC, 0.5A at 240V AC
	Opto:	Quantity:	(1) Programmable
		Specification:	30V DC, 50mA Non-inductive
	Analog:	Quantity: Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog:	(2) Non-Isolated, 0-10V or 4-20mA 10-bit 1k ohm minimum 525 ohm maximum
Keypad	Display:	Integral 2 line by 16 character LCD with (5) LED Indicators	
	Languages:	English, Francais, Espanol, Italiano, Deutsch, Portugues, Nederlands	
Communication	Type:	Serial (RS485)	
	Supported Protocols (Standard):	Drive Serial Interface (DSI) Modbus RTU Metasys N2 P1 FLN	
	Supported Protocols (Optional):	BACNet LonWorks DeviceNet EtherNet/IP ControlNet PROFIBUS DP	
	Software (Optional):	Windows Based Pocket PC/Windows Mobile 2003	

Maximum and Minimum Wire Sizes

PowerFlex 400 Standard Product

3.0 – 50HP @ 200 to 240VAC
3.0 – 350HP @ 380 to 480VAC

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)
					Maximum	Minimum	
AC Input	R/L1, S/L2, T/L3	200 - 240V AC	2.2 – 7.5	3 - 10	8 AWG	16 AWG	26
			11 – 22	15 – 30	2 AWG	8 AWG	45
			30 – 37	40 – 50	4/0 AWG	1/0 AWG	173
		380 - 480V AC	2.2 – 15	3 – 20	8 AWG	16 AWG	26
			18.5 – 30	25 – 40	2 AWG	8 AWG	45
			37 – 45	50 – 60	2 AWG	12 AWG	49.5
			55 -75	75 – 100	4/0 AWG	1/0 AWG	173
			90 – 110	125 – 150	300 MCM	3/0 AWG	173
			132 – 160	200 – 250	300 MCM	3/0 AWG	260
200 – 250	300 – 350	500 MCM	250 MCM	354			
AC Output	U/T1, V/T2, W/T3	200 – 240V AC	2.2 – 7.5	3 – 10	8 AWG	16 AWG	26
			11 – 22	15 – 30	2 AWG	8 AWG	45
			30 – 37	40 – 50	4/0 AWG	1/0 AWG	173
		380 – 480V AC	2.2 – 15	3 – 20	8 AWG	16 AWG	26
			18.5 – 30	25 – 40	2 AWG	8 AWG	45
			37 – 45	50 – 60	2 AWG	12 AWG	49.5
			55 – 75	75 – 100	4/0 AWG	1/0AWG	173
			90 – 110	125 – 150	300 MCM	3/0 AWG	173
			132 – 160	200 – 250	300 MCM	3/0 AWG	260
200 – 250	300 – 350	500 MCM	250 MCM	354			
Ground	GND	200 - 240V AC	2.2 – 7.5	3 - 10	8 AWG	16 AWG	26
			11 – 22	15 – 30	2 AWG	8 AWG	45
			30 – 37	40 – 50	4/0 AWG	1/0 AWG	173
		380 - 480V AC	2.2 – 15	3 – 20	8 AWG	16 AWG	26
			18.5 – 30	25 – 40	2 AWG	12 AWG	45
			37 – 45	50 – 60	2 AWG	12 AWG	49.5
			55 – 75	75 – 100	4/0 AWG	1/0AWG	173
			90 – 110	125 – 150	300 MCM	3/0 AWG	173
			132 – 160	200 – 250	300 MCM	3/0 AWG	260
200 – 250	300 – 350	500 MCM	250 MCM	354			
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7

Maximum and Minimum Wire Sizes

PowerFlex 400 Packaged Product – Main Input Disconnect

3.0 – 50HP @ 208VAC
3.0 – 200HP @ 460VAC

Style A – Main Input Disconnect

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)
					Maximum	Minimum	
AC Input	L1, L2, L3	208V AC	2.2 – 3.7	3 – 5	8 AWG	14 AWG	35
			5.5 – 7.5	7.5 - 10	4 AWG	14 AWG	35
			11 - 15	15 – 20	2 AWG	14 AWG	155
			18.5 – 30	25 – 40	250 MCM	6 AWG	275
			37	50	350 MCM	1/0 AWG	275
		460V AC	2.2 – 7.5	3 – 10	8 AWG	14 AWG	35
			11 – 18.5	15 – 25	4 AWG	14 AWG	35
			22 - 37	30 – 50	2 AWG	14 AWG	155
			45 - 75	60 – 100	250 MCM	6 AWG	275
			90 – 132	125 – 200	(2) 350 MCM	(2) 6 AWG	275
AC Output	U/T1, V/T2, W/T3	208V AC	2.2 – 7.5	3 – 10	8 AWG	16 AWG	26
			11 – 22	15 – 30	2 AWG	8 AWG	45
			30 – 37	40 – 50	4/0 AWG	1/0 AWG	173
		460V AC	2.2 – 15	3 – 20	8 AWG	16 AWG	26
			18.5 – 30	25 – 40	2 AWG	8 AWG	45
			37 – 45	50 – 60	2 AWG	12 AWG	49.5
			55 – 75	75 – 100	4/0 AWG	1/0 AWG	173
			90 – 100	125 – 150	300 MCM	3/0 AWG	173
			132	200	300 MCM	3/0 AWG	260
Ground	GND	208V AC	2.2 – 15	3 - 20	4 AWG	14 AWG	45
			18.5 – 37	25 – 50	2/0 AWG	14 AWG	150
		460V AC	2.2 – 30	3 – 40	4 AWG	14 AWG	45
			37 – 75	50 – 100	2/0 AWG	14 AWG	150
			90 – 110	125 – 150	(2) 250 MCM	(2) 6 AWG	275
			132	200	(2) 350 MCM	(2) 6 AWG	110 - 325
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 - 4.7

Maximum and Minimum Wire Sizes

PowerFlex 400 Packaged Product – 3 Contactor Full Feature Bypass with Disc.

3.0 – 50HP @ 208VAC
3.0 – 200HP @ 460VAC

Style B – 3 Contactor Full Feature Bypass with Disconnect

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)
					Maximum	Minimum	
AC Input	L1, L2, L3	208V AC	2.2 – 3.7	3 – 5	8 AWG	14 AWG	35
			5.5 – 7.5	7.5 – 10	4 AWG	14 AWG	35
			11 – 15	15 – 20	2 AWG	14 AWG	155
			18.5 – 30	25 – 40	250 MCM	6 AWG	275
			37	50	350 MCM	1/0 AWG	275
		460V AC	2.2 – 7.5	3 – 10	8 AWG	14 AWG	35
			11 – 18.5	15 – 25	4 AWG	14 AWG	35
			22 – 37	30 – 50	2 AWG	14 AWG	155
			45 – 75	60 – 100	250 MCM	6 AWG	275
			90 – 132	125 – 200	(2) 350 MCM	(2) 6 AWG	275
AC Output	T1, T2, T3	208V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13
			7.5 – 15	10 – 20	4 AWG	14 AWG	20
			18.5 – 22	25 – 30	1/0 AWG	14 AWG	22
			30 – 37	40 – 50	350 MCM	6 AWG	275
		460V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13
			7.5 – 22	10 – 30	4 AWG	14 AWG	20
			30 – 55	40 – 75	1/0 AWG	14 AWG	22
			75	100	350 MCM	6 AWG	275
			90 – 110	125 – 150	350 MCM	6 AWG	275
			132	200	(2) 500 MCM	(2) 4 AWG	500
Ground	GND	208V AC	2.2 – 15	3 – 20	4 AWG	14 AWG	35
			18.5 – 37	25 – 50	2/0 AWG	14 AWG	150
		460V AC	2.2 – 30	3 – 40	4 AWG	14 AWG	35
			37 – 75	50 – 100	2/0 AWG	14 AWG	150
			90 – 110	125 – 150	(2) 250 MCM	(2) 6 AWG	275
			132	200	(2) 350 MCM	(2) 6 AWG	110 – 325
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7
	T31 – T40				10 AWG	22 AWG	5 – 5.6

Maximum and Minimum Wire Sizes

PowerFlex 400 Packaged Product – 3 Contactor Basic Bypass with Disconnect

3.0 – 100HP @ 460VAC

Style C – 3 Contactor Basic Bypass with Disconnect

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)
					Maximum	Minimum	
AC Input	L1, L2, L3	460V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13
			7.5 – 22	10 - 30	4 AWG	14 AWG	20
			30	40	1/0 AWG	14 AWG	22
			37 – 45	50 - 60	2 AWG	12 AWG	120
			55 – 75	75 – 100	250 MCM	6 AWG	275
AC Output	T1, T2, T3	460V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13
			7.5 – 22	10 - 30	4 AWG	14 AWG	20
			30 – 55	40 – 75	1/0 AWG	14 AWG	22
			75	100	350 MCM	6 AWG	275
Ground	GND	460V AC	2.2 – 30	3 – 40	4 AWG	14 AWG	35
			37 – 75	50 – 100	2/0 AWG	14 AWG	150
Signal	T1 – T20 , R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7
	T18 – T24				10 AWG	22 AWG	5 – 5.6

Maximum and Minimum Wire Sizes

PowerFlex 400 Packaged Product – Main Input Circuit Breaker

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Style M – Main Input Circuit Breaker

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)		
					Maximum	Minimum			
AC Input	L1, L2, L3	208V AC	2.2 – 18.5	3 – 25	10 AWG	14 AWG	35		
					8 AWG	8 AWG	40		
					4 AWG	6 AWG	45		
					3/0 AWG	3 AWG	50		
					22 – 37	30 – 50	350 MCM	4 AWG	250
		460V AC	2.2 – 45	3 – 60	10 AWG	14 AWG	35		
					8 AWG	8 AWG	40		
					4 AWG	6 AWG	45		
					3/0 AWG	3 AWG	50		
					55 - 90	75 – 125	350 MCM	4 AWG	250
100	150				250 MCM	3/0 AWG	275		
132 – 250	200 – 350	(2) 350 MCM	(2) 3/0 AWG	375					
AC Output	U/T1, V/T2, W/T3	208V AC	2.2 – 7.5	3 – 10	8 AWG	16 AWG	26		
			11 – 22	15 – 30	2 AWG	8 AWG	45		
			30 – 37	40 – 50	4/0 AWG	1/0 AWG	173		
		460V AC	2.2 – 15	3 – 20	18.5 – 30	25 – 40	2 AWG	8 AWG	45
					37 – 45	50 – 60	2 AWG	12 AWG	49.5
					55 – 75	75 – 100	4/0 AWG	1/0 AWG	173
					90 – 100	125 – 150	300 MCM	3/0 AWG	173
					132 – 160	200 – 250	300 MCM	3/0 AWG	260
					200 – 250	300 – 350	500 MCM	250 MCM	354
					Ground	GND	208V AC	2.2 – 15	3 - 20
18.5 – 37	25 – 50	2/0 AWG	14 AWG	150					
460V AC	2.2 – 30	3 – 40	4 AWG	14 AWG			45		
	37 – 75	50 – 100	2/0 AWG	14 AWG			150		
	90 – 110	125 – 150	(2) 250 MCM	(2) 6 AWG			275		
132 – 250	200 – 350	(2) 350 MCM	(2) 6 AWG	110 – 325					
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 - 4.7		

Maximum and Minimum Wire Sizes

PowerFlex 400 Packaged Product – 3 Contactor Full Feature Bypass with CB.

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Style N – 3 Contactor Full Feature Bypass with Circuit Breaker

Type	Terminals	Voltage	kW	HP	Wire Size		Torque (in-lbs)			
					Maximum	Minimum				
AC Input	L1, L2, L3	208V AC	2.2 – 3.7	3 – 5	8 AWG	14 AWG	35			
			5.5 – 7.5	7.5 – 10	4 AWG	14 AWG	35			
			11 – 15	15 – 20	2 AWG	14 AWG	155			
			18.5 – 30	25 – 40	250 MCM	6 AWG	275			
			37	50	350 MCM	1/0 AWG	275			
		460V AC	2.2 – 7.5	3 – 10	8 AWG	14 AWG	35			
			11 – 18.5	15 – 25	4 AWG	14 AWG	35			
			22 – 37	30 – 50	2 AWG	14 AWG	155			
			45 – 75	60 – 100	250 MCM	6 AWG	275			
			90 – 100	125 – 150	(2) 350 MCM	(2) 6 AWG	275			
AC Output	T1, T2, T3	208V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13			
			7.5 – 15	10 – 20	4 AWG	14 AWG	20			
			18.5 – 22	25 – 30	1/0 AWG	14 AWG	22			
			30 – 37	40 – 50	350 MCM	6 AWG	275			
		460V AC	2.2 – 5.5	3 – 7.5	8 AWG	22 AWG	13			
			7.5 – 22	10 – 30	4 AWG	14 AWG	20			
			30 – 55	40 – 75	1/0 AWG	14 AWG	22			
			75	100	350 MCM	6 AWG	275			
			90 – 110	125 – 150	350 MCM	6 AWG	275			
			132 – 250	200 – 350	(2) 500 MCM	(2) 4 AWG	500			
			Ground	GND	208V AC	2.2 – 15	3 – 20	4 AWG	14 AWG	35
						18.5 – 37	25 – 50	2/0 AWG	14 AWG	150
		460V AC	2.2 – 30	3 – 40	4 AWG	14 AWG	35			
			37 – 75	50 – 100	2/0 AWG	14 AWG	150			
			90 – 110	125 – 150	(2) 250 MCM	(2) 6 AWG	275			
			132 – 250	200 – 350	(2) 350 MCM	(2) 6 AWG	110 – 325			
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7			
	T31 – T40				10 AWG	22 AWG	5 – 5.6			

Short Circuit Current Rating

PowerFlex 400 Packaged Product

3.0 – 50HP @ 208VAC
3.0 – 350HP @ 460VAC

Voltage	HP	Drive Frame	Drive Only	Main Input Disconnect (Style A)	3 Contactor Full Feature Bypass with Disconnect (Style B)	3 Contactor Basic Bypass with Disconnect (Style C)	Main Input Circuit Breaker (Style M)	3 Contactor Full Feature Bypass with Circuit Breaker (Style N)
	3	C	100 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	5	C	100 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	7.5	C	100 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	10	C	100 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	15	D	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	20	D	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	25	D	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	30	D	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	40	E	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
480V AC	50	E	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	3	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	5	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	7.5	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	10	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	15	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	20	C	100 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	25	D	200 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	30	D	200 kA	100 kA	100 kA	65 kA	Consult Factory	Consult Factory
	40	D	200 kA	100 kA	100 kA	42 kA	Consult Factory	Consult Factory
	50	E	200 kA	100 kA	100 kA	35 kA	Consult Factory	Consult Factory
	60	E	200 kA	100 kA	100 kA	35 kA	Consult Factory	Consult Factory
	75	E	200 kA	100 kA	100 kA	100 kA	Consult Factory	Consult Factory
	100	E	200 kA	100 kA	100 kA	100 kA	Consult Factory	Consult Factory
	125	F	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	150	F	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	200	G	200 kA	100 kA	100 kA	-	Consult Factory	Consult Factory
	250	G	200 kA	-	-	-	Consult Factory	Consult Factory
300	H	200 kA	-	-	-	Consult Factory	Consult Factory	
350	H	200 kA	-	-	-	Consult Factory	Consult Factory	

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