



## PowerFlex<sup>®</sup> 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.

**Variable Frequency Drive Schedule**  
**PowerFlex 400 Standard and Packaged Product**

**3.0 – 50HP @ 200 to 240VAC**  
**3.0 – 150HP @ 380 to 480VAC**

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Item	Qty	Desig	Catalog #	HP	Volts	Amps		Drawings				
						Input	Output	Outline	Layout	Schematic	Inter-Connect	Parameter
1	1	DR1	23C-D038A103NNBANN-LR	25	460	28.5	34	95D00700	95D00763	98D00705	97D00704	95D00775

Notes:

## Catalog Number Explanation

### PowerFlex 400 Standard Product

**3.0 – 50HP @ 200 to 240VAC**  
**3.0 – 150HP @ 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
a			b	c		d	e	f	g

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

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

\* Frame C drives only available with IP20/UL Open-Type enclosure. Field installed conversion kit available to achieve IP30/NEMA 1/UL Type 1 rating.  
† Frame D, E and F drives only available with IP30/NEMA 1/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 – 150HP @ 460VAC**

### Catalog Number Explanation – Packaged Product

Position Number														
1-3	4	5	6-8	9	10	11	12	13	14	15	16	17	18	19+
23C	-	D	038	A	1	0	3	N	N	B	A	N	N	-LR
<i>a</i>		<i>b</i>	<i>c</i>	<i>d</i>	<i>e</i>	<i>f</i>	<i>g</i>	<i>h</i>	<i>i</i>	<i>j</i>	<i>k</i>	<i>l</i>	<i>m</i>	<i>n</i>

**a**

Drive	
Code	Type
23C	PowerFlex 400

**b**

Voltage Rating		
Code	Voltage	Ph.
X	208V ac	3
D	480V ac	3

**c1**

Rating			
208V, 60Hz Input			
Code	Amps*	kW (Hp)	Frame
012	12	2.2 (3.0)	C
017	16.8	3.7 (5.0)	C
024	24	5.5 (7.5)	C
033	30.8	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

\* Packaged amp ratings may differ from stand-alone drive ratings. Packaged drives sized per NEC motor amps.

**c2**

Rating			
460V, 60Hz Input			
Code	Amps*	kW (Hp)	Frame
6P0	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

\* Packaged amp ratings may differ from stand-alone drive ratings. Packaged drives sized per NEC motor amps.

**d**

Enclosure	
Code	Enclosure
A	NEMA Type 1

**e**

HIM	
Code	Interface Module
1	Fixed Keypad

**f**

Emission Class	
Code	Rating
0	Not Filtered

**g**

Version	
Code	Version
3	RS485
D	DeviceNet Adapter
E	EtherNet/IP Adapter
P	PROFIBUS DP Adapter

**h**

Rating	
Code	Rating
N	Reserved

**i**

Rating	
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

**k**

Control	
Code	Description
A	Single Motor

**l**

Rating	
Code	Rating
N	Reserved

**m**

Rating	
Code	Rating
N	Reserved

**n**

Options	
Code	Description
-LR	3% Input Line Reactor*

\* 3% Input Line Reactor only available as integral part of enclosure with Frame C Package Code A and B drives.

## Drive Ratings

### PowerFlex 400 Standard Product

**3.0 – 50HP @ 200 to 240VAC**  
**3.0 – 150HP @ 380 to 480VAC**

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 Protectors(1)</i>	<i>Contactors</i>	<i>IP 20 Open Watts</i>
<b>200 – 240V AC – 3-Phase Input, 0 – 230V 3-Phase Output</b>									
22C-B012N103	2.2 (3)	12.0	180-265	6.5	15.5	20	140M-F8E-C16	100-C23	170
22C-B017N103	3.7 (5)	17.5	180-265	8.8	21	30	140M-F8E-C25	100-C37	210
22C-B024N103	5.5 (7.5)	24.0	180-265	10.9	26.1	35	140M-F8E-C32	100-C37	298
22C-B033N103	7.5 (10)	33.0	180-265	14.4	34.6	45	140M-F8E-C45	100-C45	365
22C-B049A103	11 (15)	49.0	180-265	21.3	51	70	140-CMN-6300	100-C60	488
22C-B065A103	15 (20)	65.0	180-265	28.3	68	90	140-CMN-9000	100-C85	650
22C-B075A103	18.5 (25)	75.0	180-265	32.5	78	100	140-CMN-9000	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
<b>380 – 480V AC – 3-Phase Input, 0 – 460V 3-Phase Output</b>									
22C-D6P0N103	2.2 (3)	6.0	340-528	6.3	7.5	10	140M-D8E-C10	100-C09	125
22C-D010N103	4.0 (5)	10.5	340-528	10.9	13	20	140M-D8E-C16	100-C16	185
22C-D012N103	5.5 (7.5)	12.0	340-528	11.9	14.2	20	140M-D8E-C16	100-C23	199
22C-D017N103	7.5 (10)	17.0	340-528	15.3	18.4	25	140M-D8E-C20	100-C23	243
22C-D022N103	11 (15)	22.0	340-528	19.2	23	30	140M-F8E-C32	100-C30	326
22C-D030N103	15 (20)	30.0	340-528	25.8	31	40	140M-F8E-C32	100-C37	433
22C-D038A103	18.5 (25)	38.0	340-528	33.3	40	50	140M-F8E-C45	100-C60	489
22C-D045A103	22 (30)	45.5	340-528	39.1	47	60	140-CMN-6300	100-C60	519
22C-D060A103	30 (40)	60.0	340-528	53.3	64	80	140-CMN-9000	100-C85	703
22C-D072A103	37 (50)	72.0	340-528	60.7	73	100	140-CMN-9000	100-C85	800
22C-D088A103	45 (60)	88.0	340-528	74.9	90	125	--	100-D110	1122
22C-D105A103	55 (75)	105.0	340-528	89	107	150	--	100-D140	1278
22C-D142A103	75 (100)	142.0	340-528	124.8	150	200	--	100-D180	1550
22C-D170A103	90 (125)	170.0	340-528	142	170	250	--	100-D250	1900
22C-D208A103	110 (150)	208.0	340-528	167	200	250	--	100-D250	2300

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

## Drive Ratings

### PowerFlex 400 Packaged Product

**3.0 – 50HP @ 208VAC**  
**3.0 – 150HP @ 460VAC**

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	Watts
<b>208V AC – 3-Phase Input, 0 – 208V 3-Phase Output</b>								
<b>Main Input Disconnect</b>								
23C-X012A103NNAANN	2.2 (3)	12	187-229	5.6	15.5	20	-	170
23C-X017A103NNAANN	3.7 (5)	16.8	187-229	7.3	20.2	20	-	210
23C-X024A103NNAANN	5.5 (7.5)	24	187-229	9.5	26.1	35	-	298
23C-X033A103NNAANN	7.5 (10)	30.8	187-229	11.7	32.3	40	-	365
23C-X049A103NNAANN	11 (15)	46.2	187-229	17.3	48	80	-	488
23C-X065A103NNAANN	15 (20)	64	187-229	22.7	62.8	100	-	650
23C-X075A103NNAANN	18.5 (25)	75	187-229	28.1	78	125	-	734
23C-X090A103NNAANN	22 (30)	88	187-229	32.5	90	150	-	778
23C-X120A103NNAANN	30 (40)	114	187-229	42.5	118	200	-	1055
23C-X145A103NNAANN	37 (50)	143	187-229	53.3	148	250	-	1200
<b>3 Contactor Full Feature Bypass with Disconnect</b>								
23C-X012A103NNBANN	2.2 (3)	12	187-229	5.7	15.7	20	-	180
23C-X017A103NNBANN	3.7 (5)	16.8	187-229	7.4	20.4	20	-	220
23C-X024A103NNBANN	5.5 (7.5)	24	187-229	9.6	26.3	35	-	308
23C-X033A103NNBANN	7.5 (10)	30.8	187-229	11.8	32.5	40	-	375
23C-X049A103NNBANN	11 (15)	46.2	187-229	17.4	48.2	80	-	498
23C-X065A103NNBANN	15 (20)	64	187-229	22.8	63	100	-	660
23C-X075A103NNBANN	18.5 (25)	75	187-229	28.2	78.2	125	-	744
23C-X090A103NNBANN	22 (30)	88	187-229	32.6	90.2	150	-	788
23C-X120A103NNBANN	30 (40)	114	187-229	42.6	118.2	200	-	1065
23C-X145A103NNBANN	37 (50)	143	187-229	53.4	148.2	250	-	1210

## Drive Ratings PowerFlex 400 Packaged Product - Continued

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	Watts
<b>460V AC – 3-Phase Input, 0 – 460V 3-Phase Output</b>								
<b>Main Input Disconnect</b>								
23C-D6P0A103NNAANN	2.2 (3)	4.8	414-500	4.8	6	10	-	125
23C-D010A103NNAANN	4 (5)	7.6	414-500	7.2	9.4	15	-	185
23C-D012A103NNAANN	5.5 (7.5)	11	414-500	10.4	13	20	-	199
23C-D017A103NNAANN	7.5 (10)	14	414-500	12.1	15.2	20	-	243
23C-D022A103NNAANN	11 (15)	21	414-500	17.5	22	35	-	326
23C-D030A103NNAANN	15 (20)	27	414-500	22.3	28	35	-	433
23C-D038A103NNAANN	18.5 (25)	34	414-500	28.4	35.7	60	-	489
23C-D045A103NNAANN	22 (30)	40	414-500	32.9	41.3	70	-	519
23C-D060A103NNAANN	30 (40)	52	414-500	44.2	55.5	80	-	703
23C-D072A103NNAANN	37 (50)	65	414-500	52.6	66	100	-	800
23C-D088A103NNAANN	45 (60)	77	414-500	62.8	78.8	150	-	1122
23C-D105A103NNAANN	55 (75)	96	414-500	77.9	97.8	175	-	1278
23C-D142A103NNAANN	75 (100)	124	414-500	104.4	131	200	-	1550
23C-D170A103NNAANN	90 (125)	156	414-500	124.3	156	250	-	1900
23C-D208A103NNAANN	110 (150)	180	414-500	137.9	173.1	350	-	2300
<b>3 Contactor Full Feature Bypass with Disconnect</b>								
23C-D6P0A103NNAANN	2.2 (3)	4.8	414-500	4.9	6.2	10	-	135
23C-D010A103NNBANN	3.7 (5)	7.6	414-500	7.3	9.6	15	-	195
23C-D012A103NNBANN	5.5 (7.5)	11	414-500	10.5	13.2	20	-	209
23C-D017A103NNBANN	7.5 (10)	14	414-500	12.2	15.4	20	-	253
23C-D022A103NNBANN	11 (15)	21	414-500	17.6	22.2	35	-	336
23C-D030A103NNBANN	15 (20)	27	414-500	22.4	28.2	35	-	443
23C-D038A103NNBANN	18.5 (25)	34	414-500	28.5	35.9	60	-	499
23C-D045A103NNBANN	22 (30)	40	414-500	33.0	41.5	70	-	529
23C-D060A103NNBANN	30 (40)	52	414-500	44.3	55.7	80	-	713
23C-D072A103NNBANN	37 (50)	65	414-500	52.7	66.2	100	-	810
23C-D088A103NNBANN	45 (60)	77	414-500	62.9	80	150	-	1132
23C-D105A103NNBANN	55 (75)	96	414-500	78.0	98	175	-	1288
23C-D142A103NNBANN	75 (100)	124	414-500	104.5	131.2	200	-	1560
23C-D170A103NNBANN	90 (125)	156	414-500	124.4	156.2	250	-	1910
23C-D208A103NNBANN	110 (150)	180	414-500	138.0	173.3	350	-	2310
<b>3 Contactor Basic Bypass with Disconnect</b>								
23C-D6P0A103NNCANN	2.2 (3)	4.8	414-500	4.9	6.2	-	140M-C2E-B63	135
23C-D010A103NNCANN	4 (5)	7.6	414-500	7.3	9.6	-	140M-D8E-C10	195
23C-D012A103NNCANN	5.5 (7.5)	11	414-500	10.4	13.2	-	140M-D8E-C16	209
23C-D017A103NNCANN	7.5 (10)	14	414-500	12.2	15.4	-	140M-D8E-C16	253
23C-D022A103NNCANN	11 (15)	21	414-500	17.6	22.2	-	140M-D8E-C25	336
23C-D030A103NNCANN	15 (20)	27	414-500	22.4	28.2	-	140M-D8E-C32	443
23C-D038A103NNCANN	18.5 (25)	34	414-500	28.5	35.9	-	140M-D8E-C45	499
23C-D045A103NNCANN	22 (30)	40	414-500	33.0	41.5	-	140-CMN-4000	529
23C-D060A103NNCANN	30 (40)	52	414-500	44.3	55.7	-	140-CMN-6300	713
23C-D072A103NNCANN	37 (50)	65	414-500	52.7	66.2	-	140-CMN-9000	810
23C-D088A103NNCANN	45 (60)	77	414-500	62.9	80	150	-	1132
23C-D105A103NNCANN	55 (75)	96	414-500	78.0	98	175	-	1288
23C-D142A103NNCANN	75 (100)	124	414-500	104.5	131.3	200	-	1560

## Drive Specification

### PowerFlex 400 Standard Product

**3.0 – 50HP @ 200 to 240VAC**  
**3.0 – 150HP @ 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:	I <sup>2</sup> 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 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 <b>must not</b> 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:	200-240V ±10% 380-480V ±10%
	Frequency Tolerance:	48-63 Hz
	Input Phases	Three-phase input provides full rating. Single-phase operation provides 50% rated current.
	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



## Drive Specification PowerFlex 400 Standard Product - Continued

<b>Control</b>	Method:	Sinusoidal PWM, Volts/Hertz	
	Carrier Frequency: Frames C and D Frame E and F	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.	
<b>Control Inputs</b>	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
<b>Control Outputs</b>	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:	(2) Non-Isolated, 0-10V or 4-20mA
Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog:		10-bit 1k ohm minimum 525 ohm maximum	
<b>Keypad</b>	Display:	Integral 2 line by 16 character LCD with (5) LED Indicators	
	Languages:	English, Francais, Espanol, Italiano, Deutsch, Portugues, Nederlands	
<b>Communication</b>	Type:	Serial (RS485)	
	Supported Protocols (Standard):	Drive Serial Interface (DSI) Modbus RTU Metasys N2	
	Supported Protocols (Optional):	DeviceNet EtherNet/IP PROFIBUS DP	
	Software (Optional):	Windows Based Pocket PC/Windows Mobile 2003	

## Drive Specification

### PowerFlex 400 Packaged Product

**3.0 – 50HP @ 208VAC**  
**3.0 – 150HP @ 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 <sup>2</sup> 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 <b>must not</b> 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

## Drive Specification PowerFlex 400 Packaged Product - Continued

<b>Control</b>	Method:		Sinusoidal PWM, Volts/Hertz
	Carrier Frequency: Frames C and D Frame E and F		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).
<b>Control Inputs</b>	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
<b>Control Outputs</b>	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:	(2) Non-Isolated, 0-10V or 4-20mA
		Specification: Resolution: 0 to 10V DC Analog: 4-20mA Analog:	10-bit 1k ohm minimum 525 ohm maximum
<b>Keypad</b>	Display:	Integral 2 line by 16 character LCD with (5) LED Indicators	
	Languages:	English, Francais, Espanol, Italiano, Deutsch, Portugues, Nederlands	
<b>Communication</b>	Type:	Serial (RS485)	
	Supported Protocols (Standard):	Drive Serial Interface (DSI) Modbus RTU Metasys N2	
	Supported Protocols (Optional):	DeviceNet EtherNet/IP 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 – 150HP @ 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			
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			
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			
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7

## Maximum and Minimum Wire Sizes

### PowerFlex 400 Packaged Product

**3.0 – 50HP @ 208VAC**

**3.0 – 150HP @ 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 – 110	125 – 150	(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			
		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		
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 - 4.7		

**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 – 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
			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	35
	37 – 75	50 – 100			2/0 AWG	14 AWG	150
	90 – 110	125 – 150			(2) 250 MCM	(2) 6 AWG	275
Signal	T1 – T20, R1 – R6	All	All	All	16 AWG	26 AWG	4 – 4.7
	T31 – T40				10 AWG	22 AWG	5 – 5.6

**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

**Short Circuit Breaking Capacity**  
**PowerFlex 400 Packaged Product**

**3.0 – 50HP @ 208VAC**  
**3.0 – 150HP @ 460VAC**

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Voltage	HP	Isc		
		Style A - Main Input Disconnect	Style B – 3 Contactor Full Feature Bypass with Disconnect	Style C – 3 Contactor Basic Bypass with Disconnect
208V AC	3 – 50	100 kA	100 kA	-
460V AC	3 – 30	100 kA	100 kA	65 kA
	40	100 kA	100 kA	42 kA
	50 – 60	100 kA	100 kA	35 kA
	75 - 100	100 kA	100 kA	100 kA
	125 – 150	100 kA	100 kA	-





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