Allen-Bradley

PowerFlex® Family of AC Drives Catalog




Rockwell Automation

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Powerful Performance. Flexible Control.
For motor control applications from low to medium voltage, and from simple to complex, the Powerflex family of drives from 0.2 kW (0.25 Hp) to 6340 kW (8500 Hp) offers world-class motor control solutions.

Motor Control Performance
Because you have a wide range of control needs, PowerFlex offers a variety of motor control technologies, from Volts/Hertz Control for the simplest applications, to Vector Control with patented FORCE™ Technology, which provides excellent low speed/zero speed performance for both induction and permanent magnet motors.

Compact, Space Saving Design
The PowerFlex family offers a compact, Zero-Stacking™ design, allowing side by side mounting to optimize panel space. With a variety of enclosure and package options, PowerFlex drives are able to meet your specific application requirements.

Advanced Communications Capabilities
To help you gain the most from your automation investment, PowerFlex drives utilize an open network architecture to integrate your manufacturing process from shop floor to top floor. PowerFlex drives provide common features and services for DeviceNet™, ControlNet™ and EtherNet™/IP networks, as well as supporting PROFIBUS™, InterBus™, Universal Remote I/O and RS485 DF1.

Common Operator Interface and Programming
Featuring an advanced, common operator interface, PowerFlex drives reduce training and simplify operation. With a consistent programming structure, common PC tools (for programming, monitoring and troubleshooting), consistent parameter names and descriptions, PowerFlex drives reduce set-up time and costs.

Choice, Value and Support
And because the PowerFlex family is from Rockwell Automation, you can be sure these world-class solutions come backed by world-leading service and support, maximizing your automation investment now and in the future.


PowerFlex 7000
Allen-Bradley
PowerFlex 700
PowerFlex 700S
PowerFlex 400
PowerFlex 70
PowerFlex 4

PowerFlex Selection Guide

PowerFlex AC Drives Comparison Chart




Attributes	PowerFlex® 4	PowerFlex® 40	PowerFlex® 400 For Fans and Pumps	PowerFlex® 70 Enhanced Control
Catalog Reference	22A …	22B …	22C …	20A …
Ratings 100-120V	0.2 - 1.1 kW 0.25 - 1.5 HP	0.4 - 1.1 kW 0.5 - 1.5 HP	N/A	N/A
Ratings 200-240V	0.2 - 3.7 kW 0.25 - 5 HP	0.4 - 7.5 kW 0.5 - 10 HP	2.2 - 37 kW 3.0 - 50 HP	0.37 - 18.5 kW 0.5 - 25 HP
Ratings 400-480V	0.4 - 3.7 kW 0.5 - 5 HP	0.4 - 11 kW 0.5 - 15 HP	2.2 - 110 kW 3.0 - 150 HP	0.37 - 37 kW 0.5 - 50 HP
Ratings 500-600V	N/A	0.75 - 11 kW 1 - 15 HP	N/A	0.37 - 37 kW 0.5 - 50 HP
Ratings 690V	N/A	N/A	N/A	N/A
Control Performance	Volts per Hertz Slip Compensation	Volts per Hertz Sensorless Vector Slip Compensation	Volts per Hertz Slip Compensation	Vector Control (VC) w/FORCE™ Technology Sensorless VC, Slip Compensation Encoder Speed Control Encoderless Speed Control Torque Regulation, Volts per Hertz
Features	Drive Overload (OL) Protection Ramp Regulation Flying Start	Drive OL Protection Ramp Regulation Standard PID Control Flying Start StepLogic™	Drive OL Protection Ramp Regulation Standard PID Control Flying Start Hand/Off/Auto Sleep-Wake Purge Input Damper Input	User Sets, Multi-Language Adv. Drive OL Protection Adv. Bus Regulation Adv. PID Control (Spd or Trq) Droop Analog Trim/Invert Adv. Flying Start Motor OL Protection DriveGuard™ Safe-Off Flux Braking
Ambient Temperature Limit for Enclosure Types	IP 20/Open = 50°C IP 30/NEMA 1 = 40°C Flange = 50°C	IP 20/Open = 50°C IP 30/NEMA 1 = 40°C Flange = 50°C	IP 30/NEMA 1 = 45°C	NEMA 1/IP 20/Open = 50°C Flange = 50°C NEMA 4X/12, IP 66 = 40°C
Communications Options	Integral RS485 Optional: *DeviceNet™ *EtherNet/IP™ *PROFIBUS DP™ *Bluetooth®* * Optional network for use only with External DSI Communications Kit	Integral RS485 Optional: DeviceNet EtherNet/IP PROFIBUS DP *Bluetooth*	Integral RS485 w/ Modbus RTU and Metasys® N2, Optional: DeviceNet EtherNet/IP PROFIBUS DP *Bluetooth*	DeviceNet ControlNet™ - Coax ControlNet - Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus™ LonWorks® Modbus RTU Metasys N2 Siemens P1 FLN *Bluetooth*

			
PowerFlex® 700 Vector Control	**PowerFlex® 700H**	**PowerFlex® 700S**	**PowerFlex® 7000 Medium Voltage**
20B …	20C …	20D …	7000A, 7000B, 7000C
N/A	N/A	N/A	N/A
0.37 - 55 kW 0.5 - 100 HP 0.37 - 132 kW 0.5 - 200 HP 0.75 - 110 kW 1 - 150 HP 45 - 132 kW	N/A 132 - 560 kW 200 - 900 HP 110 - 560 kW 150 - 800 HP 160 - 800 kW	0.75 - 55 kW 1 - 100 HP 0.75 - 800 kW 1 - 1250 HP 50 - 800 kW 1 - 1100 HP 75 - 1200 kW	2400V 60Hz 150 - 1500 kW, 200 - 2000 HP 3300V 50Hz 187 - 2050 kW, 250 - 2750 HP 4160V 50/60Hz 260 - 3730 kW, 350 - 5000 HP 6600V 50Hz 400 - 6340 kW, 500 - 8500 HP
Vector Control (VC) w/FORCE™ Technology Sensorless VC, Slip Compensation Encoder Speed Control Encoderless Speed Control Torque Regulation, Volts per Hertz Adjustable Voltage Control	Volts per Hertz Sensorless Vector Slip Compensation	Vector Control (VC) w/FORCE Technology Sensorless VC, Slip Compensation Encoder Speed Control Encoderless Speed Control Torque Regulation, Volts per Hertz Permanent Magnet Control	Digital Sensorless Direct Vector Full Vector Control with Tach Feedback (optional)
User Sets, Multi-Language Adv. Drive OL Protection Adv. Bus Regulation Adv. PID Control (Spd or Trq) Flux Braking, Fast Stop Scale Blocks, Droop Analog Trim/Invert TorqProve™, Position Indexing/Speed Profiler Adv. Flying Start Motor OL Protection Common Bus Capability Parameter Linking Open Motor Lead Detection	User Sets Multi-Language Drive OL Protection Bus Regulation PI Control Speed Droop Analog Trim Flying Start Motor OL Protection	Adv. Drive OL Protection Adv. Bus Regulation Adv. PI Control (Spd or Trq) Droop Analog Trim/Invert Feedback Loss Switchover Stegmann Interface, Heidenhain Interface Resolver Interface, Stahltronic and Temposonics SSI Interface Integral Position Loop SynchLink™ DriveLogix™ Option Inertia Adaptation User Function Blocks Motor Overload Common Bus Capability	6.5KV SGCT Power Semiconductor with Integrated Gate Drive Patented PowerCage™ Converter Modules Set-up Wizard Auto Tuning Remote "Dial-In" Access Field Programmable Gate Arrays Drive Identity Module
IP 20 / Open = 50°C IP 21/NEMA 1 = 40°C IP 54 Flange = 40°C	IP 21 / NEMA 1 Normal Duty = 40°C	IP 20 / Open = 50°C IP 21/NEMA 1 = 40°C IP 54 Flange = 40°C	IP 21/NEMA 1 = 40° C
DeviceNet ControlNet - Coax ControlNet - Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus Modbus RTU *Bluetooth*	DeviceNet ControlNet - Coax ControlNet - Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus LonWorks Modbus RTU Metasys N2 Siemens P1 FLN *Bluetooth*	DeviceNet ControlNet - Coax ControlNet - Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus Modbus RTU *Bluetooth*	Internal - DPI DeviceNet ControlNet - Coax ControlNet - Fiber EtherNet/IP Remote I/O RS485 DF1 RS485 HVAC Modbus RTU Modbus Plus PROFIBUS DP RS232 DFI *Bluetooth*

PowerFlex Standard Packaged Drives

Attributes	PowerFlex® 40 Standard Packaged Drive	PowerFlex® 70 Enhanced Control Standard Packaged Drive	PowerFlex® 700 Vector Control Standard Packaged Drive
			
Catalog Reference	23B	21A	21B
Ratings 480V	0.5-15 HP	0.5-50 HP	0.5-200 HP
Control Performance	Volts per Hertz Sensorless Vector Slip Compensation	Vector Control (VC) w/FORCE™ Technology Sensorless VC, Slip Compensation Encoder Speed Control Encoderless Speed Control Torque Regulation Volts per Hertz	Vector Control (VC) w/FORCE™ Technology Sensorless VC, Slip Compensation Encoder Speed Control Encoderless Speed Control Torque Regulation Volts per Hertz Adjustable Voltage Control
Features	All Standard Drive Features Power Disconnect Options Control and Interface Options I/O Options Quick Disconnect Options Program Specific Documentation Additional Custom Capabilities	All Standard Drive Features Power Disconnect Options Control and Interface Options Bypass and Bypass Options Power Conditioning Options Motor Interface Options Order Specific Documentation Additional Custom Capabilities	All Standard Drive Features Power Disconnect Options Control and Interface Options Bypass and Bypass Options Power Conditioning Options Motor Interface Options Order Specific Documentation Additional Custom Capabilities
Ambient Temperature Limit for Enclosure Types	IP 66/NEMA 4/12 = 0° to 40°C (NEMA 4 indoor/outdoor) IP 66/NEMA 4X = 0° to 40°C (indoor/outdoor)	IP 20/NEMA 1 = 0° to 40°C IP 65/NEMA 4/12 (indoor) = 0° to 40°C IP 65/NEMA 4 (outdoor) = 0° to 40°C	IP 20/NEMA 1 = 0° to 40°C IP 54/NEMA 12 Fan & Filter = 0° to 40°C
Communications Options	Integral RS485 Optional: DeviceNet EtherNet/IP PROFIBUS DP *Bluetooth*	DeviceNet ControlNet-Coax ControlNet-Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus LonWorks Modbus RTU Metasys N2 Siemens P1 FLN *Bluetooth*	DeviceNet ControlNet-Coax ControlNet-Fiber EtherNet/IP Remote I/O RS485 DF1 PROFIBUS DP Interbus Modbus RTU *Bluetooth*

PowerFlex 4 AC Drive

Contents

Conformity to Standards

PowerFlex 4 drives conform to the following:

Conformity to:	Standard Product
UL Listed	✓
IEC (Designed to Meet)	✓
CE Approved	✓
C-Tick	✓

Drive Description

PowerFlex® 4 drives are designed to worldwide standards and ratings, allowing out-of-the-box performance around the globe. Drives are available in two frame sizes that cover ratings from 0.2 to 3.7 kW (0.25 to 5 Hp), 100 to 120 volts, 200 to 240 volts and 380 to 480 volts.

Drives feature integral RS485 communications and are compatible with PC tools such as DriveExplorer™ and DriveTools™ SP which assist with programming, monitoring, and troubleshooting PowerFlex drives.

Catalog Number Explanation

To interpret the meaning of a catalog number, match the values of the catalog number code in positions **a, b, c,** etc. with the tables labeled **a, b, c,** etc. below.

Position

1-3	*4*	*5*	*6-8*	*9*	*10*	*11*	*12*	*13-14*
22A	–	A	1P5	N	1	1	4	AA
a		*b*	*c*	*d*	*e*	*f*	*g*	*h*

a

Drive	
Code	Type
22A	PowerFlex 4

b

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

c1

Rating		
100-120V Single-Phase Input		
Code	Amps	kW (Hp)
1P5	1.5	0.2 (0.25)
2P3	2.3	0.4 (0.5)
4P5	4.5	0.75 (1.0)
6P0	6.0	1.1 (1.5)

c2

Rating		
200-240V Single-Phase Input - **No Brake**		
Code	Amps	kW (Hp)
1P4	1.4	0.2 (0.25)
2P1	2.1	0.4 (0.5)
3P6	3.6	0.75 (1.0)
6P8	6.8	1.5 (2.0)
9P6	9.6	2.2 (3.0)

c3

Rating		
200-240V Single-Phase Input		
Code	Amps	kW (Hp)
1P5	1.5	0.2 (0.25)
2P3	2.3	0.4 (0.5)
4P5	4.5	0.75 (1.0)
8P0	8.0	1.5 (2.0)

c4

Rating		
200-240V Three-Phase Input		
Code	Amps	kW (Hp)
1P5	1.5	0.2 (0.25)
2P3	2.3	0.4 (0.5)
4P5	4.5	0.75 (1.0)
8P0	8.0	1.5 (2.0)
012	12.0	2.2 (3.0)
017	17.5	3.7 (5.0)

c5

Rating		
380-480V Three-Phase Input		
Code	Amps	kW (Hp)
1P4	1.4	0.4 (0.5)
2P3	2.3	0.75 (1.0)
4P0	4.0	1.5 (2.0)
6P0	6.0	2.2 (3.0)
8P7	8.7	3.7 (5.0)

d

Enclosure	
Code	Enclosure
N	Panel Mount - IP 20 (NEMA Type Open)
F	Flange Mount - IP 20 (NEMA Type Open)
H	Replacement Plate Drive - IP 20 (NEMA Type Open) *- Contact factory for ordering information.*

e

HIM	
Code	Interface Module
1	Fixed Keypad

f

Emission Class	
Code	Rating
0	Not Filtered
1	Filtered

g *

Version	
Code	Version
3	No Brake IGBT
4	Standard

* This position of the Catalog Number now indicates drive version. All PowerFlex 4 drives are equipped with RS485 communication.

h

Optional	
Code	Purpose
AA through ZZ	Reserved for custom firmware

Product Selection

120V ac, Single-Phase Drives (50/60 Hz, No Filter)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
0.2	0.25	1.5	22A-V1P5N104	A	22A-V1P5F104
0.4	0.5	2.3	22A-V2P3N104	A	22A-V2P3F104
0.75	1.0	4.5	22A-V4P5N104	B	22A-V4P5F104
1.1	1.5	6.0	22A-V6P0N104	B	22A-V6P0F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.

240V ac, Single-Phase Drives (50/60 Hz, No Brake)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
With Integral "S Type" EMC Filter❄					
0.2	0.25	1.4	22A-A1P4N113	A	–
0.4	0.5	2.1	22A-A2P1N113	A	–
0.75	1.0	3.6	22A-A3P6N113	A	–
1.5	2.0	6.8	22A-A6P8N113	B	–
2.2	3.0	9.6	22A-A9P6N113	B	–
No Filter					
0.2	0.25	1.4	22A-A1P4N103	A	–
0.4	0.5	2.1	22A-A2P1N103	A	–
0.75	1.0	3.6	22A-A3P6N103	A	–
1.5	2.0	6.8	22A-A6P8N103	B	–
2.2	3.0	9.6	22A-A9P6N103	B	–

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.
❄ This filter is suitable for use with a cable length of up to 10 meters for Class A and 1 meter for Class B environments.

240V ac, Three-Phase Drives (50/60 Hz)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
With Integral "S Type" EMC Filter❄					
0.2	0.25	1.5	22A-A1P5N114	A	–
0.4	0.5	2.3	22A-A2P3N114	A	–
0.75	1.0	4.5	22A-A4P5N114	A	–
1.5	2.0	8.0	22A-A8P0N114	B	–
No Filter					
0.2	0.25	1.5	22A-A1P5N104	A	22A-A1P5F104
0.4	0.5	2.3	22A-A2P3N104	A	22A-A2P3F104
0.75	1.0	4.5	22A-A4P5N104	A	22A-A4P5F104
1.5	2.0	8.0	22A-A8P0N104	B	22A-A8P0F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.
❄ This filter is suitable for use with a cable length of up to 10 meters for Class A and 1 meter for Class B environments.

480V ac, Three-Phase Drives

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
0.4	0.5	1.4	22A-D1P4N104	A	22A-D1P4F104
0.75	1.0	2.3	22A-D2P3N104	A	22A-D2P3F104
1.5	2.0	4.0	22A-D4P0N104	A	22A-D4P0F104
2.2	3.0	6.0	22A-D6P0N104	B	22A-D6P0F104
3.7	5.0	8.7	22A-D8P7N104	B	22A-D8P7F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.

User Installed Options

IP30/NEMA 1/UL Type 1 Conversion Kit

Description	Drive Frame	Cat. No.
Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes conduit box with mounting screws and plastic top panel.	A	22-JBAA
	B	22-JBAB

Human Interface Module Option Kits and Accessories

Description	Cat. No.
LCD Display, Remote Panel Mount, Digital Speed Control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only, Includes 2.0 meter cable.	22-HIM-C2S*
LCD Display, Remote Panel Mount, Digital Speed Control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only, Includes 2.9 meter cable.	22-HIM-C2
LCD Display, Remote Handheld, Digital Speed Control, Full Numeric Keypad, CopyCat capable, IP30 (NEMA Type 1), Includes 1.0 meter cable, Panel Mount with optional Bezel Kit.	22-HIM-A3
Remote Handheld, Wireless Interface Module with *Bluetooth* technology, IP30 (NEMA Type 1), Panel Mount with optional Bezel Kit.	22-WIM-N1
Remote Panel Mount, Wireless Interface Module with *Bluetooth* technology, IP66 (NEMA Type 4X/12) indoor use only.	22-WIM-N4S
Bezel Kit. Panel Mount for LCD Display, Remote Handheld unit, IP30 (NEMA Type 1). Includes a 22-RJ45CBL-C20 cable.	22-HIM-B1
DSI HIM Cable (DSI HIM to RJ45 cable)	
1.0 Meter (3.3 Feet)	22-HIM-H10
2.9 Meter (9.51 Feet)	22-HIM-H30

* The 22-HIM-C2S is smaller than the 22-HIM-C2 and cannot be used as a direct replacement.

Spare Parts

Description	Cat. No.
Fan Replacement Kit - Frame A	SK-U1-FAN1-A1
Fan Replacement Kit - Frame B, 1 Fan	SK-U1-FAN1-B1
Fan Replacement Kit - Frame B, 2 Fans	SK-U1-FAN2-B1
Frame A Cover with Power Terminal Guard	SK-U1-ACVR1-A1
Frame B Cover with Power Terminal Guard	SK-U1-ACVR1-B1
Frame A Cover - Black without Logo	SK-U1-CVR2-A1
Frame B Cover - Black without Logo	SK-U1-CVR2-B1

Communication Option Kits

Description	Cat. No.
Serial Converter Module (RS485 to RS232) *Description:* Provides serial communication via DF1 protocol for use with DriveExplorer and DriveExecutive software. *Includes:* DSI to RS232 serial converter, 1203-SFC serial cable, 22-RJ45CBL-C20 cable, and DriveExplorer Lite CD.	22-SCM-232
Serial Cable *Description:* 2.0 meter serial cable with a locking low profile connector to connect to the serial converter and a 9-pin sub-miniature D female connector to connect a computer.	1203-SFC
Null Cable Converter *Description:* For use when connecting the serial converter to DriveExplorer on a handheld PC.	1203-SNM
DSI Cable *Description:* 2.0 meter RJ45 to RJ45 cable, male to male connectors.	22-RJ45CBL-C20
Splitter Cable *Description:* RJ45 one to two port splitter cable.	AK-U0-RJ45-SC1
Terminating Resistors *Description:*120 Ohm resistor embedded in an RJ45 connector (2 pieces).	AK-U0-RJ45-TR1
Terminal Block *Description:* RJ45 two position terminal block (5 pieces) with two 120 Ohm terminating resistors (loose).	AK-U0-RJ45-TB2P
External DSI Communications Kit *Description:* External mounting kit for 22-COMM-D, -E, and -P.	22-XCOMM-DC-BASE
External Comms Power Supply *Description:* Optional 100…240V ac Power Supply for External DSI Communications Kit	20-XCOMM-AC-PS1
DeviceNet Communication Adapter	22-COMM-D‡
EtherNet/IP™ Communication Adapter	22-COMM-E‡
PROFIBUS™ DP Communication Adapter	22-COMM-P‡
Compact I/O Module (3 Channel)	1769-SM2

❄ If NEMA 1/IP30 is required, must also order 22-JBCB (Frame B drives) or 22-JBCC (Frame C drives).

‡ PowerFlex 4 drives require External DSI Communication Kits. Communication Adapters cannot be drive mounted.

PC Programming Software

Description	
DriveTools™ SP Software	See A-B publication 9303-PL002… for ordering/pricing information.
DriveExplorer™ Software	
Pocket DriveExplorer™ Software	

Input Line Reactors - 240V, 50/60 Hz, Three-Phase, 3% Impedance

kW	Hp	Fundamental Amps A	Maximum Continuous Amps A	Inductance mh	Watts Loss W	Cat. No.✶
0.2	0.25	2.0	3.0	12	7.5	1321-3R2-A
0.4	0.5	4.0	6.0	12	21	1321-3R4-B
0.75	1.0	8.0	12	3.0	29	1321-3R8-B
1.5	2.0	8.0	12	1.5	19.5	1321-3R8-A
2.2	3.0	12	18	1.25	26	1321-3R12-A
3.7	5.0	18	27	0.8	36	1321-3R18-A

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

Input Line Reactors - 480V, 50/60 Hz, Three-Phase, 3% Impedance

kW	Hp	Fundamental Amps A	Maximum Continuous Amps A	Inductance mh	Watts Loss W	Cat. No.✶
0.4	0.5	2.0	3.0	20	11.3	1321-3R2-B
0.75	1.0	4.0	6.0	9.0	20	1321-3R4-C
1.5	2.0	4.0	6.0	6.5	20	1321-3R4-B
2.2	3.0	8.0	12	5.0	25.3	1321-3R8-C
3.7	5.0	8.0	12	3.0	29	1321-3R8-B

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

EMC Filters

Drive Ratings			S Type Filter	L Type Filter
Input Voltage	kW	Hp	Cat. No. ✶	Cat. No. ‡
120V 50/60 Hz 1-Phase	0.2	0.25	–	22-RF010-AL
	0.4	0.5	–	22-RF010-AL
	0.75	1.0	–	22-RF018-BL
	1.1	1.5	–	22-RF025-CL §
240V 50/60 Hz 1-Phase	0.2	0.25	❄	22-RF010-AL
	0.4	0.5	❄	22-RF010-AL
	0.75	1.0	❄	22-RF010-AL
	1.5	2.0	❄	22-RF018-BL
240V 50/60 Hz 1-Phase NO BRAKE	0.2	0.25	❄	22-RF010-AL
	0.4	0.5	❄	22-RF010-AL
	0.75	1.0	❄	22-RF010-AL
	1.5	2.0	❄	22-RF018-BL
	2.2	3.0	❄	22-RF025-CL §
240V 50/60 Hz 3-Phase	0.2	0.25	22-RF9P5-AS	22-RF9P5-AL
	0.4	0.5	22-RF9P5-AS	22-RF9P5-AL
	0.75	1.0	22-RF9P5-AS	22-RF9P5-AL
	1.5	2.0	22-RF9P5-AS	22-RF9P5-AL
	2.2	3.0	22-RF021-BS	22-RF021-BL
	3.7	5.0	22-RF021-BS	22-RF021-BL
480V 50/60 Hz 3-Phase	0.4	0.5	22-RF5P7-AS	22-RF5P7-AL
	0.75	1.0	22-RF5P7-AS	22-RF5P7-AL
	1.5	2.0	22-RF5P7-AS	22-RF5P7-AL
	2.2	3.0	22-RF012-BS	22-RF012-BL
	3.7	5.0	22-RF012-BS	22-RF012-BL

✶ This filter is suitable for use with a cable length of up to 10 meters for Class A and 1 meter for Class B environments.
❄ Drives are available in these ratings with internal “S Type” filters.
‡ This filter is suitable for use with a cable length of up to 100 meters for Class A and 5 meters for Class B environments.
§ The piggyback mounting option cannot be used with Frame B PowerFlex 4 drives and Frame C EMC Line Filters.

Dynamic Brake Resistors

Drive Ratings			Minimum Resistance	
Input Voltage	kW	Hp	Ω	Cat. No.*
120V 50/60 Hz 1-Phase	0.2	0.25	48	AK-R2-091P500
	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
240V 50/60 Hz 1-Phase	0.2	0.25	48	AK-R2-091P500
	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
	1.5	2.0	48	AK-R2-091P500
240V 50/60 Hz 3-Phase	0.2	0.25	48	AK-R2-091P500
	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
	1.5	2.0	48	AK-R2-091P500
	2.2	3.0	32	AK-R2-047P500
	3.7	5.0	19	AK-R2-047P500
480V 50/60 Hz 3-Phase	0.4	0.5	97	AK-R2-360P500
	0.75	1.0	97	AK-R2-360P500
	1.5	2.0	97	AK-R2-360P500
	2.2	3.0	97	AK-R2-120P1K2
	3.7	5.0	77	AK-R2-120P1K2

* Resistors listed in this table are rated 5% duty cycle.

PowerFlex 40 AC Drive

Contents

Conformity to Standards

PowerFlex 40 drives conform to the following:

Conformity to:	Standard Product
UL Listed	✓
IEC (Designed to Meet)	✓
CE Approved	✓
C-Tick	✓

Drive Description

PowerFlex® 40 drives are designed to worldwide standards and ratings, allowing out-of-the-box performance around the globe. Drives are available in two frame sizes that cover ratings from 0.4 to 11 kW (0.5 to 15 Hp), 100 to 120 volts, 200 to 240 volts, 380 to 480 volts and 460 to 600 volts.

Drives feature integral RS485 communications and are compatible with PC tools such as DriveExplorer™ and DriveTools™ SP which assist with programming, monitoring, and troubleshooting PowerFlex drives.

Catalog Number Explanation

Position

1-3	4	5	6-8	9	10	11	12	13-14
22B	–	A	2P3	N	1	1	4	AA
a		b	c	d	e	f	g	h

a

Drive	
Code	Type
22B	PowerFlex 40

b

Voltage Rating		
Code	Voltage	Ph.
V	120V ac	1
A	240V ac	1
B	240V ac	3
D	480V ac	3
E	600V ac	3

c1

Rating		
100-120V Single-Phase Input		
Code	Amps	kW (Hp)
2P3	2.3	0.4 (0.5)
5P0	5.0	0.75 (1.0)
6P0	6.0	1.1 (1.5)

c2

Rating		
200-240V Single-Phase Input		
Code	Amps	kW (Hp)
2P3	2.3	0.4 (0.5)
5P0	5.0	0.75 (1.0)
8P0	8.0	1.5 (2.0)
012	12	2.2 (3.0)

c3

Rating		
200-240V Three-Phase Input		
Code	Amps	kW (Hp)
2P3	2.3	0.4 (0.5)
5P0	5.0	0.75 (1.0)
8P0	8.0	1.5 (2.0)
012	12	2.2 (3.0)
017	17.5	3.7 (5.0)
024	24	5.5 (7.5)
033	33	7.5 (10)

c4

Rating		
380-480V Three-Phase Input		
Code	Amps	kW (Hp)
1P4	1.4	0.4 (0.5)
2P3	2.3	0.75 (1.0)
4P0	4.0	1.5 (2.0)
6P0	6.0	2.2 (3.0)
010	10.5	4.0 (5.0)
012	12	5.5 (7.5)
017	17	7.5 (10)
024	24	11 (15)

c5

Rating		
460-600V Three-Phase Input		
Code	Amps	kW (Hp)
1P7	1.7	0.75 (1.0)
3P0	3.0	1.5 (2.0)
4P2	4.2	2.2 (3.0)
6P6	6.6	4.0 (5.0)
9P9	9.9	5.5 (7.5)
012	12	7.5 (10)
019	19	11 (15)

d

Enclosure	
Code	Enclosure
N	Panel Mount - IP 20 (NEMA Type Open)
F	Flange Mount - IP 20 (NEMA Type Open)
H	Replacement Plate Drive - IP 20 (NEMA Type Open) *- Contact factory for ordering information.*

e

HIM	
Code	Interface Module
1	Fixed Keypad

f

Emission Class	
Code	Rating
0	Not Filtered
1	Filtered

g *

Version	
Code	Version
3	No Brake IGBT
4	Standard

* This position of the Catalog Number now indicates drive version. All PowerFlex 40 drives are equipped with RS485 communication.

h

Optional	
Code	Purpose
AA through ZZ	Reserved for custom firmware

Product Selection

120V ac, Single-Phase Drives (50/60 Hz, No Filter)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
0.4	0.5	2.3	22B-V2P3N104	B	22B-V2P3F104
0.75	1.0	5.0	22B-V5P0N104	B	22B-V5P0F104
1.1	1.5	6.0	22B-V6P0N104	B	22B-V6P0F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.

240V ac, Single-Phase Drives (50/60 Hz)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
With Integral “S Type” EMC Filter❄					
0.4	0.5	2.3	22B-A2P3N114	B	–
0.75	1.0	5.0	22B-A5P0N114	B	–
1.5	2.0	8.0	22B-A8P0N114	B	–
2.2	3.0	12	22B-A012N114	C	–
No Filter					
0.4	0.5	2.3	22B-A2P3N104	B	22B-A2P3F104
0.75	1.0	5.0	22B-A5P0N104	B	22B-A5P0F104
1.5	2.0	8.0	22B-A8P0N104	B	22B-A8P0F104
2.2	3.0	12	22B-A012N104	C	22B-A012F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.
❄ This filter is suitable for use with a cable length of up to 10 meters for Class A and 1 meter for Class B environments.

240V ac, Three-Phase Drives (50/60 Hz, No Filter)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount✶
kW	Hp	Output Current A	Cat. No.	Frame Size	Cat. No.
0.4	0.5	2.3	22B-B2P3N104	B	22B-B2P3F104
0.75	1.0	5.0	22B-B5P0N104	B	22B-B5P0F104
1.5	2.0	8.0	22B-B8P0N104	B	22B-B8P0F104
2.2	3.0	12	22B-B012N104	B	22B-B012F104
3.7	5.0	17.5	22B-B017N104	B	22B-B017F104
5.5	7.5	24	22B-B024N104	C	22B-B024F104
7.5	10	33	22B-B033N104	C	22B-B033F104

✶ Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.

480V ac, Three-Phase Drives (50/60 Hz, No Filter)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount*
		Output Current			
kW	Hp	A	Cat. No.	Frame Size	Cat. No.
0.4	0.5	1.4	22B-D1P4N104	B	22B-D1P4F104
0.75	1.0	2.3	22B-D2P3N104	B	22B-D2P3F104
1.5	2.0	4.0	22B-D4P0N104	B	22B-D4P0F104
2.2	3.0	6.0	22B-D6P0N104	B	22B-D6P0F104
4.0	5.0	10.5	22B-D010N104	B	22B-D010F104
5.5	7.5	12	22B-D012N104	C	22B-D012F104
7.5	10	17	22B-D017N104	C	22B-D017F104
11	15	24	22B-D024N104	C	22B-D024F104‡

* Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.
‡ Requires use of external DC Bus inductor or AC Line Reactor.

600V ac, Three-Phase Drives (50/60 Hz, No Filter)

Drive Ratings			IP20/NEMA Type Open		IP20 Flange Mount*
		Output Current			
kW	Hp	A	Cat. No.	Frame Size	Cat. No.
0.75	1.0	1.7	22B-E1P7N104	B	22B-E1P7F104
1.5	2.0	3.0	22B-E3P0N104	B	22B-E3P0F104
2.2	3.0	4.2	22B-E4P2N104	B	22B-E4P2F104
4.0	5.0	6.6	22B-E6P6N104	B	22B-E6P6F104
5.5	7.5	9.9	22B-E9P9N104	C	22B-E9P9F104
7.5	10	12	22B-E012N104	C	22B-E012F104
11	15	19	22B-E019N104	C	22B-E019F104

* Meets IP40/54/65 (NEMA 1/12/4/4X) when installed in an enclosure of like rating.

User Installed Options

IP30/NEMA 1/UL Type 1 Conversion Kit

Description	Drive Frame	Cat. No.
Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes conduit box with mounting screws and plastic top panel.	B	22-JBAB
	C	22-JBAC
Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes communication option conduit box with mounting screws and plastic top panel.	B	22-JBCB
	C	22-JBCC

Human Interface Module Option Kits and Accessories

Description	Cat. No.
LCD Display, Remote Panel Mount, Digital Speed Control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only. Includes 2.0 meter cable.	22-HIM-C2S✶
LCD Display, Remote Panel Mount, Digital Speed Control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only. Includes 2.9 meter cable.	22-HIM-C2
LCD Display, Remote Handheld, Digital Speed Control, Full Numeric Keypad, CopyCat capable, IP30 (NEMA Type 1). Includes 1.0 meter cable, Panel Mount with optional Bezel Kit.	22-HIM-A3
Remote Handheld, Wireless Interface Module with *Bluetooth* technology, IP30 (NEMA Type 1), Panel Mount with optional Bezel Kit.	22-WIM-N1
Remote Panel Mount, Wireless Interface Module with *Bluetooth* technology, IP66 (NEMA Type 4X/12) indoor use only.	22-WIM-N4S
Bezel Kit. Panel Mount for LCD Display, Remote Handheld unit, IP30 (NEMA Type 1). Includes a 22-RJ45CBL-C20 cable.	22-HIM-B1
DSI HIM Cable (DSI HIM to RJ45 cable)	
1.0 Meter (3.3 Feet)	22-HIM-H10
2.9 Meter (9.51 Feet)	22-HIM-H30

✶ The 22-HIM-C2S is smaller than the 22-HIM-C2 and cannot be used as a direct replacement.

Spare Parts

Description	Cat. No.
Fan Replacement Kit - Frame B, 1 Fan	SK-U1-FAN1-B1
Fan Replacement Kit - Frame B, 2 Fans	SK-U1-FAN2-B1
Fan Replacement Kit - Frame C, 1 Fan	SK-U1-FAN1-C1
Fan Replacement Kit - Frame C, 1 Fan, 15 Hp	SK-U1-FAN1-C2
Frame B Cover with Power Terminal Guard	SK-U1-BCVR1-B1
Frame C Cover with Power Terminal Guard	SK-U1-BCVR1-C1
Frame B Cover - Black without Logo	SK-U1-CVR2-B1
Frame C Cover - Black without Logo	SK-U1-CVR2-C1
Frame B Cover for Comm Option - Black without Logo	SK-U1-CVR2-BC
Frame C Cover for Comm Option - Black without Logo	SK-U1-CVR2-CC

Communication Option Kits

Description	Cat. No.
Serial Converter Module (RS485 to RS232) *Description:* Provides serial communication via DF1 protocol for use with DriveExplorer and DriveExecutive software. *Includes:* DSI to RS232 serial converter, 1203-SFC serial cable, 22-RJ45CBL-C20 cable, and DriveExplorer Lite CD.	22-SCM-232
Serial Cable *Description:* 2.0 meter serial cable with a locking low profile connector to connect to the serial converter and a 9-pin sub-miniature D female connector to connect a computer.	1203-SFC
Null Cable Converter *Description:* For use when connecting the serial converter to DriveExplorer on a handheld PC.	1203-SNM
DSI Cable *Description:* 2.0 meter RJ45 to RJ45 cable, male to male connectors.	22-RJ45CBL-C20
Splitter Cable *Description:* RJ45 one to two port splitter cable.	AK-U0-RJ45-SC1
Terminating Resistors *Description:*120 Ohm resistor embedded in an RJ45 connector (2 pieces).	AK-U0-RJ45-TR1
Terminal Block *Description:* RJ45 two position terminal block (5 pieces) with two 120 Ohm terminating resistors (loose).	AK-U0-RJ45-TB2P
DeviceNet Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame B and C PowerFlex 40 drives (Ordered Separately).	22-COMM-D
EtherNet/IP™ Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame B and C PowerFlex 40 drives (Ordered Separately).	22-COMM-E
PROFIBUS™ DP Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame B and C PowerFlex 40 drives (Ordered Separately).	22-COMM-P
External DSI Communications Kit *Description:* External mounting kit for 22-COMM-D, -E, and -P.	22-XCOMM-DC-BASE
External Comms Power Supply *Description:* Optional 100…240V ac Power Supply for External DSI Communications Kit	20-XCOMM-AC-PS1
Compact I/O Module (3 Channel)	1769-SM2
Communication Adapter Cover *Description:* Houses the Communication Adapter for Frame B and C drives. *Note:* This cover adds 25 mm (0.98 in.) to the overall depth of the drive.	
Frame B Drive	22B-CCB❄
Frame C Drive	22B-CCC❄

❄ If NEMA 1/IP30 is required, must also order 22-JBCB (Frame B drives) or 22-JBCC (Frame C drives).

PC Programming Software

Description	
DriveTools™ SP Software	See A-B publication 9303-PL002… for ordering/pricing information.
DriveExplorer™ Software	
Pocket DriveExplorer™ Software	

Dynamic Brake Resistors

Drive Ratings			Minimum Resistance	
Input Voltage	kW	Hp	Ω	Cat. No.✶
120V 50/60 Hz 1-Phase	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
	1.1	1.5	48	AK-R2-091P500
240V 50/60 Hz 1-Phase	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
	1.5	2.0	48	AK-R2-091P500
	2.2	3.0	32	AK-R2-047P500
240V 50/60 Hz 3-Phase	0.4	0.5	48	AK-R2-091P500
	0.75	1.0	48	AK-R2-091P500
	1.5	2.0	48	AK-R2-091P500
	2.2	3.0	32	AK-R2-047P500
	3.7	5.0	19	AK-R2-047P500
	5.5	7.5	13	AK-R2-030P1K2
	7.5	10	10	AK-R2-030P1K2
480V 50/60 Hz 3-Phase	0.4	0.5	97	AK-R2-360P500
	0.75	1.0	97	AK-R2-360P500
	1.5	2.0	97	AK-R2-360P500
	2.2	3.0	97	AK-R2-120P1K2
	4.0	5.0	77	AK-R2-120P1K2
	5.5	7.5	55	AK-R2-120P1K2
	7.5	10	39	AK-R2-120P1K2
	11	15	24	AK-R2-120P1K2 ❄
600V 50/60 Hz 3-Phase	0.75	1.0	120	AK-R2-360P500
	1.5	2.0	120	AK-R2-360P500
	2.2	3.0	82	AK-R2-120P1K2
	4.0	5.0	82	AK-R2-120P1K2
	5.5	7.5	51	AK-R2-120P1K2
	7.5	10	51	AK-R2-120P1K2
	11	15	51	AK-R2-120P1K2 ❄

✶ Resistors listed in this table are rated 5% duty cycle.
❄ Requires two resistors wired in parallel.

Input Line Reactors - 240V, 50/60 Hz, Three-Phase, 3% Impedance

kW	Hp	Fundamental Amps A	Maximum Continuous Amps A	Inductance mh	Watts Loss W	Cat. No.*
0.4	0.5	4.0	6.0	12	21	1321-3R4-B
0.75	1.0	8.0	12	3.0	29	1321-3R4-B
1.5	2.0	8.0	12	1.5	19.5	1321-3R8-B
2.2	3.0	12	18	1.25	26	1321-3R12-A
3.7	5.0	18	27	0.8	36	1321-3R18-A
5.5	7.5	25	37.5	0.5	48	1321-3R25-A
7.5	10	35	52.5	0.4	49	1321-3R35-A

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

Input Line Reactors - 480V, 50/60 Hz, Three-Phase, 3% Impedance

kW	Hp	Fundamental Amps A	Maximum Continuous Amps A	Inductance mh	Watts Loss W	Cat. No.*
0.4	0.5	2.0	3.0	20	11.3	1321-3R2-B
0.75	1.0	4.0	6.0	9.0	20	1321-3R4-C
1.5	2.0	4.0	6.0	6.5	20	1321-3R4-B
2.2	3.0	8.0	12	5.0	25.3	1321-3R8-C
4.0	5.0	12	18	2.5	31	1321-3R8-B
5.5	7.5	12	18	2.5	31	1321-3R12-B
7.5	10	18	27	1.5	43	1321-3R18-B
11	15	25	37.5	1.2	52	1321-3R25-B

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

Input Line Reactors - 600V, 50/60 Hz, Three-Phase, 3% Impedance

kW	Hp	Fundamental Amps A	Maximum Continuous Amps A	Inductance mh	Watts Loss W	Cat. No.*
0.75	1.0	2.0	3.0	20	11.3	1321-3R2-B
1.5	2.0	4.0	6.0	6.5	20	1321-3R4-C
2.2	3.0	4.0	6.0	6.5	20	1321-3R4-B
4.0	5.0	8.0	12	5.0	25.3	1321-3R8-C
5.5	7.5	12	18	2.5	31	1321-3R12-B
7.5	10	12	18	2.5	31	1321-3R12-B
11	15	18	27	1.5	43	1321-3R18-B

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

EMC Filters

Drive Ratings			S Type Filter	L Type Filter
Input Voltage	kW	Hp	Cat. No.✶	Cat. No.§
120V 50/60 Hz 1-Phase	0.4	0.5	–	22-RF018-BL
	0.75	1.0	–	22-RF018-BL
	1.1	1.5	–	22-RF018-BL
240V 50/60 Hz 1-Phase	0.4	0.5	❄	22-RF018-BL
	0.75	1.0	❄	22-RF018-BL
	1.5	2.0	❄	22-RF018-BL
	2.2	3.0	❄	22-RF025-CL
240V 50/60 Hz 3-Phase	0.4	0.5	22-RF021-BS ‡	22-RF021-BL
	0.75	1.0	22-RF021-BS ‡	22-RF021-BL
	1.5	2.0	22-RF021-BS ‡	22-RF021-BL
	2.2	3.0	22-RF021-BS ‡	22-RF021-BL
	3.7	5.0	22-RF021-BS ‡	22-RF021-BL
	5.5	7.5	22-RF034-CS	22-RF034-CL
	7.5	10	22-RF034-CS	22-RF034-CL
480V 50/60 Hz 3-Phase	0.4	0.5	22-RF012-BS	22-RF012-BL
	0.75	1.0	22-RF012-BS	22-RF012-BL
	1.5	2.0	22-RF012-BS	22-RF012-BL
	2.2	3.0	22-RF012-BS	22-RF012-BL
	4.0	5.0	22-RF012-BS	22-RF012-BL
	5.5	7.5	22-RF018-CS	22-RF018-CL
	7.5	10	22-RF018-CS	22-RF018-CL
	11	15	22-RF026-CS	22-RF026-CL
600V 50/60 Hz 3-Phase	0.75	1.0	–	22-RF8P0-BL
	1.5	2.0	–	22-RF8P0-BL
	2.2	3.0	–	22-RF8P0-BL
	4.0	5.0	–	22-RF8P0-BL
	5.5	7.5	–	22-RF015-CL
	7.5	10	–	22-RF015-CL
	11	15	–	22-RF024-CL

✶ This filter is suitable for use with a cable length of up to 10 meters for Class A and 1 meter for Class B environments.
❄ Drives are available in these ratings with internal “S Type” filters.
‡ Filter must be Series B or later.
§ This filter is suitable for use with a cable length of up to 100 meters for Class A and 5 meters for Class B environments.

Overview

The PowerFlex 40 Packaged Drives Program allows users to create drive packages based on their specific needs. This program enhances stand-alone drive functionality through additional control, power and packaging options which are ideal for OEM and end users with special installation needs.

The program has two levels:

Standard Packaged Drives

The Standard Packaged Drives Program allows users to create drive packages based on their specific needs. A complete drive package may be specified by assembling a single catalog number string that includes a base drive and all required options. Packaging is available for 480V requirements in NEMA Type 4/12 (IP66) and NEMA Type 4X (IP66). The program consists of a fully defined catalog string identified within this price sheet. Focused on higher volume, repeat business, the standard designs provide consistent manufacturing and minimizes customer resources by reducing engineering, manufacturing and installation time. Product can be ordered through the order entry system.

Engineered Drives

The Engineered Drives Program offers users the ability to create drive packages beyond the Standard Packaged Drives offering. Product can be ordered by entering a custom quote request for additional options not listed.

A custom quote will require a Passport quote using "SP-SDB-CUSTOM" as the line item part number and entering a description of the base catalog string and custom options in the Competitive Summary. For questions or help with a custom quote please contact the Engineered Drives Group at 262-512-8415.

PowerFlex 40 Packaged Drives Programs

How to Order

- Step 1
  Select the basic PowerFlex 40 Drive Catalog Number based on application requirements (nominal HP).
- Step 2
  Specify Options – The following pages list and describe the available options. The listing is divided into simple categories to assist in quickly locating specific needs. Some options are horsepower and/or voltage specific, or will have special rules associated with them – Read all Footnotes.

Example

An application requires a variable speed control for an existing 3 HP, 480V ac conveyor motor. Both drive and motor will be located in a wash down environment. Drive mounted keypad is required for programming, RS485 for communication, a system disconnect providing branch circuit protection, and Hand/Off/Auto.

Description	Cat. No. / Code	Position
Bulletin Number	23B	1-3
Voltage Rating	D	5
Drive Rating	6P0	6-8
Enclosure	D	9
Interface Module	1	10
Emission Class	0	11
Version	4	12
Special Options	NN	13-14
Base List		
Fused Disconnect Switch	-P6	
Hand/Off/Auto	-S1	
23B-D6P0D104NN-P6-S1		

Catalog Number Explanation

To interpret the meaning of a catalog number, match the values of the catalog number code in positions **a, b, c,** etc. with the tables labeled **a, b, c,** etc. below.

Position	1-3	4	5	6-8	9	10	11	12	13	14	15	16+
	23B	–	D	4P0	D	1	0	4	N	N	–	P6
	a		*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*		*j*

a

Drive	
Code	**Type**
23B	PowerFlex 40

b

Voltage Rating		
Code	**Voltage**	**Ph.**
D	480V ac	3

c

Amp Rating		
480V 60Hz Input		
Code	**Amps**	**kW (Hp)**
1P4	1.4	0.4 (0.5)
2P3	2.3	0.75 (1.0)
4P0	4.0	1.5 (2.0)
6P0	6.0	2.2 (3.0)
010	10.5	4.0 (5.0)
012	12	5.5 (7.5)
017	17	7.5 (10)
024	24	11 (15)

d

Enclosure	
Code	**Enclosure**
C	NEMA Type 4X (IP66)*
D	NEMA Type 4/12 (IP66)*

* The design of the PowerFlex 40 Standard Packaged Drive supports indoor and outdoor applications that are not in direct sunlight.

e

HIM	
Code	**Interface Module**
1	Fixed Keypad on Drive

f

Emission Class	
Code	**Rating**
0	Not Filtered

g

Version	
Code	**Version**
4	RS485 (Standard)
D	DeviceNet
E	EtherNet/IP
P	PROFIBUS DP

h

Code	Rating
N	**Reserved**

i

Code	Rating
N	**Reserved**

j

Options	
Code	**Description**
-E22	DeviceNet Quick Disconnect (Bottom)
-E23	DeviceNet Quick Disconnect (Left Side)
-J10*	ZAC Master (Left Feed)
-J11*	ZAC Master (Right Feed)
-J12*	ZAC Infeed (Left Feed)
-J13*	ZAC Infeed (Right Feed)
-J14*	Intermediate (Left Feed)
-J15*	Intermediate (Right Feed)
-P3	Motor Circuit Protector
-P6	Disconnect Switch (Fused)
-R3	DeviceNet I/O (4 In/2 Out) w/Spring Return HOA and Power Disconnect Aux. Contact
-R4	DeviceNet Point I/O w/IB4 (4 Inputs)
-R5	-R3 plus 4 I/O Quick Disconnect
-S1	Hand/Off/Auto S.S. (Start/Stop/Speed Ref.)
-S4	Auto/Manual S.S. (Speed Ref.)
-S7	Start and Stop P.B.
-S8	Forward/Reverse S.S.
-S20	Local Control with Off/Run FWD and a Local/Remote S.S.
-S21	Local/Off/Remote with 1 N.O. Interposing Relay

* This option changes the enclosure rating to NEMA 1 (IP 20).

Product Selection

480V ac Base Drive

Drive Ratings			Frame Size	Single Motor	
				NEMA 4/12 (IP66)	NEMA 4X (IP66)
kW	Hp	Output Current *(40°C)* A		Cat. No.	Cat. No.
0.4	0.5	1.4	B	23B-D1P4D104NN	23B-D1P4C104NN
0.75	1.0	2.3	B	23B-D2P3D104NN	23B-D2P3C104NN
1.5	2.0	4.0	B	23B-D4P0D104NN	23B-D4P0C104NN
2.2	3.0	6.0	B	23B-D6P0D104NN	23B-D6P0C104NN
4.0	5.0	10.5	B	23B-D010D104NN	23B-D010C104NN
5.5	7.5	12	C	23B-D012D104NN	23B-D012C104NN
7.5	10	17	C	23B-D017D104NN	23B-D017C104NN
11	15	24	C	23B-D024D104NN	23B-D024C104NN

Factory Installed Options

Version (Communication)

Description	Catalog Code (Position 12)
RS485 (Standard)	4
DeviceNet	D
EtherNet/IP	E
PROFIBUS DP	P

Power Disconnect Means

Description	Option Code*
Motor Circuit Protector	-P3
Fused Disconnect	-P6

* If option -P3 or -P6 is not selected, branch circuit protection must be supplied by user.

Operator Devices - Door Mounted

Description P.B. = Pushbutton, S.S. = Selector Switch, P.L. = Pilot Light	Option Code
H/O/A S.S. (Start/Stop/Spd. Ref.)	-S1
Auto/Manual S.S. (Speed Ref.)	-S4
Start and Stop P.B.	-S7
Forward Reverse	-S8
Local Control with Off/Run/Forward and a Local Remote S.S.	-S20
Local/Off/Remote with N.O. Interposing Relay	-S21

I/O Options

Description	Option Code
DeviceNet I/O (4 In/2 Out) w/Spring Return HOA and Power Disconnect Aux. Contact	-R3
DeviceNet Point I/O w/IB4 (4 Inputs)	-R4
-R3 plus 4 I/O Quick Disconnect	-R5

Enclosure Options

Description	Option Code
DeviceNet Quick Disconnect (Bottom)	-E22
DeviceNet Quick Disconnect (Side)	-E23

Codes and Standards

Code/Standard	
UL, c-UL (CSA)	
UL508C C CSA C 22.2 No. 14	This program provides UL listed from the factory as standard.
CE (European Conformance Standard)	
LV Directive 73/23/EEC LV: EN 50178 EN 60204 EMC Directive 89/336/EEC EMC: EN 61800-3	This program meets CE directives noted.*
C-Tick	
EN 61800-3	This program meets C-Tick directives noted.*

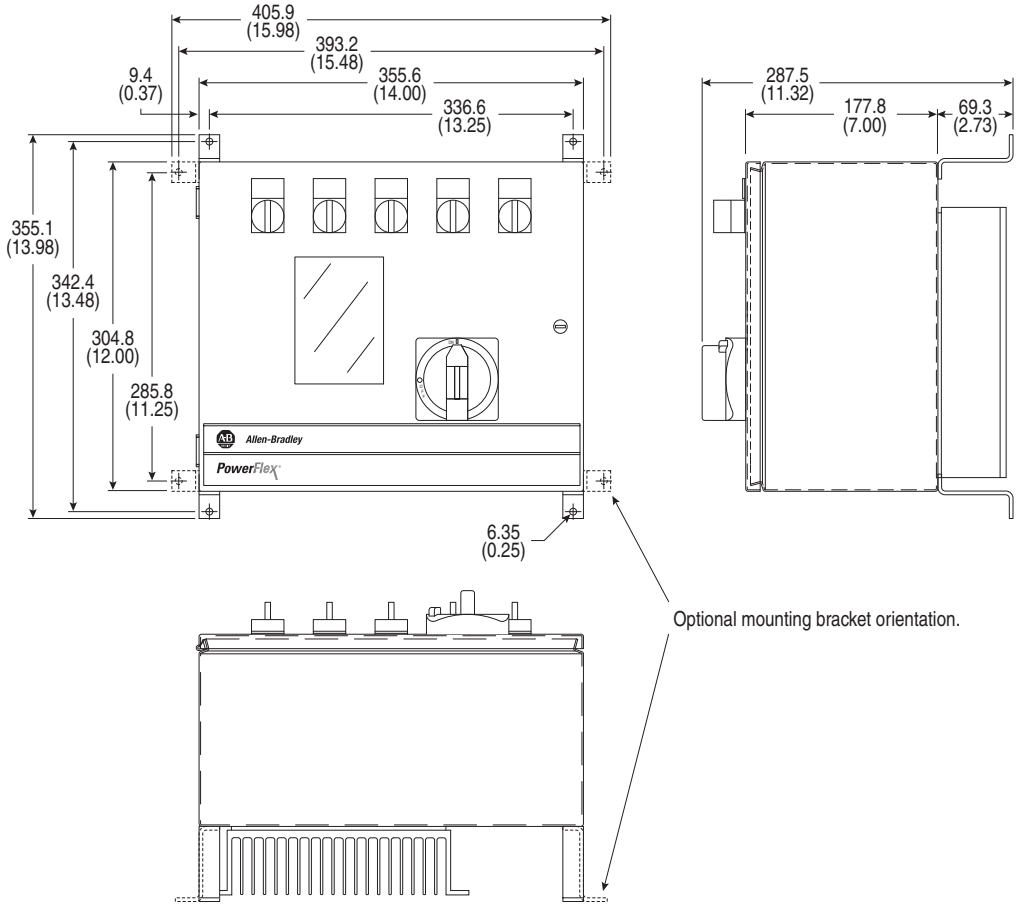
* Refer to the PowerFlex 40 User Manual, publication 22B-UM001.

Option Selection Reference Guide

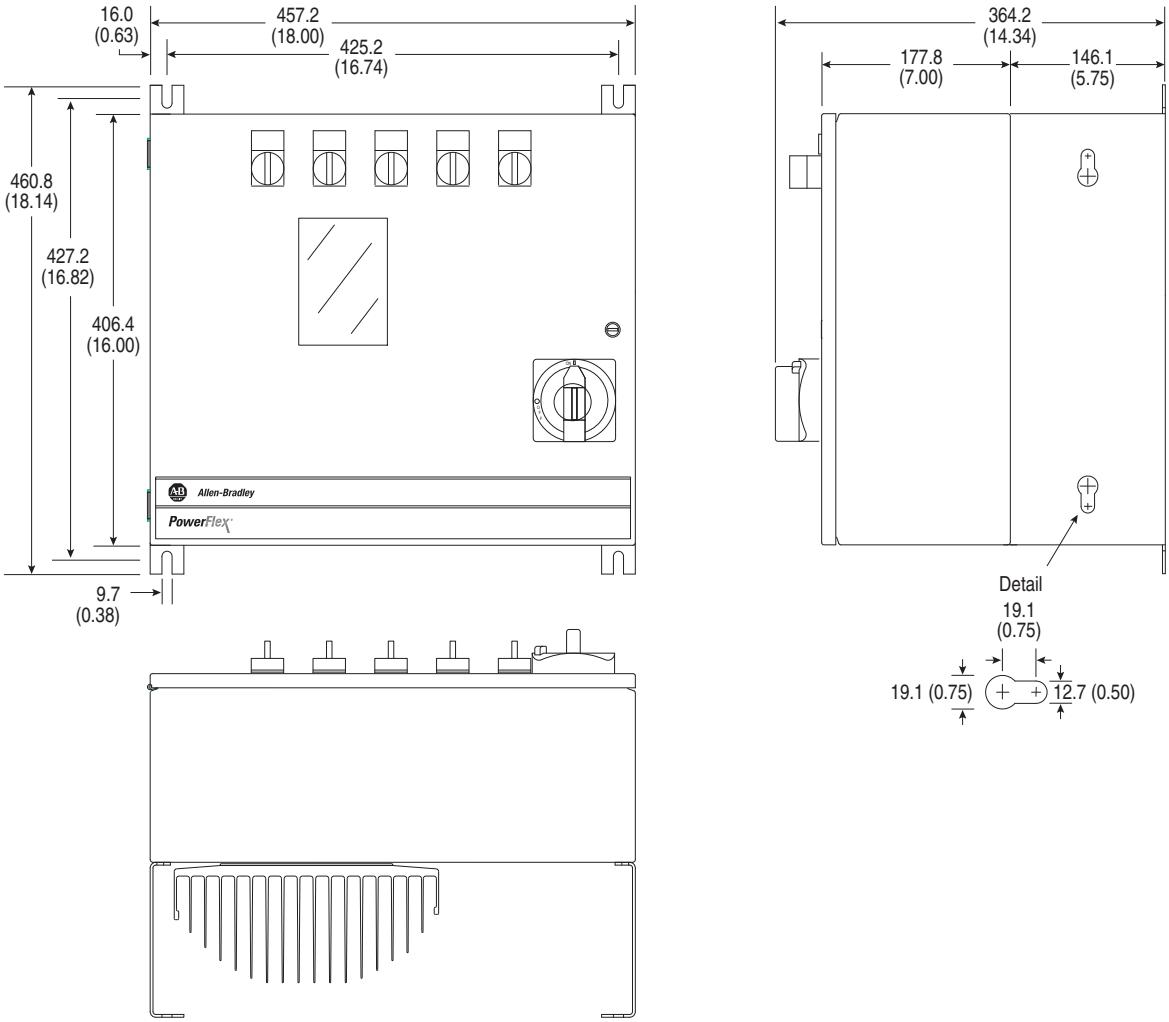
Option	Must Be Used With…	Cannot Be Used With…
Voltage		Only one can be selected.
Current Rating		Only one can be selected.
Enclosure Type		Only one can be selected.
Interface Module		Only one can be selected.
Emission Class		Only one can be selected.
Version		Only one can be selected; 4, D, E, or P
-E22 -E23	-D (Position 12) -D (Position 12)	4, E, P (Position 12), E23 4, E, P (Position 12), E22
-P3		P6
-P6		P3
-R3	D (Position 12)	4, E, P (Position 12), R4, R5, S1, S4, S7, S8, S20, S21
-R4	D (Position 12)	4, E, P (Position 12), R3, R5
-R5	D (Position 12)	C (Position 9), 4, E, P (Position 12), R3, R4, S1, S4, S7, S8, S20, S21
-S1 -S4 -S7 -S8		R3, R5, S4, S7, S20, S21 R3, R5, S1, S20, S21 R3, R5, S1, S20, S21 R3, R5, S20, S21
-S20	Any comm module (Position 12)	R3, R5, S1, S4, S7, S8, S21
-S21		R3, R5, S1, S4, S7, S8, S20

Dimensions

Frame B



Frame C


16.0
(0.63)
457.2
(18.00)
425.2
(16.74)
460.8
(18.14)
427.2
(16.82)
406.4
(16.00)
9.7
(0.38)
Allen-Bradley
PowerFlex
364.2
(14.34)
177.8
(7.00)
146.1
(5.75)
Detail
19.1
(0.75)
19.1 (0.75)
12.7 (0.50)

Bulletin 284 ArmorStart™ Distributed motor Controller

- On Machine Starting Solution
- Variable Frequency AC Drive using PowerFlex™ Technology
- Horsepower Range 0.5…5 Hp (0.4…3.3 kW)
- Robust IP67/Nema Type 4 enclosure rating
- Modular Plug and Play Design
- Quick Disconnect connections for I/O, communications and motor
- 4 Inputs and 2 Outputs (Expandable with ArmorPoint™)
- LED Status Indication
- DeviceNet™ Communications
- DeviceLogix™ Component Technology
- Connectivity to ArmorPoint™ Distributed I/O Products
- ControlNet and EtherNet Communication via ArmorPoint
- Factory Installed Options:
  - Hand/Off/Auto (HOA) Keypad Configuration
  - EMI Filter
  - Dynamic Brake Connector
  - Output Contactor
  - Source Brake Contactor
  - Shielded Motor Cable
  - Safety Monitor
  - 0…10V Analog Input

Table of Contents

Conformity to Standards

- cULus (File No. E207834)
- UL 508C
- EN/IEC 60947-1, EN 50178, EN 61800-3
- CE Marked per Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC

Description

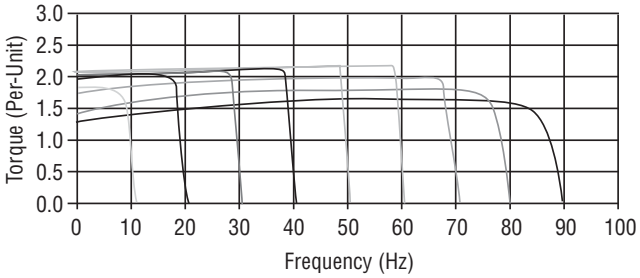
The Bulletin 284 ArmorStart Distributed Motor Controller is an integrated, pre-engineered, combination starter for variable frequency AC drive applications. The ArmorStart offers a robust IP 67/Nema Type 4 enclosure design, which is suitable for water wash down environments. The modular “plug and play” design offers simplicity in wiring the installation. The quick disconnects for the I/O, communication, and motor connection reduce the wiring time and eliminate wiring errors. The ArmorStart offers, as standard, 4 inputs and 2 outputs to be used with sensors and actuators for monitoring the application process. The ArmorStart’s LED status indication and built-in diagnostics capabilities allows ease of maintenance and troubleshooting. The optional Hand/Off/Auto (HOA) keypad allows for local start/stop control at the ArmorStart Distributed Motor Controller.

The Bulletin 284 ArmorStart Distributed Motor Controller offers short circuit protection per UL508C and IEC 60947-1. The ArmorStart is rated for local-disconnect service by incorporating the Bulletin 140 Motor Protector as the local-disconnect, eliminating the need for additional components. The ArmorStart Distributed Motor Controllers are rated for group motor installations.

Mode of Operation

Volts per Hertz (Sensorless Vector Performance)

This method provides excellent speed regulation and high levels of torque across the entire speed range of the drive, and improved speed regulation even as loading increases. Basic control yields the most cost effective performance when sensorless vector control is not required.



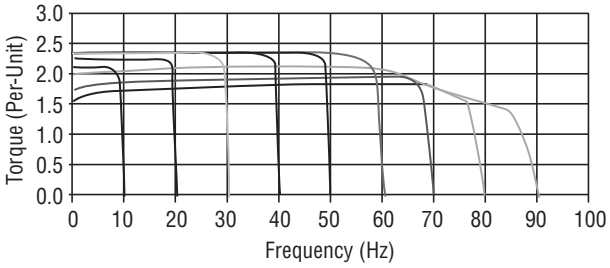
ArmorStart with Sensorless Vector Performance — 3 Hp, High Speed

Additional Features

- 4 Preset Speeds
- Flying Start
- Auto Restart

Sensorless Vector Control (SVC)

Sensorless vector control provides exceptional speed regulation and very high levels of torque across the entire speed range of the drive.



ArmorStart with Sensorless Vector Control — 3 Hp, High Speed

Additional Features

- 8 Preset Speeds
- Skip Frequency
- Flying Start
- Auto Restart
- Process Control Loop (PID)
- Step Logic Functionality
- Timer/Counter Functions

Description of Features

Overload Protection

The Bulletin 284 ArmorStart Distributed Motor Controller incorporates, as standard, electronic motor overload protection. This overload protection is accomplished electronically with an I^2t algorithm. The ArmorStart's overload protection is programmable via the communication network providing the user with flexibility. The overload trip class allows for class 10 overload protection. Ambient insensitivity is inherent in the electronic design of the overload.

LED Status Indication

The LED Status Indication provides 4 status LEDs and a Reset button. The LEDs provide status indication for the following:

- **POWER LED**
  The LED is illuminated solid green when control power is present and with the proper polarity
- **RUN LED**
  This LED is illuminated solid green when the motor is running
- **NETWORK LED**
  This bicolor (red/green) LEDs indicates the status of the communication link
- **FAULT LED**
  Indicates Controller Fault (trip) condition
- The "Reset Button" as a local trip reset.

Inputs

The inputs are single keyed (2 inputs per connector), which are sourced from DeviceNet power (24V DC), with LED status indication.

Outputs

The outputs are dual key connectors. Which are sourced from the control voltage power, which can be either, 24V DC, 120V AC or 240V AC with LED status indication.

Motor Cable

With every Bulletin 284 ArmorStart Distributed Motor Controller, a 3-meter unshielded 4-conductor cordset is provided with each unit as standard. If the optional EMI filter is selected, a 3-meter shielded 4-conductor cordset is provided with each unit as standard.

Fault Diagnostics

Fault diagnostics capabilities built into the Bulletin 284 ArmorStart Distributed Motor Controller help you pinpoint a problem for easy troubleshooting and quick re-starting.

- Short Circuit
- Overload
- Phase Short
- Ground Fault
- Stall
- Control Power Loss
- Input Short Circuit
- Overcurrent
- Overtemperature
- DeviceNet Power Loss
- Internal Communication Fault
- DC Bus Fault
- EEPROM Fault
- Hardware Fault
- Restart Retries
- Miscellaneous Fault

Network and Expandable I/O Capabilities

The Bulletin 284D ArmorStart Distributed Motor Controller delivers enhanced control to access parameter settings and provides fault diagnostics, and remote start/stop control. DeviceNet is the communication protocol, provided with the ArmorStart including DeviceLogix.

The Bulletin 284A ArmorStart Distributed Motor Controller allows connectivity to the ArmorPoint backplane. The ArmorPoint I/O system can communicate using DeviceNet, ControlNet and EtherNet communication protocols. In addition to the different network protocols, the ArmorPoint Distributed I/O products allow the I/O capability to be expanded beyond the standard two outputs. The two outputs that are provided as standard which are a dual key connector, are sourced from the control voltage power of 24V DC, 120V AC, or 240V AC. LED status indication is also provided, as standard with ArmorPoint. When using the ArmorPoint, a maximum of two ArmorPoint Distributed Motor Controllers can be connected to the ArmorPoint Distributed I/O product.

Factory Installed Options

HOA Selector Keypad with Jog Function

The HOA Selector Keypad with Jog Function allows for local start/stop control with capabilities to JOG and to Forward/Reverse motor direction.

EMI Filter

The EMI Filter option is required if the Bulletin 284 ArmorStart Distributed Motor requires to be CE compliant. If the EMI Filter is selected, a 3 meter shielded 4 conductor cordset is provided as standard. This option is only available with sensorless vector control.

Dynamic Brake Connector

A 3 meter, 3 pin cable for connection to a dynamic brake module is provided as standard when this option is selected. See Accessories for available dynamic brake modules.

Output Contactor

An internal contactor will be sourced from control voltage to isolate the load side of the Bulletin 284 ArmorStart Distributed Motor Controller. When control power is applied the output contactor is closed and when control power is removed the output contact opens. There is no switching element such as a relay in the system. If control power is lost then the output contactor will open since its coil power is lost. A sequenced stop involving the output contact cannot be performed.

Source Brake Contactor

An internal contactor will be used to switch the electromechanical brake on/off. This contactor's coil will be driven by the auxiliary relay output of the ArmorStart Distributed Motor Controller. A 3 meter, 3 pin cable for connection to an electromechanical brake is provided as standard when option is selected.

Shielded Motor Cable

A 3 meter shielded 4 conductor cordset is provided instead of the 3 meter unshielded 4 conductor cordset. If the EMI Filter is selected, a 3 meter shielded 4 conductor cordset is provided as standard.

Safety Monitor

The Safety Monitor Option allows for independent monitoring of the output status of the device. The function is implemented using a normally closed contact which complies with IEC 60947-5-1 for mechanically linked contacts. Two terminal blocks are provided as the inputs which maybe used with an external safety circuit. The external safety circuit monitors the status of the contactor.

0...10V Analog Input

The Bulletin 284 Distributed Motor Controller with Sensorless Vector Control provides a 0…10V analog input. The 0…10V Analog Input, 15 A, factory-installed option provides a 0…10V external frequency command from the 0…10V or +/-10V analog input or remote potentiometer. A 5-pin micro receptacle is provided for connectivity for customer connection. A shielded 5-conductor cordset or patch cord is recommended.

Catalog Number Explanation

								Option	Option	Option
284	D	– F	H	D2P3	– D	– 10	– CR	– 1	– 2	– 3
a	b	c	d	e	f	g	h	i	j	k

a

Bulletin Number	
284	Combination Starter

b

Communications	
D	DeviceNet™
A	ArmorPoint™

c

Enclosure Type	
F	Type 4 (IP67)

d

Torque Performance Mode	
Code	Description
H	Volts per Hertz (Sensorless Vector Performance)
V	Sensorless Vector Control and Volts per Hertz

✶ See Accessories for extended motor and source brake cable lengths.

❄ The output contactor is included with the Safety Monitor option.

e1

Output Current 200…240V	
Code	Description
B2P3	2.3 A, 0.4 kW, 0.5 Hp
B4P5	4.5 A, 0.75 kW, 1.0 Hp
B7P6	7.6 A, 1.5 kW, 2.0 Hp

e2

Output Current 380…480V	
Code	Description
D1P4	1.4 A, 0.4 kW, 0.5 Hp
D2P3	2.3 A, 0.75 kW, 1.0 Hp
D4P0	4.0 A, 1.5 kW, 2.0 Hp
D6P0	6.0 A, 2.2 kW, 3.0 Hp
D7P6	7.6 A, 3.3 kW, 5.0 Hp

f

Control Voltage	
Code	Description
Z	24V dc
D	120V ac
B	240V ac

g

Short Circuit Protection (Motor Circuit Protector)	
10	10 A Rated Device
25	25 A Rated Device

h

Line/Motor Connections (Conduit/Round)		
CR	blank	3 meter unshielded single ended cordset male 90°
CR	N	3 meter shielded single ended cordset male 90°
CR	W ✶	No cable

i

Option 1	
Code	Description
3	Hand-Off-Auto Selector Keypad with Jog Function

j

Option 2		
DB	blank	DB Brake Connector
SB	blank	Source Brake Contactor
SB	W ✶	No cable

k

Option 3	
Code	Description
OC	Output Contactor
SM ❄	Safety Monitor

Product Selection

Only a sample of products are listed in the tables below. Refer to the Catalog Number Explanation for complete product availability.

Input Voltage	3-Phase kW Rating	3-Phase Hp Rating	Output Current	Cat. No. 24V DC Control Voltage	Cat. No. 120V AC Control Voltage	Cat. No. 240V AC Control Voltage
200...240V, 50/60 Hz 3-Phase	0.4	0.5	2.3 A	284D-FHB2P3Z-10-CR	284D-FHB2P3D-10-CR	284D-FHB2P3B-10-CR
	0.75	1.0	4.5 A	284D-FHB4P5Z-10-CR	284D-FHB4P5D-10-CR	284D-FHB4P5B-10-CR
	1.5	2.0	7.6 A	284D-FHB7P6Z-25-CR	284D-FHB7P6D-25-CR	284D-FHB7P6B-25-CR
380...480V, 50/60 Hz 3-Phase	0.4	0.5	1.4 A	284D-FHD1P4Z-10-CR	284D-FHD1P4D-10-CR	284D-FHD1P4B-10-CR
	0.75	1.0	2.3 A	284D-FHD2P3Z-10-CR	284D-FHD2P3D-10-CR	284D-FHD2P3B-10-CR
	1.5	2.0	4.0 A	284D-FHD4P0Z-10-CR	284D-FHD4P0D-10-CR	284D-FHD4P0B-10-CR
	2.2	3.0	6.0 A	284D-FHD6P0Z-25-CR	284D-FHD6P0D-25-CR	284D-FHD6P0B-25-CR
	3.3	5.0	7.6 A	284D-FHD7P6Z-25-CR	284D-FHD7P6D-25-CR	284D-FHD7P6B-25-CR

Input Voltage	3-Phase kW Rating	3-Phase Hp Rating	Output Current	Cat. No. 24V DC Control Voltage	Cat. No. 120V AC Control Voltage	Cat. No. 240V AC Control Voltage
200…240V, 50/60 Hz 3-Phase	0.4	0.5	2.3 A	284A-FHB2P3Z-10-CR	284A-FHB2P3D-10-CR	284A-FHB2P3B-10-CR
	0.75	1.0	5.0 A	284A-FHB4P5Z-10-CR	284A-FHB4P5D-10-CR	284A-FHB4P5B-10-CR
	1.5	2.0	7.6 A	284A-FHB7P6Z-25-CR	284A-FHB7P6D-25-CR	284A-FHB7P6B-25-CR
380…480V, 50/60 Hz 3-Phase	0.4	0.5	1.4 A	284A-FHD1P4Z-10-CR	284A-FHD1P4D-10-CR	284A-FHD1P4B-10-CR
	0.75	1.0	2.3 A	284A-FHD2P3Z-10-CR	284A-FHD2P3D-10-CR	284A-FHD2P3B-10-CR
	1.5	2.0	4.0 A	284A-FHD4P0Z-10-CR	284A-FHD4P0D-10-CR	284A-FHD4P0B-10-CR
	2.2	3.0	6.0 A	284A-FHD6P0Z-25-CR	284A-FHD6P0D-25-CR	284A-FHD6P0B-25-CR
	3.3	5.0	7.6 A	284A-FHD7P6Z-25-CR	284A-FHD7P6D-25-CR	284A-FHD7P6B-25-CR

Product Line Overview

						
	Bulletin 280D/281D	Bulletin 280A/281A	Bulletin 283D	Bulletin 283A	Bulletin 284D	Bulletin 284A
Horsepower Range:						
0.5…10 Hp (0.37…7.5 kW)	✓	✓	—	—	—	—
0.5…10 Hp (0.37…5.5 kW)	—	—	✓	✓	—	—
0.5…5 Hp (0.4…3.3 kW)	—	—	—	—	✓	✓
Starting Method:						
Full Voltage and Reversing	✓	✓	—	—	—	—
Current Limit, Soft Start including Soft Stop	—	—	✓	✓	—	—
Sensorless Vector Performance	—	—	—	—	✓	✓
Sensorless Vector Control	—	—	—	—	✓	✓
Environmental Rating: IP67/NEMA Type 4	✓	✓	✓	✓	✓	✓
Control Voltage Ratings: 24V DC, 120V AC, and 240V AC	✓	✓	✓	✓	✓	✓
Operational Voltage Ratings:						
200…460V AC	✓	✓	✓	✓	—	—
200…240V AC	—	—	—	—	✓	✓
380…480V AC	—	—	—	—	✓	✓
Rated for Group Motor Installations	✓	✓	✓	✓	✓	✓
Network Communications with DeviceNet including DeviceLogix	✓	✓	✓	✓	✓	✓
I/O Capability:						
4 Inputs and 2 Outputs	✓	—	✓	—	✓	—
2 Outputs	—	✓	—	✓	—	✓
Network Communications via ArmorPoint Distributed I/O Products (DeviceNet, EtherNet, ControlNet)	—	✓	—	✓	—	✓
I/O Expansion with ArmorPoint Distributed I/O Products	✓	✓	✓	✓	✓	✓
LED Status Indication	✓	✓	✓	✓	✓	✓
Quick Disconnects (I/O, Communication and Motor Connections)	✓	✓	✓	✓	✓	✓
Extended Length Motor and Brake Cables	✓	✓	✓	✓	✓	✓
Factory Installed Options:						
HOA Keypad	✓	✓	✓	✓	✓	✓
Safety Monitor	✓	✓	✓	✓	✓	✓
Source Brake Contactor	—	—	✓	✓	✓	✓
Dynamic Brake Connector	—	—	—	—	✓	✓
Output Contactor	—	—	—	—	✓	✓
EMI Filter	—	—	—	—	✓	✓
Shielded Motor Cable	—	—	—	—	✓	✓
0…10V Analog Input	—	—	—	—	✓	✓

Product details are not listed in this catalog, refer to the Product Selection Guide, publication 280-SG001.

PowerFlex 400 AC Drive Family

Contents

Conformity to Standards

The PowerFlex 400 conforms to the following:

Conformity to:	Standard Product	Packaged Product
UL Listed	✓	✓
IEC (Designed to Meet)	✓	
cUL Listed for Canada	✓	✓
CE Approved	✓	
C-Tick	✓	
UL508C Plenum Rating	✓	

Drive Description

The PowerFlex 400® offers a wide range of features for integration into fan and pump applications. Drives are available in four frame sizes that cover ratings from 2.2 to 37.5 kW (3 to 50 Hp) @ 200-240V AC and 2.2 to 110 kW (3 to 150 Hp) @ 380-480V AC.

Drives feature integral RS485 communications and support Drive Serial Interface (DSI), Modbus RTU and Metasys N2 Protocols. PowerFlex 400 drives are also compatible with PC tools such as DriveExplorer™ and DriveTools™ SP which assist with programming, monitoring and troubleshooting PowerFlex drives.

An integral 2 line, 16 character LCD operator keypad provides text for metering, programming and troubleshooting. LED indicators provide system configuration status.

Catalog Number Explanation

To interpret the meaning of a catalog number, match the values of the catalog number code in positions **a, b, c,** etc. with the tables labeled **a, b, c,** etc. below.

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

Product Selection

200...240V ac, Three-Phase Drives

Drive Ratings				Rating	Panel Mount	Flange Mount
kW	Hp	Output Current ✶ A	Frame Size		Cat. No.	Cat. No.
2.2	3.0	12	C	IP20/UL Open Type ❄	22C-B012N103	22C-B012F103
3.7	5.0	17.5	C	IP20/UL Open Type ❄	22C-B017N103	22C-B017F103
5.5	7.5	24	C	IP20/UL Open Type ❄	22C-B024N103	22C-B024F103
7.5	10	33	C	IP20/UL Open Type ❄	22C-B033N103	22C-B033F103
11	15	49	D	IP30/NEMA 1/UL Type 1	22C-B049A103	–
15	20	65	D	IP30/NEMA 1/UL Type 1	22C-B065A103	–
18.5	25	75	D	IP30/NEMA 1/UL Type 1	22C-B075A103	–
22	30	90	D	IP30/NEMA 1/UL Type 1	22C-B090A103	–
30	40	120	E	IP30/NEMA 1/UL Type 1	22C-B120A103	–
37	50	145	E	IP30/NEMA 1/UL Type 1	22C-B145A103	–

✶ Drive terminals are sized according to UL. Depending on operating ambient and wire used, some local or national codes may require a larger wire size than what the power terminals can accept. Multiple conductors, 90°C wire, and/or lugs may be required. Refer to the PowerFlex 400 *User Manual* for details on terminal block wire ranges.

❄ IP30/NEMA 1/UL Type 1 can be achieved for panel mount drives with top cover and optional conduit box kit installed. Field installed conversion kit specified under User Installed Options.

380...480V ac, Three-Phase Drives

Drive Ratings				Rating	Panel Mount	Flange Mount
kW	Hp	Output Current ✶ A	Frame Size		Cat. No.	Cat. No.
2.2	3.0	6.0	C	IP20/UL Open Type ❄	22C-D6P0N103	22C-D6P0F103
4.0	5.0	10.5	C	IP20/UL Open Type ❄	22C-D010N103	22C-D010F103
5.5	7.5	12	C	IP20/UL Open Type ❄	22C-D012N103	22C-D012F103
7.5	10	17	C	IP20/UL Open Type ❄	22C-D017N103	22C-D017F103
11	15	22	C	IP20/UL Open Type ❄	22C-D022N103	22C-D022F103 ‡
15	20	30	C	IP20/UL Open Type ❄	22C-D030N103	22C-D030F103 ‡
18.5	25	38	D	IP30/NEMA 1/UL Type 1	22C-D038A103	–
22	30	45.5	D	IP30/NEMA 1/UL Type 1	22C-D045A103	–
30	40	60	D	IP30/NEMA 1/UL Type 1	22C-D060A103	–
37	50	72	E	IP30/NEMA 1/UL Type 1	22C-D072A103	–
45	60	88	E	IP30/NEMA 1/UL Type 1	22C-D088A103	–
55	75	105	E	IP30/NEMA 1/UL Type 1	22C-D105A103	–
75	100	142	E	IP30/NEMA 1/UL Type 1	22C-D142A103	–
90	125	170	F	IP30/NEMA 1/UL Type 1	22C-D170A103	–
110	150	208	F	IP30/NEMA 1/UL Type 1	22C-D208A103	–

✶ Drive terminals are sized according to UL. Depending on operating ambient and wire used, some local or national codes may require a larger wire size than what the power terminals can accept. Multiple conductors, 90°C wire, and/or lugs may be required. Refer to the PowerFlex 400 *User Manual* for details on terminal block wire ranges.

❄ IP30/NEMA 1/UL Type 1 can be achieved for panel mount drives with top cover and optional conduit box kit installed. Field installed conversion kit specified under User Installed Options.

‡ 11 and 15 kW (15 and 20 Hp) Frame C flange mount drives require external DC series bus inductor.

User Installed Options

IP30/NEMA 1/UL Type 1 Conversion Kit

Description	Drive Frame	Cat. No.
IP30/NEMA 1/UL Type 1 Kit *Description:* Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes conduit box with mounting screws and plastic top panel.	C	22-JBAC
IP30/NEMA 1/UL Type 1 Kit with Communication Option *Description:* Field installed kit. Converts drive to IP30/NEMA 1/UL Type 1 enclosure. Includes communication option conduit box with mounting screws and plastic top panel.	C	22-JBCC

Human Interface Module Option Kits and Accessories

Description	Cat. No.
Remote Human Interface Module (HIM) – Panel Mount *Description:* LCD Display, Remote Panel Mount, Digital Speed Control, CopyCat capable, IP66 (NEMA Type 4X/12) indoor use only, Includes 2.0 meter cable. *Note:* Remote HIM display and keypad are different than PowerFlex 400 integral keypad. See the PowerFlex 400 *User Manual* for details.	22-HIM-C2S✶
Remote Human Interface Module (HIM) – Handheld *Description:* LCD Display, Remote Handheld, Digital Speed Control, Full Numeric Keypad, CopyCat capable, IP30 (NEMA Type 1), Includes 1.0 meter cable, Panel Mount with optional Bezel Kit. *Note:* Remote HIM display and keypad are different than PowerFlex 400 integral keypad. See the PowerFlex 400 *User Manual* for details.	22-HIM-A3
Remote Handheld, Wireless Interface Module with *Bluetooth* technology, IP30 (NEMA Type 1), Panel Mount with optional Bezel Kit.	22-WIM-N1
Remote Panel Mount, Wireless Interface Module with *Bluetooth* technology, IP66 (NEMA Type 4X/12) indoor use only.	22-WIM-N4S
Bezel Kit *Description:* Panel Mount for LCD Display, Remote Handheld unit, IP30 (NEMA Type 1).	22-HIM-B1
DSI HIM Cable *Description:* DSI HIM to RJ45 cable. 1.0 Meter (3.3 Feet) 2.9 Meter (9.51 Feet)	 22-HIM-H10 22-HIM-H30

✶ The 22-HIM-C2S is smaller than the 22-HIM-C2 and cannot be used as a direct replacement.

Spare Parts

Description	Cat. No.
PowerFlex 400 Fan Replacement Kit *Description:* (1) Fan, 3…10 HP @ 200…240V ac and 3…10 HP @ 380…480V ac	SK-U1-FAN1-C1
PowerFlex 400 Fan Replacement Kit *Description:* (1) Fan, 15…20 HP @ 380…480V ac	SK-U1-FAN1-C2

Other Options

Description	Cat. No.
Auxiliary Relay Board *Description:* Field installed kit. Expands drive output capabilities.	AK-U9-RLB1

Communication Option Kits

Description	Cat. No.
Serial Converter Module (RS485 to RS232) *Description:* Provides serial communication via DF1 protocol for use with DriveExplorer and DriveExecutive software. *Includes:* DSI to RS232 serial converter, 1203-SFC serial cable, 22-RJ45CBL-C20 cable, and DriveExplorer Lite CD.	22-SCM-232
Serial Cable *Description:* 2.0 meter serial cable with a locking low profile connector to connect to the serial converter and a 9-pin sub-miniature D female connector to connect a computer.	1203-SFC
Null Cable Converter *Description:* For use when connecting the serial converter to DriveExplorer on a handheld PC.	1203-SNM
DSI Cable *Description:* 2.0 meter RJ45 to RJ45 cable, male to male connectors.	22-RJ45CBL-C20
Splitter Cable *Description:* RJ45 one to two port splitter cable.	AK-U0-RJ45-SC1
Terminating Resistors *Description:* 120 Ohm resistor embedded in an RJ45 connector (2 pieces).	AK-U0-RJ45-TR1
Terminal Block *Description:* RJ45 two position terminal block (5 pieces) with two 120 Ohm terminating resistors (loose).	AK-U0-RJ45-TB2P
DeviceNet Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame C PowerFlex 400 drives (Ordered Separately).	22-COMM-D
EtherNet/IP™ Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame C PowerFlex 400 drives (Ordered Separately).	22-COMM-E
PROFIBUS™ DP Communication Adapter *Note:* Requires a Communication Adapter Cover when used with Frame C PowerFlex 400 drives (Ordered Separately).	22-COMM-P
External DSI Communications Kit *Description:* External mounting kit for 22-COMM-D, -E, and -P.	22-XCOMM-DC-BASE
External Comms Power Supply *Description:* Optional 100…240V ac Power Supply for External DSI Communications Kit	20-XCOMM-AC-PS1
Compact I/O Module (3 Channel)	1769-SM2
Communication Adapter Cover *Description:* Houses the Communication Adapter for Frame C drives. *Note:* This cover adds 25 mm (0.98 in.) to the overall depth of the drive and is only required for Frame C PowerFlex 400 drives.	22C-CCC ❄
Serial Flash Firmware Kit *Description:* Use a PC to update drive firmware.	AK-U9-FLSH1

❄ If NEMA 1/IP30 is required, must also order 22-JBCC (Frame C drives only).

PC Programming Software

Description	
DriveTools™ SP Software	See A-B publication 9303-PL002… for ordering/pricing information.
DriveExplorer™ Software	
Pocket DriveExplorer™ Software	

Isolation Transformers (Loose)

208V ac, Three-Phase, 60 Hz Secondary

PowerFlex 400 Drive Ratings			IP32 (NEMA Type 3R) Isolation Transformer	
				208V Primary
kW	Hp	Amps	kVA	Cat. No.
2.2	3.0	12	5.0	1321-3TW005-XX
4.0	5.0	17.5	7.5	1321-3TW007-XX
5.5	7.5	24	11	1321-3TW011-XX
7.5	10	33	14	1321-3TW014-XX
11	15	49	20	1321-3TW020-XX
15	20	65	27	1321-3TW027-XX
18.5	25	75	34	1321-3TW034-XX

230V ac, Three-Phase, 60 Hz Secondary

PowerFlex 400 Drive Ratings			IP32 (NEMA Type 3R) Isolation Transformer			
				230V Primary	460V Primary	575V Primary
kW	Hp	Amps	kVA	Cat. No.	Cat. No.	Cat. No.
2.2	3.0	12	5.0	1321-3TW005-AA	1321-3TW005-BA	1321-3TW005-CA
3.7	5.0	17.5	7.5	1321-3TW007-AA	1321-3TW007-BA	1321-3TW007-CA
5.5	7.5	24	11	1321-3TW011-AA	1321-3TW011-BA	1321-3TW011-CA
7.5	10	33	14	1321-3TW014-AA	1321-3TW014-BA	1321-3TW014-CA
11	15	49	20	1321-3TW020-AA	1321-3TW020-BA	1321-3TW020-CA
15	20	65	27	1321-3TW027-AA	1321-3TW027-BA	1321-3TW027-CA
18.5	25	75	34	1321-3TW034-AA	1321-3TW034-BA	1321-3TW034-CA
22	30	90	40	1321-3TW040-AA	1321-3TW040-BA	1321-3TW040-CA
30	40	120	51	1321-3TW051-AA	1321-3TW051-BA	1321-3TW051-CA
37	50	145	63	1321-3TH063-AA	1321-3TH063-BA	–

460V ac, Three-Phase, 60 Hz Secondary

PowerFlex 400 Drive Ratings			IP32 (NEMA Type 3R) Isolation Transformer			
				230V Primary	460V Primary	575V Primary
kW	Hp	Amps	kVA	Cat. No.	Cat. No.	Cat. No.
2.2	3.0	6.0	5.0	1321-3TW005-AB	1321-3TW005-BB	1321-3TW005-CB
4.0	5.0	10.5	7.5	1321-3TW007-AB	1321-3TW007-BB	1321-3TW007-CB
5.5	7.5	12	11	1321-3TW011-AB	1321-3TW011-BB	1321-3TW011-CB
7.5	10	17	14	1321-3TW014-AB	1321-3TW014-BB	1321-3TW014-CB
11	15	22	20	1321-3TW020-AB	1321-3TW020-BB	1321-3TW020-CB
15	20	30	27	1321-3TW027-AB	1321-3TW027-BB	1321-3TW027-CB
18.5	25	38	34	1321-3TW034-AB	1321-3TW034-BB	1321-3TW034-CB
22	30	45.5	40	1321-3TW040-AB	1321-3TW040-BB	1321-3TW040-CB
30	40	60	51	1321-3TW051-AB	1321-3TW051-BB	1321-3TW051-CB
37	50	72	63	1321-3TH063-AB	1321-3TH063-BB	–
45	60	88	75	1321-3TH075-AB	1321-3TH075-BB	–
55	75	105	93	1321-3TH093-AB	1321-3TH093-BB	–
75	100	142	118	1321-3TH118-AB	1321-3TH118-BB	–
90	125	170	145	1321-3TH145-AB	1321-3TH145-BB	–
110	150	208	175	1321-3TH175-AB	1321-3TH175-BB	–

Input and Output Line Reactors (Loose)

208V, 60 Hz, Three-Phase

PowerFlex 400 Ratings			IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.
3% Impedance				
2.2	3.0	12	1321-3R12-A	1321-3RA12-A
3.7	5.0	17.5	1321-3R18-A	1321-3RA18-A
5.5	7.5	24	1321-3R25-A	1321-3RA25-A
7.5	10	33	1321-3R35-A	1321-3RA35-A
11	15	49	1321-3R45-A	1321-3RA45-A
15	20	65	1321-3R55-A	1321-3RA55-A
18.5	25	75	1321-3R80-A	1321-3RA80-A
22	30	90	1321-3R80-A	1321-3RA80-A
30	40	120	1321-3R100-A	1321-3RA100-A
37	50	145	1321-3R130-A	1321-3RA130-A
5% Impedance				
2.2	3.0	12	1321-3R12-B	1321-3RA12-B
3.7	5.0	17.5	1321-3R18-B	1321-3RA18-B
5.5	7.5	24	1321-3R25-B	1321-3RA25-B
7.5	10	33	1321-3R35-B	1321-3RA35-B
11	15	49	1321-3R45-B	1321-3RA45-B
15	20	65	1321-3R55-B	1321-3RA55-B
18.5	25	75	1321-3R80-B	1321-3RA80-B
22	30	90	1321-3R80-B	1321-3RA80-B
30	40	120	1321-3R100-B	1321-3RA100-B
37	50	145	1321-3R130-B	1321-3RA130-B

240V, 60 Hz, Three-Phase

PowerFlex 400 Ratings			IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.
3% Impedance				
2.2	3.0	12	1321-3R12-A	1321-3RA12-A
3.7	5.0	17.5	1321-3R18-A	1321-3RA18-A
5.5	7.5	24	1321-3R25-A	1321-3RA25-A
7.5	10	33	1321-3R35-A	1321-3RA35-A
11	15	49	1321-3R45-A	1321-3RA45-A
15	20	65	1321-3R55-A	1321-3RA55-A
18.5	25	75	1321-3R80-A	1321-3RA80-A
22	30	90	1321-3R80-A	1321-3RA80-A
30	40	120	1321-3R100-A	1321-3RA100-A
37	50	145	1321-3R130-A	1321-3RA130-A
5% Impedance				
2.2	3.0	12	1321-3R12-B	1321-3RA12-B
3.7	5.0	17.5	1321-3R18-B	1321-3RA18-B
5.5	7.5	24	1321-3R25-B	1321-3RA25-B
7.5	10	33	1321-3R35-B	1321-3RA35-B
11	15	49	1321-3R45-B	1321-3RA45-B
15	20	65	1321-3R55-B	1321-3RA55-B
18.5	25	75	1321-3R80-B	1321-3RA80-B
22	30	90	1321-3R80-B	1321-3RA80-B
30	40	120	1321-3R100-B	1321-3RA100-B
37	50	145	1321-3R130-B	1321-3RA130-B

480V, 60 Hz, Three-Phase

PowerFlex 400 Ratings			IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.
3% Impedance				
2.2	3.0	6.0	1321-3R8-C	1321-3RA8-C
4.0	5.0	10.5	1321-3R8-B	1321-3RA12-B
5.5	7.5	12	1321-3R12-B	1321-3RA12-B
7.5	10	17	1321-3R18-B	1321-3RA18-B
11	15	22	1321-3R25-B	1321-3RA25-B
15	20	30	1321-3R35-B	1321-3RA35-B
18.5	25	38	1321-3R35-B	1321-3RA35-B
22	30	45.5	1321-3R45-B	1321-3RA45-B
30	40	60	1321-3R55-B	1321-3RA55-B
37	50	72	1321-3R80-B	1321-3RA80-B
45	60	88	1321-3R80-B	1321-3RA80-B
55	75	105	1321-3R100-B	1321-3RA100-B
75	100	142	1321-3R130-B	1321-3RA130-B
90	125	170	1321-3R160-B	1321-3RA160-B
110	150	208	1321-3R200-B	1321-3RA200-B
5% Impedance				
2.2	3.0	6.0	1321-3R8-D	1321-3RA8-D
4.0	5.0	10.5	1321-3R8-C	1321-3RA12-B
5.5	7.5	12	1321-3R12-C	1321-3RA12-C
7.5	10	17	1321-3R18-C	1321-3RA18-C
11	15	22	1321-3R25-C	1321-3RA25-C
15	20	30	1321-3R35-C	1321-3RA35-C
18.5	25	38	1321-3R35-C	1321-3RA35-C
22	30	45.5	1321-3R45-C	1321-3RA45-C
30	40	60	1321-3R55-C	1321-3RA55-C
37	50	72	1321-3R80-C	1321-3RA80-C
45	60	88	1321-3R80-C	1321-3RA80-C
55	75	105	1321-3R100-C	1321-3RA100-C
75	100	142	1321-3R130-C	1321-3RA130-C
90	125	170	1321-3R160-C	1321-3RA160-C
110	150	208	1321-3R200-C	1321-3RA200-C

DC Series Bus Inductors (Loose)

200…240V, 60 Hz, Three-Phase

PowerFlex 400 Drive Ratings			IP00 (Open Style)	
kW	Hp	Amps	Inductance (mH)	Cat. No.
2.2	3.0	12	0.92	1321-DC12-1
3.7	5.0	17.5	0.63	1321-DC18-1
5.5	7.5	24	0.85	1321-DC32-1
7.5	10	33	0.75	1321-DC40-2

380…480V, 60 Hz, Three-Phase

PowerFlex 400 Drive Ratings			IP00 (Open Style)	
kW	HP	Amps	Inductance (mH)	Cat. No.
2.2	3.0	6.0	3.68	1321-DC9-2
4.0	5.0	10.5	2.1	1321-DC12-2
5.5	7.5	12	3.75	1321-DC18-4
7.5	10	17	1.75	1321-DC25-4
11	15	22	2.68	1321-DC32-2
15	20	30	2.00	1321-DC40-4

EMC Filters (Loose)

200…240V, 50/60 Hz, Three-Phase

PowerFlex 400 Drive Ratings			IP00 (Open Style)
kW	Hp	Amps	Cat. No.
2.2	3.0	12	22-RF034-CS
3.7	5.0	17.5	22-RF034-CS
5.5	7.5	24	22-RF034-CS
7.5	10	33	22-RF034-CS
11	15	49	22-RFD070
15	20	65	22-RFD100
18.5	25	75	22-RFD100
22	30	90	22-RFD150
30	40	120	22-RFD150
37	50	145	22-RFD180

380…480V, 50/60 Hz, Three-Phase

PowerFlex 400 Drive Ratings			IP00 (Open Style)
kW	Hp	Amps	Cat. No.
2.2	3.0	6.0	22-RF018-CS
4.0	5.0	10.5	22-RF018-CS
5.5	7.5	12	22-RF018-CS
7.5	10	17	22-RF018-CS
11	15	22	22-RF026-CS
15	20	30	22-RFD036
18.5	25	38	22-RFD050
22	30	45.5	22-RFD050
30	40	60	22-RFD070
37	50	72	22-RFD100
45	60	88	22-RFD100
55	75	105	22-RFD150
75	100	142	22-RFD180
90	125	170	Consult Factory
110	150	208	Consult Factory

Overview

The Packaged Product program allows users to create Disconnect and Contactor Bypass packages based on their specific needs and requirements. A limited factory installed option set is offered to optimize package configurations while providing a versatile and cost-effective solution. All configurations feature wall mount NEMA Type 1 packaging.

The program has two levels:

Standard Packaged Drives

The Standard Packaged Drives Program allows users to create drive packages based on their specific needs. A complete drive package may be specified by assembling a single catalog number string that includes a base drive and all required options. Packaging is available for 208V and 480V systems in NEMA Type 1 enclosures. The program consists of a fully defined catalog string identified within this price sheet. Three packaged configurations are offered which provide consistent manufacturing and minimize customer resources by reducing engineering, manufacturing and installation time. Typical delivery is 15-20 business days from order entry and can be ordered through the Passport order entry system.

Engineered Drives

The Engineered Drives Program offers users the ability to create drive packages beyond the Standard Packaged Drives offering. Options may or may not be defined within this publication. Product can be ordered by:

- Assembling a catalog string from the options listed in this publication.
  Engineered options that are listed within this publication will be specified by the heading *"Engineered Drives Program Only"* and will have varied lead-times.
- Entering a custom quote request for additional options not listed.
  A custom quote will require a Passport quote using "SP-SDB-CUSTOM" as the line item part number and entering a description of the base catalog string and custom options in the Competitive Summary. For questions or help with a custom quote please contact the Engineered Drives Group at 262-512-8415.

Catalog Number Explanation

To interpret the meaning of a catalog number, match the values of the catalog number code in positions **a, b, c,** etc. with the tables labeled **a, b, c,** etc. below.

Position

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
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	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

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

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*

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

Product Selection

208V ac, Main Input Disconnect

Drive Ratings				Single Motor
		Output Current *(40°C)*		
kW	Hp	A	Frame Size	Cat. No.
2.2	3.0	12	C	23C-X012A103NNAANN
3.7	5.0	16.8	C	23C-X017A103NNAANN
5.5	7.5	24	C	23C-X024A103NNAANN
7.5	10	30.8	C	23C-X033A103NNAANN
11	15	46.2	D	23C-X049A103NNAANN
15	20	64	D	23C-X065A103NNAANN
18.5	25	75	D	23C-X075A103NNAANN
22	30	88	D	23C-X090A103NNAANN
30	40	114	E	23C-X120A103NNAANN
37	50	143	E	23C-X145A103NNAANN

208V ac, 3 Contactor Full Feature Bypass with Disconnect

Drive Ratings				Single Motor
		Output Current *(40°C)*		
kW	Hp	A	Frame Size	Cat. No.
2.2	3.0	12	C	23C-X012A103NNBANN
3.7	5.0	16.8	C	23C-X017A103NNBANN
5.5	7.5	24	C	23C-X024A103NNBANN
7.5	10	30.8	C	23C-X033A103NNBANN
11	15	46.2	D	23C-X049A103NNBANN
15	20	64	D	23C-X065A103NNBANN
18.5	25	75	D	23C-X075A103NNBANN
22	30	88	D	23C-X090A103NNBANN
30	40	114	E	23C-X120A103NNBANN
37	50	143	E	23C-X145A103NNBANN

460V ac, Main Input Disconnect

Drive Ratings				Single Motor
		Output Current *(40°C)*		
kW	Hp	A	Frame Size	Cat. No.
2.2	3.0	4.8	C	23C-D6P0A103NNAANN
4.0	5.0	7.6	C	23C-D010A103NNAANN
5.5	7.5	11	C	23C-D012A103NNAANN
7.5	10	14	C	23C-D017A103NNAANN
11	15	21	C	23C-D022A103NNAANN
15	20	27	C	23C-D030A103NNAANN
18.5	25	34	D	23C-D038A103NNAANN
22	30	40	D	23C-D045A103NNAANN
30	40	52	D	23C-D060A103NNAANN
37	50	65	E	23C-D072A103NNAANN
45	60	77	E	23C-D088A103NNAANN
55	75	96	E	23C-D105A103NNAANN
75	100	124	E	23C-D142A103NNAANN
90	125	156	F	23C-D170A103NNAANN
110	150	180	F	23C-D208A103NNAANN

460V ac, 3 Contactor Full Feature Bypass with Disconnect

Drive Ratings				Single Motor
		Output Current *(40°C)*		
kW	Hp	A	Frame Size	Cat. No.
2.2	3.0	4.8	C	23C-D6P0A103NNBANN
4.0	5.0	7.6	C	23C-D010A103NNBANN
5.5	7.5	11	C	23C-D012A103NNBANN
7.5	10	14	C	23C-D017A103NNBANN
11	15	21	C	23C-D022A103NNBANN
15	20	27	C	23C-D030A103NNBANN
18.5	25	34	D	23C-D038A103NNBANN
22	30	40	D	23C-D045A103NNBANN
30	40	52	D	23C-D060A103NNBANN
37	50	65	E	23C-D072A103NNBANN
45	60	77	E	23C-D088A103NNBANN
55	75	96	E	23C-D105A103NNBANN
75	100	124	E	23C-D142A103NNBANN
90	125	156	F	23C-D170A103NNBANN
110	150	180	F	23C-D208A103NNBANN

460V ac, 3 Contactor Basic Bypass with Disconnect

Drive Ratings				Single Motor
		Output Current *(40°C)*		
kW	Hp	A	Frame Size	Cat. No.
2.2	3.0	4.8	C	23C-D6P0A103NNCANN
4.0	5.0	7.6	C	23C-D010A103NNCANN
5.5	7.5	11	C	23C-D012A103NNCANN
7.5	10	14	C	23C-D017A103NNCANN
11	15	21	C	23C-D022A103NNCANN
15	20	27	C	23C-D030A103NNCANN
18.5	25	34	D	23C-D038A103NNCANN
22	30	40	D	23C-D045A103NNCANN
30	40	52	D	23C-D060A103NNCANN
37	50	65	E	23C-D072A103NNCANN
45	60	77	E	23C-D088A103NNCANN
55	75	96	E	23C-D105A103NNCANN
75	100	124	E	23C-D142A103NNCANN

Factory Installed Options

Version (Communication)

Description	Cat. Code
RS485	3
DeviceNet	D
EtherNet/IP	E
PROFIBUS DP	P

Drawing Options (Engineered Drives Program Only)

Description — One Set of...	Cat. No.
Manufacturing Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Information Only - Manufacture Proceeding"** Not to be used as Approval Drawings	
Diskette	1301-MFDISK-FP
Electronic Drawings	1301-MFDWG-E-FP
Black & Whites	1301-MFDWG-FP
Final Drawings (as shipped) 279 x 432 mm (11 x 17 in.) One set of schematics — **"Copy of Drawings that Shipped with the Job"**	
Diskette	1301-FINDISK-FP
Electronic Drawings	1301-FINDWG-E-FP
Black & Whites	1301-FINDWG-FP
Approval Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Manufacture Held Until Approved Prints are Received"**	
Diskette	1301-APPDISK-FP
Electronic Drawings	1301-APPDWG-E-FP
Black & Whites	1301-APPDWG-FP

Notes

PowerFlex 70 AC Drive

Contents

Conformity to Standards

The PowerFlex 70 conforms to the following:

Conformity to:	Standard Product	Packaged Product
UL Listed	✓	✓
CSA Certified (c-UL)	✓	✓
IEC (Designed to Meet)	✓	
CE Approved (excluding 600V)	✓	
C-Tick (excluding 600V)	✓	
NSF Certified (IP66, NEMA Type 4X/12 only)	✓	
TÜV Certified *	✓	

* Certified to EN 954-1, Category 3 for 240V, 400V, and 480V ratings of PowerFlex 70 Enhanced Control with DriveGuard Safe-Off option. TUV Approved to EN 954-1, Category 3 for 600V ratings of PowerFlex 70 Enhanced Control with DriveGuard Safe-Off option.

Drive Description

PowerFlex® 70 drives are designed to worldwide standards and ratings, allowing out-of-the-box performance around the globe. Available ratings include: 0.5 to 25 Hp output at 240V ac input, 0.5 to 50 Hp output at 480V ac input, 0.5 to 50 Hp output at 600V ac input.

The PowerFlex 70 drive can be used with the full featured LCD Human Interface Module, which provides multilingual text for startup, metering, programming, and troubleshooting.

The PowerFlex 70 can be programmed for 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: DeviceNet™, ControlNet™, EtherNet/IP, Remote I/O, Serial Communications and other communication networks. PC tools such as DriveExplorer™ and DriveTools™ SP assist with programming, monitoring, and troubleshooting the PowerFlex 70.

Catalog Number Explanation

Many of the catalog codes below represent factory installed options, which can increase lead times. Most of these options can also be ordered as user installed with a shorter lead time. Refer to page 48 for normally stocked IP20/NEMA Type 1 drives and page 53 for user installed options.

Position Number

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
20A	PowerFlex 70

b

Voltage Rating		
Code	Voltage	Ph.
B	240V ac	3
C	400V ac	3
D	480V ac	3
E	600V ac	3

c1

ND Rating		
208V, 60 Hz Input		
Code	Amps	kW (Hp)
2P2	2.5	0.37 (0.5)
4P2	4.8	0.75 (1.0)
6P8	7.8	1.5 (2.0)
9P6	11	2.2 (3.0)
015	17.5	4.0 (5.0)
022	25.3	5.5 (7.5)
028	32.2	7.5 (10)
042	43	11 (15)
054	62.1	15 (20)
070	78.2	18.5 (25)

c2

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

c3

ND Rating		
400V, 50 Hz Input		
Code	Amps	kW (Hp)
1P3	1.3	0.37 (0.5)
2P1	2.1	0.75 (1.0)
3P5	3.5	1.5 (2.0)
5P0	5.0	2.2 (3.0)
8P7	8.7	4.0 (5.0)
011	11.5	5.5 (7.5)
015	15.4	7.5 (10)
022	22	11 (15)
030	30	15 (20)
037	37	18.5 (25)
043	43	22 (30)
060	60	30 (40)
072	72	37 (50)

c4

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

c5

ND Rating		
600V, 60 Hz Input		
Code	Amps	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)

d

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

e

HIM *	
Code	Interface Module
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
5	Prog. Only LCD

* IP66, NEMA Type 4X/12 (Enclosure Code C) is available only with HIM Codes 0, 3, or 5.

f

Documentation	
Code	**Type**
A	English User Manual and Multi-Language Quick Start
N	No Manual

g

Brake IGBT	
Code	**w/Brake IGBT**
Y	Yes

h

Internal Brake Resistor	
Code	**w/Resistor**
Y	Yes
N	No

i

Emission Class	
Code	**Rating**
A	Filtered✶ A❄ & B Frames (Optional) C, D, & E Frames (Standard)
N	Not Filtered✶ A & B Frames (Optional) C, D, & E Frames

✶ 600V Frames A through D available only without filter (Cat. Code N). 600V Frame E available only with filter (Cat. Code A).

❄ Increases size to Frame B.

j

Comm Slot	
Code	**Version**
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
H	RS485 HVAC
R	RIO
S	RS485 DF1
N	None

k

Control & I/O		
Code	**Control**	**Safe-Off**
N	Standard	N/A
C	Enhanced	No
G✶	Enhanced	Yes

✶ Not available as factory installed option for 600V ratings.

l

Feedback	
Code	**Feedback**
N	N/A
0	None
1	5V/12V Encoder

Stock Products Program

Panel Mount - IP 20, NEMA Type 1 *(Position d = A)*

The following catalog numbers represent the PowerFlex 70 U.S. Stock Products Program, which offers the shortest lead time and the lowest price on an IP20/NEMA Type 1 drive with a factory installed LCD full numeric HIM, but no other factory installed options, other than what comes as standard (Brake IGBT on all ratings and EMC Filter on some ratings).

Allen-Bradley recommends ordering a Stock Product from this list along with separate "user installed" options shown immediately following the Standard Drives Section.

For other enclosure types, other factory installed HIMs (including no HIM), or additional factory installed options, refer to Standard Drives Selection section.

200...240V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP20, NEMA Type 1 with HIM	
240V ac Input*			208V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	Frame Size
2.2	2.4	3.3	2.5	2.7	3.7	0.37	0.5	0.25	0.33	B2P2A3AYNNNC0	A
4.2	4.8	6.4	4.8	5.5	7.4	0.75	1.0	0.55	0.75	B4P2A3AYNNNC0	A
6.8	9.0	12	7.8	10.3	13.8	1.5	2.0	1.1	1.5	B6P8A3AYNNNC0	B
9.6	10.6	14.4	11	12.1	16.5	2.2	3.0	1.5	2.0	B9P6A3AYNNNC0	B
15.3	17.4	23.2	17.5	19.2	26.2	4.0	5.0	3.0	3.0	B015A3AYNANC0	C
22	24.2	33	25.3	27.8	37.9	5.5	7.5	4.0	5.0	B022A3AYNANC0	D
28	33	44	32.2	37.9	50.6	7.5	10	5.5	7.5	B028A3AYNANC0	D
42	46.2	63	43	55.5	74	11	15	7.5	10	B042A3AYNANC0	D
54	63	84	62.1	72.4	96.6	15	20	11	15	B054A3AYNANC0	E
70	81	108	78.2	93.1	124	18.5	25	15	20	B070A3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

380...480V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP20, NEMA Type 1 with HIM	
480V ac Input*			380...400V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	Frame Size
1.1	1.2	1.6	1.3	1.4	1.9	0.37	0.5	0.25	0.33	D1P1A3AYNNNC0	A
2.1	2.4	3.2	2.1	2.4	3.2	0.75	1.0	0.55	0.75	D2P1A3AYNNNC0	A
3.4	4.5	6.0	3.5	4.5	6.0	1.5	2.0	1.1	1.5	D3P4A3AYNNNC0	A
5.0	5.5	7.5	5.0	5.5	7.5	2.2	3.0	1.5	2.0	D5P0A3AYNNNC0	B
8.0	8.8	12	8.7	9.9	13.2	4.0	5.0	3.0	3.0	D8P0A3AYNNNC0	B
11	12.1	16.5	11.5	13	17.4	5.5	7.5	4.0	5.0	D011A3AYNANC0	C
14	16.5	22	15.4	17.2	23.1	7.5	10	5.5	7.5	D014A3AYNANC0	C
22	24.2	33	22	24.2	33	11	15	7.5	10	D022A3AYNANC0	D
27	33	44	30	33	45	15	20	11	15	D027A3AYNANC0	D
34	40.5	54	37	45	60	18.5	25	15	20	D034A3AYNANC0	D
40	51	68	43	56	74	22	30	18.5	25	D040A3AYNANC0	D
52	60	80	60	66	90	30	40	22	30	D052A3AYNANC0	E
65	78	104	72	90	120	37	50	30	40	D065A3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

Standard Drives Selection

Panel Mount - IP 20, NEMA Type 1 *(Position d = A)*

200...240V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP20, NEMA Type 1 without HIM	
240V ac Input*			208V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	Frame Size
2.2	2.4	3.3	2.5	2.7	3.7	0.37	0.5	0.25	0.33	B2P2A0AYNNNC0	A
4.2	4.8	6.4	4.8	5.5	7.4	0.75	1.0	0.55	0.75	B4P2A0AYNNNC0	A
6.8	9.0	12	7.8	10.3	13.8	1.5	2.0	1.1	1.5	B6P8A0AYNNNC0	B
9.6	10.6	14.4	11	12.1	16.5	2.2	3.0	1.5	2.0	B9P6A0AYNNNC0	B
15.3	17.4	23.2	17.5	19.2	26.2	4.0	5.0	3.0	3.0	B015A0AYNANC0	C
22	24.2	33	25.3	27.8	37.9	5.5	7.5	4.0	5.0	B022A0AYNANC0	D
28	33	44	32.2	37.9	50.6	7.5	10	5.5	7.5	B028A0AYNANC0	D
42	46.2	63	43	55.5	74	11	15	7.5	10	B042A0AYNANC0	D
54	63	84	62.1	72.4	96.6	15	20	11	15	B054A0AYNANC0	E
70	81	108	78.2	93.1	124	18.5	25	15	20	B070A0AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

380...480V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP20, NEMA Type 1 without HIM	
480V ac Input*			380...400V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	Frame Size
1.1	1.2	1.6	1.3	1.4	1.9	0.37	0.5	0.25	0.33	D1P1A0AYNNNC0	A
2.1	2.4	3.2	2.1	2.4	3.2	0.75	1.0	0.55	0.75	D2P1A0AYNNNC0	A
3.4	4.5	6.0	3.5	4.5	6.0	1.5	2.0	1.1	1.5	D3P4A0AYNNNC0	A
5.0	5.5	7.5	5.0	5.5	7.5	2.2	3.0	1.5	2.0	D5P0A0AYNNNC0	B
8.0	8.8	12	8.7	9.9	13.2	4.0	5.0	3.0	3.0	D8P0A0AYNNNC0	B
11	12.1	16.5	11.5	13	17.4	5.5	7.5	4.0	5.0	D011A0AYNANC0	C
14	16.5	22	15.4	17.2	23.1	7.5	10	5.5	7.5	D014A0AYNANC0	C
22	24.2	33	22	24.2	33	11	15	7.5	10	D022A0AYNANC0	D
27	33	44	30	33	45	15	20	11	15	D027A0AYNANC0	D
34	40.5	54	37	45	60	18.5	25	15	20	D034A0AYNANC0	D
40	51	68	43	56	74	22	30	18.5	25	D040A0AYNANC0	D
52	60	80	60	66	90	30	40	22	30	D052A0AYNANC0	E
65	78	104	72	90	120	37	50	30	40	D065A0AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

500...600V ac, Three-Phase Drives

Output Amps			Nominal Power Ratings				IP20, NEMA Type 1 without HIM	
600V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	Frame Size
0.9	1.0	1.4	0.37	0.5	0.25	0.33	E0P9A0AYNNNC0	A
1.7	1.9	2.6	0.75	1.0	0.55	0.75	E1P7A0AYNNNC0	A
2.7	3.6	4.8	1.5	2.0	1.1	1.0	E2P7A0AYNNNC0	A
3.9	4.3	5.8	2.2	3.0	1.5	1.5	E3P9A0AYNNNC0	B
6.1	6.7	9.1	4.0	5.0	3.0	3.0	E6P1A0AYNNNC0	B
9.0	9.9	13.5	5.5	7.5	4.0	5.0	E9P0A0AYNNNC0	C
11	13.5	18	7.5	10	5.5	7.5	E011A0AYNNNC0	C
17	18.7	25.5	11	15	7.5	10	E017A0AYNNNC0	D
22	25.5	34	15	20	11	15	E022A0AYNNNC0	D
27	33	44	18.5	25	15	20	E027A0AYNNNC0	D
32	40.5	54	22	30	18.5	25	E032A0AYNNNC0	D
41	48	64	30	40	22	30	E041A0AYNANC0	E
52	61.5	82	37	50	30	40	E052A0AYNANC0	E

Standard Drives Selection

Wall / Machine Mount - IP66, NEMA Type 4X/12, For Indoor Use *(Position d = C)*

200...240V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP66, NEMA Type 4X/12 with HIM	Frame Size
240V ac Input*			208V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
2.2	2.4	3.3	2.5	2.7	3.7	0.37	0.5	0.25	0.33	B2P2C3AYNNNC0	B
4.2	4.8	6.4	4.8	5.5	7.4	0.75	1.0	0.55	0.75	B4P2C3AYNNNC0	B
6.8	9.0	12	7.8	10.3	13.8	1.5	2.0	1.1	1.5	B6P8C3AYNNNC0	B
9.6	10.6	14.4	11	12.1	16.5	2.2	3.0	1.5	2.0	B9P6C3AYNNNC0	B
15.3	17.4	23.2	17.5	19.2	26.2	4.0	5.0	3.0	3.0	B015C3AYNANC0	D
22	24.2	33	25.3	27.8	37.9	5.5	7.5	4.0	5.0	B022C3AYNANC0	D
28	33	44	32.2	37.9	50.6	7.5	10	5.5	7.5	B028C3AYNANC0	D
42	46.2	63	43	55.5	74	11	15	7.5	10	B042C3AYNANC0	D
54	63	84	62.1	72.4	96.6	15	20	11	15	B054C3AYNANC0	E
70	81	108	78.2	93.1	124	18.5	25	15	20	B070C3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

380...480V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP66, NEMA Type 4X/12 with HIM	Frame Size
480V ac Input*			380…400V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
1.1	1.2	1.6	1.3	1.4	1.9	0.37	0.5	0.25	0.33	D1P1C3AYNNNC0	B
2.1	2.4	3.2	2.1	2.4	3.2	0.75	1.0	0.55	0.75	D2P1C3AYNNNC0	B
3.4	4.5	6.0	3.5	4.5	6.0	1.5	2.0	1.1	1.5	D3P4C3AYNNNC0	B
5.0	5.5	7.5	5.0	5.5	7.5	2.2	3.0	1.5	2.0	D5P0C3AYNNNC0	B
8.0	8.8	12	8.7	9.9	13.2	4.0	5.0	3.0	3.0	D8P0C3AYNNNC0	B
11	12.1	16.5	11.5	13	17.4	5.5	7.5	4.0	5.0	D011C3AYNANC0	D
14	16.5	22	15.4	17.2	23.1	7.5	10	5.5	7.5	D014C3AYNANC0	D
22	24.2	33	22	24.2	33	11	15	7.5	10	D022C3AYNANC0	D
27	33	44	30	33	45	15	20	11	15	D027C3AYNANC0	D
34	40.5	54	37	45	60	18.5	25	15	20	D034C3AYNANC0	D
40	51	68	43	56	74	22	30	18.5	25	D040C3AYNANC0	D
52	60	80	60	66	90	30	40	22	30	D052C3AYNANC0	E
65	78	104	72	90	120	37	50	30	40	D065C3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

500...600V ac, Three-Phase Drives

Output Amps			Nominal Power Ratings				IP66, NEMA Type 4X/12 with HIM	Frame Size
600V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
0.9	1.0	1.4	0.37	0.5	0.25	0.33	E0P9C3AYNNNC0	B
1.7	1.9	2.6	0.75	1.0	0.55	0.75	E1P7C3AYNNNC0	B
2.7	3.6	4.8	1.5	2.0	1.1	1.0	E2P7C3AYNNNC0	B
3.9	4.3	5.8	2.2	3.0	1.5	1.5	E3P9C3AYNNNC0	B
6.1	6.7	9.1	4.0	5.0	3.0	3.0	E6P1C3AYNNNC0	B
9.0	9.9	13.5	5.5	7.5	4.0	5.0	E9P0C3AYNNNC0	D
11	13.5	18	7.5	10	5.5	7.5	E011C3AYNNNC0	D
17	18.7	25.5	11	15	7.5	10	E017C3AYNNNC0	D
22	25.5	34	15	20	11	15	E022C3AYNNNC0	D
27	33	44	18.5	25	15	20	E027C3AYNNNC0	D
32	40.5	54	22	30	18.5	25	E032C3AYNNNC0	D
41	48	64	30	40	22	30	E041C3AYNANC0	E
52	61.5	82	37	50	30	40	E052C3AYNANC0	E

Standard Drives Selection

Wall / Machine Mount - IP54, NEMA Type 12 *(Position d = G)*

200...240V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP54, NEMA Type 12 with HIM	Frame Size
240V ac Input*			208V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
54	63	84	62.1	72.4	96.6	15	20	11	15	B054G3AYNANC0	E
70	81	108	78.2	93.1	124	18.5	25	15	20	B070G3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

380...480V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP54, NEMA Type 12 with HIM	Frame Size
480V ac Input*			380…400V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
52	60	80	60	66	90	30	40	22	30	D052G3AYNANC0	E
65	78	104	72	90	120	37	50	30	40	D065G3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

500...600V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				IP54, NEMA Type 12 with HIM	Frame Size
480V ac Input*			500…600V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
41	48	64	41	48	64	30	40	22	30	E041G3AYNANC0	E
52	61.5	82	52	61.5	82	37	50	30	40	E052G3AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

Standard Drives Selection

Flange Mount - Front Chassis = IP20, NEMA 1; Heatsink = IP66, NEMA Type 4X/12 *(Position d = F)*

200...240V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				Flange Type without HIM	Frame Size
240V ac Input*			208V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
2.2	2.4	3.3	2.5	2.7	3.7	0.37	0.5	0.25	0.33	B2P2F0AYNNNC0	A
4.2	4.8	6.4	4.8	5.5	7.4	0.75	1.0	0.55	0.75	B4P2F0AYNNNC0	A
6.8	9.0	12	7.8	10.3	13.8	1.5	2.0	1.1	1.5	B6P8F0AYNNNC0	B
9.6	10.6	14.4	11	12.1	16.5	2.2	3.0	1.5	2.0	B9P6F0AYNNNC0	B
15.3	17.4	23.2	17.5	19.2	26.2	4.0	5.0	3.0	3.0	B015F0AYNANC0	C
22	24.2	33	25.3	27.8	37.9	5.5	7.5	4.0	5.0	B022F0AYNANC0	D
28	33	44	32.2	37.9	50.6	7.5	10	5.5	7.5	B028F0AYNANC0	D
42	46.2	63	43	55.5	74	11	15	7.5	10	B042F0AYNANC0	D
54	63	84	62.1	72.4	96.6	15	20	11	15	B054F0AYNANC0	E
70	81	108	78.2	93.1	124	18.5	25	15	20	B070F0AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

380...480V ac, Three-Phase Drives

Output Amps						Nominal Power Ratings				Flange Type without HIM	Frame Size
480V ac Input*			380…400V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
1.1	1.2	1.6	1.3	1.4	1.9	0.37	0.5	0.25	0.33	D1P1F0AYNNNC0	A
2.1	2.4	3.2	2.1	2.4	3.2	0.75	1.0	0.55	0.75	D2P1F0AYNNNC0	A
3.4	4.5	6.0	3.5	4.5	6.0	1.5	2.0	1.1	1.5	D3P4F0AYNNNC0	A
5.0	5.5	7.5	5.0	5.5	7.5	2.2	3.0	1.5	2.0	D5P0F0AYNNNC0	B
8.0	8.8	12	8.7	9.9	13.2	4.0	5.0	3.0	3.0	D8P0F0AYNNNC0	B
11	12.1	16.5	11.5	13	17.4	5.5	7.5	4.0	5.0	D011F0AYNANC0	C
14	16.5	22	15.4	17.2	23.1	7.5	10	5.5	7.5	D014F0AYNANC0	C
22	24.2	33	22	24.2	33	11	15	7.5	10	D022F0AYNANC0	D
27	33	44	30	33	45	15	20	11	15	D027F0AYNANC0	D
34	40.5	54	37	45	60	18.5	25	15	20	D034F0AYNANC0	D
40	51	68	43	56	74	22	30	18.5	25	D040F0AYNANC0	D
52	60	80	60	66	90	30	40	22	30	D052F0AYNANC0	E
65	78	104	72	90	120	37	50	30	40	D065F0AYNANC0	E

* Catalog code corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.

500...600V ac, Three-Phase Drives

Output Amps			Nominal Power Ratings				Flange Type without HIM	Frame Size
600V ac Input			Normal Duty		Heavy Duty		Cat. No.	
Cont.	1 Min.	3 Sec.	kW	Hp	kW	Hp	20A...	
0.9	1.0	1.4	0.37	0.5	0.25	0.33	E0P9F0AYNNNC0	A
1.7	1.9	2.6	0.75	1.0	0.55	0.75	E1P7F0AYNNNC0	A
2.7	3.6	4.8	1.5	2.0	1.1	1.0	E2P7F0AYNNNC0	A
3.9	4.3	5.8	2.2	3.0	1.5	1.5	E3P9F0AYNNNC0	B
6.1	6.7	9.1	4.0	5.0	3.0	3.0	E6P1F0AYNNNC0	B
9.0	9.9	13.5	5.5	7.5	4.0	5.0	E9P0F0AYNNNC0	C
11	13.5	18	7.5	10	5.5	7.5	E011F0AYNNNC0	C
17	18.7	25.5	11	15	7.5	10	E017F0AYNNNC0	D
22	25.5	34	15	20	11	15	E022F0AYNNNC0	D
27	33	44	18.5	25	15	20	E027F0AYNNNC0	D
32	40.5	54	22	30	18.5	25	E032F0AYNNNC0	D
41	48	64	30	40	22	30	E041F0AYNANC0	E
52	61.5	82	37	50	30	40	E052F0AYNANC0	E

User Installed Options

Human Interface and Wireless Interface Modules

LCD Digital Speed
20-HIM-A2

LCD Full Numeric
20-HIM-A3

LCD Programmer Only
20-HIM-A5

DPI NEMA 4 WIM
Remote (Panel Mount)
20-WIM-N4S

DPI NEMA 1 WIM
20-WIM-N1

Remote (Panel Mount)
Full Numeric
20-HIM-C3

Remote (Panel Mount)
Full Numeric
20-HIM-C3S

Remote (Panel Mount)
Programmer Only
20-HIM-C5

Remote (Panel Mount)
Programmer Only
20-HIM-C5S

Description	Handheld/Local (Drive Mount) ✶ Cat. No.	Remote (Panel Mount) IP66, UL Type 4x/12 ❄ Cat. No.
Blank Plate	20-HIM-A0	–
LCD Display, Digital Speed	20-HIM-A2	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3 ‡
		20-HIM-C3S §
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5 ‡
		20-HIM-C5S §
DPI NEMA 1 WIM	20-WIM-N1	–
DPI NEMA 4 WIM	–	20-WIM-N4S

✶ User installed drive mounted available only on IP20, NEMA Type 1 and Flange Type. See Factory Installed Options for drive mount IP66, NEMA Type 4X/12 HIM.
❄ For indoor use only.
‡ Includes a PowerFlex HIM Interface Cable (20-HIM-H10).
§ Includes a 1202-C30 cable (3 Meters).

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA 1 ♣	20-HIM-B1
PowerFlex HIM Interface Cable, 1 m (39 in)➤	20-HIM-H10
HIM/Comm 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 an interface cable (1202-C30) 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).

Communication Option Kits

Description	Cat. No.
ControlNet Communication Adapter (Coax)	20-COMM-C
DeviceNet Communication Adapter	20-COMM-D
EtherNet/IP Communication Adapter	20-COMM-E
RS485 HVAC Communication Adapter	20-COMM-H
Interbus Communication Adapter	20-COMM-I
LonWorks Communication Adapter	20-COMM-L
PROFIBUS DP Communication Adapter	20-COMM-P
ControlNet Communication Adapter (Fiber)	20-COMM-Q
Remote I/O Communication Adapter	20-COMM-R
RS-485 DF1 Communication Adapter	20-COMM-S
External DPI Communications Kit	20-XCOMM-DC-BASE
External DPI I/O Option Board	20-XCOMM-IO-OPT1
External Comms Power Supply	20-XCOMM-AC-PS1
Compact I/O Module (3 Channel)	1769-SM1
Smart Self-powered Serial Converter (RS-232 DF1) includes 1203-SFC and 1202-C10 Cables	1203-SSS
Serial Null Modem Adapter	1203-SNM

Other Options

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

✶ Works only with PowerFlex 70 Enhanced Control.
❄ Provides temporary DPI/HIM connection for NEMA 1 and Flange drives with cover removed.

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%	N/A	N/A
5.5 (7.5)	4.0 (5.0)	23	20AB-DB1-D	22	0.036	0.9	117%	100%	1.3%	117%	1.1%
7.5 (10)	5.5 (7.5)	23	20AB-DB1-D	22	0.036	0.9	86%	86%	1.1%	N/A	N/A
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%	N/A	N/A
7.5 (10)	5.5 (7.5)	74	20AD-DB1-C	115	0.04	0.9	69%	69%	1.5%	N/A	N/A
11 (15) ‡	7.5 (10)	44	20AD-DB1-D	62	0.036	0.8	87%	87%	0.8%	N/A	N/A
15 (20) ‡	11 (15) ‡	31	20AD-DB1-D	62	0.036	0.8	64%	64%	0.8%	N/A	N/A
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	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
15 (20)	11 (15)	48	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

✶ 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.

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
380...480V ac	115	A	20AD-DB1-A
		B	20AD-DB1-B
		C	20AD-DB1-C
	62	D	20AD-DB1-D
600V ac	115	A	20AD-DB1-A
		B	20AD-DB1-B
		C	20AD-DB1-C
		D	Not Available

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	Continous 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

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA 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	1.0	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	2.0	1321-3R8-A	1321-3RA8-A	1321-3R8-A	1321-3RA8-A
20AB9P6	Heavy Duty	2.0	1321-3R8-A	1321-3RA8-A	1321-3R12-A	1321-3RA12-A
20AB9P6	Normal Duty	3.0	1321-3R12-A	1321-3RA12-A	1321-3R12-A	1321-3RA12-A
20AB015	Heavy Duty	3.0	1321-3R12-A	1321-3RA12-A	1321-3R18-A	1321-3RA18-A
20AB015	Normal Duty	5.0	1321-3R18-A	1321-3RA18-A	1321-3R18-A	1321-3RA18-A
20AB022	Heavy Duty	5.0	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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA 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	1.0	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	2.0	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20AB9P6	Heavy Duty	2.0	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20AB9P6	Normal Duty	3.0	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20AB015	Heavy Duty	3.0	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20AB015	Normal Duty	5.0	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20AB022	Heavy Duty	5.0	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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 3% Impedance

			Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
Drive Cat. No.	Duty	Hp	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	1.0	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	2.0	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20AD5P0	Heavy Duty	2.0	1321-3R4-B	1321-3RA4-B	1321-3R8-C	1321-3RA8-C
20AD5P0	Normal Duty	3.0	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AD8P0	Heavy Duty	3.0	1321-3R8-C	1321-3RA8-C	1321-3R8-B	1321-3RA8-B
20AD8P0	Normal Duty	5.0	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20AD011	Heavy Duty	5.0	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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA 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	1.0	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	2.0	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20AD5P0	Heavy Duty	2.0	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20AD5P0	Normal Duty	3.0	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20AD8P0	Heavy Duty	3.0	1321-3R8-D	1321-3RA8-D	1321-3R8-C	1321-3RA8-C
20AD8P0	Normal Duty	5.0	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AD011	Heavy Duty	5.0	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‡	1321-3RA35-C‡	1321-3R25-C	1321-3RA25-C
20AD034	Heavy Duty	20	1321-3R35-C‡	1321-3RA35-C‡	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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ Reactors sized at 4% impedance.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 3% Impedance

			Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
Drive Cat. No.	Duty	Hp	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	0.75	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20AE1P7	Normal Duty	1.0	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20AE2P7	Heavy Duty	1.5	1321-3R2-A	1321-3RA2-A	1321-3R4-D	1321-3RA4-D
20AE2P7	Normal Duty	2.0	1321-3R4-C	1321-3RA4-C	1321-3R4-D	1321-3RA4-D
20AE3P9	Heavy Duty	2.0	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20AE3P9	Normal Duty	3.0	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20AE6P1	Heavy Duty	3.0	1321-3R4-C	1321-3RA4-C	1321-3R8-C	1321-3RA8-C
20AE6P1	Normal Duty	5.0	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20AE9P0	Heavy Duty	5.0	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-C	1321-3RA18-C
20AE017	Normal Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R18-C	1321-3RA18-C
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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA 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	0.75	1321-3R2-C	1321-3RA2-C	1321-3R2-C	1321-3RA2-C
20AE1P7	Normal Duty	1.0	1321-3R2-C	1321-3RA2-C	1321-3R2-C	1321-3RA2-C
20AE2P7	Heavy Duty	1.5	1321-3R2-B	1321-3RA2-B	1321-3R4-D‡	1321-3RA4-D‡
20AE2P7	Normal Duty	2.0	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D‡	1321-3RA4-D‡
20AE3P9	Heavy Duty	2.0	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D	1321-3RA4-D
20AE3P9	Normal Duty	3.0	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20AE6P1	Heavy Duty	3.0	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20AE6P1	Normal Duty	5.0	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20AE9P0	Heavy Duty	5.0	1321-3R8-D	1321-3RA8-D	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-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	1321-3RA25-C
20AE022	Normal Duty	20	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20AE027	Heavy Duty	20	1321-3R25-C‡	1321-3RA25-C‡	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-C‡	1321-3RA35-C‡
20AE032	Normal Duty	30	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20AE041	Heavy Duty	30	1321-3R35-C‡	1321-3RA35-C‡	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

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ Reactors sized at 4% impedance..

Isolation Transformers - NEMA 3R Standalone

Motor Rating kW (Hp)	240V, 60 Hz, Three-Phase, 230V Primary & 230V Secondary IP32 (NEMA Type 3R) Cat. No.	480V, 60 Hz, Three-Phase, 460V Primary & 460V Secondary IP32 (NEMA Type 3R) Cat. No.	600V, 60 Hz, Three-Phase 575V Primary & 575V Secondary IP32 (NEMA Type 3R) Cat. No.
0.25 (0.33)	1321-3TW005-AA	1321-3TW005-BB	–
0.37 (0.5)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
0.55 (0.75)	1321-3TW005-AA	1321-3TW005-BB	–
0.75 (1.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
1.1 (1.5)	1321-3TW005-AA	1321-3TW005-BB	–
1.5 (2.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
2.2 (3.0)	1321-3TW005-AA	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

EMC Filters *

Description	Frame	Cat. No.
External 1-Phase 200-240V, 8A Filter	A	20A-RF-08-A1
External 3-Phase 200-480V, 5A Filter	A	20A-RF-05-A3

* These external filters are only for Frame A drives. Other Frames are available with internal filters. See Factory Installed Options.

Factory Installed Options

Human Interface and Wireless Interface Modules

IP20/NEMA Type 1 and Flange Type Drives *(Position e)*

Cat. Code: 0
No HIM (Blank Cover)

Cat. Code: 2
LCD Digital Speed

Cat. Code: 3
LCD Full Numeric

Cat. Code: 5
LCD Programmer Only

Cat. Code: 8
DPI WIM

IP66/NEMA Type 4X/12 Drives *(Position e)*

Cat. Code: 0
No HIM (Blank)

Cat. Code: 3
LCD Full Numeric

Cat. Code: 5
LCD Programmer Only

Cat. Code: 8
DPI WIM

Documentation

Description	Cat. Code *(Position f)*
English User Manual, Multi-Language Quick Start	A
No User Manual	N

Internal Dynamic Brake Resistors

Drive Input Voltage	Brake Resistance Ω	Frame	Cat. Code *(Position h)*
200...240V ac	62	A	Y
		B	Y
		C	Y
	22	D	Y
380...480V ac	115	A	Y
		B	Y
		C	Y
	62	D	Y
600V ac	115	A	Y
		B	Y
		C	Y
		D	Not Available

Internal EMC Filter

Drive Input Voltage	CE Filter	Frame*	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	

* Internal CE filters are not available for PowerFlex 70 A Frame drives. If an A Frame rating is ordered with an internal filter option, it will be supplied in a B Frame.

Internal Communication Adapters

Description	Cat. Code *(Position j)*
ControlNet	C
DeviceNet	D
Remote I/O	R
EtherNet I/P	E
RS485 DF-1	S
RS485 HVAC	H

Control Options

Description	Cat. Code *(Position k)*
Enhanced Control without DriveGuard	C
Enhanced Control with DriveGuard	G
Standard Control	N

Feedback Options

Description	Cat. Code *(Position l)*
None (Standard Control)	N
None (Enhanced Control)	0
5V/12V Encoder (Enhanced Control)	1

Overview

The PowerFlex 70 Packaged Drives Program allows users to create drive packages based on their specific needs. This program enhances stand-a-lone drive functionality through additional control, power and packaging options which are ideal for OEM and end users with special installation needs.

The program has three levels:

Quick Ship

Quick Ship products are intended to meet faster than normal delivery requirements. Pre-defined catalog strings are offered to support shipping one to three business days from date of order entry. The current offering is based on NEMA 1 (IP20) and NEMA 4/12 (IP65), 480V, top of frame ratings (frame A-D). These packages are a subset of the Standard Packaged Drives Program noted below and can be ordered through the Passport order entry system. **This program uses the Standard Control version of the PowerFlex 70.**

Standard Packaged Drives

The Standard Packaged Drives Program allows users to create drive packages based on their specific needs. A complete drive package may be specified by assembling a single catalog number string that includes a base drive and all required options. Packaging is available for 208V, 240V, 480V and 600V requirements in NEMA Type 1 (IP20), NEMA 4/12 (IP65) indoor, and NEMA 3/4 (IP65) outdoor. The program consists of a fully defined catalog string identified within this price sheet. Focused on higher volume, repeat business, the standard designs provide consistent manufacturing and minimizes customer resources by reducing engineering, manufacturing and installation time. Typical delivery is 10 business days from order entry and can be ordered through the Passport order entry system. **This program uses the Standard Control version of the PowerFlex 70.**

Engineered Drives

The Engineered Drives Program offers users the ability to create drive packages beyond the Standard Packaged Drives offering. **This program supports both the Standard and the Enhanced Control versions of the PowerFlex 70.** Options may or may not be defined within this publication. Product can be ordered by:

- Assembling a catalog string from the options listed in this publication.
  Engineered options that are listed within this publication will be specified by the heading *"Engineered Drives Program Only"* and will have varied lead-times.
- Entering a custom quote request for additional options not listed.
  A custom quote will require a Passport quote using "SP-SDB-CUSTOM" as the line item part number and entering a description of the base catalog string and custom options in the Competitive Summary. For questions or help with a custom quote please contact the Engineered Drives Group at 262-512-8415.

Catalog Number Explanation

To interpret the meaning of a catalog number, match the values of the catalog number code in positions **a, b, c,** etc. with the tables labeled **a, b, c,** etc. below.

Position

1-3	*4*	*5-7*		*8-10*		*11-12*		*13+*
21A	B	9P6	–	AA2	–	H1	–	BM1-CF-DS-D1A-D4A-D5A
a	*b*	*c*		*d*		*e*		*f*

a

Drive	
Code	**Type**
21A	PowerFlex 70 Packaged ✶

✶ Supports the Standard Control version of the PowerFlex 70.

b

Voltage Rating ❄		
Code	**Voltage**	**Ph.**
B	240V ac✶	3
D	480V ac✶	3
E	600V ac✶	3
X	208V ac✶	3
	400V ac‡	3

✶ Supports the Standard Control version of the PowerFlex 70.

❄ Must be specified.

‡ Custom quote required.

c1

Amp Rating ❄§		
208V 60Hz Input		
Code	**Amps**	**kW (Hp)**
2P2	2.5	0.37 (0.5)
4P2	4.8	0.75 (1.0)
6P8	7.8	1.5 (2.0)
9P6	11	2.2 (3.0)
015	17.5	4.0 (5.0)
022	25.3	5.5 (7.5)
028	32.2	7.5 (10)

❄ Must be specified.

§ Maximum continuous rating for Normal Duty drives.

c2

Amp Rating ❄§		
240V 60Hz Input		
Code	**Amps**	**kW (Hp)**
2P2	2.2	0.37 (0.5)
4P2	4.2	0.75 (1.0)
6P8	6.8	1.5 (2.0)
9P6	9.6	2.2 (3.0)
015	15.3	4.0 (5.0)
022	22	5.5 (7.5)
028	28	7.5 (10)

❄ Must be specified.

§ Maximum continuous rating for Normal Duty drives.

c3

Amp Rating ❄§		
480V 60Hz Input		
Code	**Amps**	**kW (Hp)**
1P1	1.1	0.37 (0.5)
2P1	2.1	0.75 (1.0)
3P4	3.4	1.5 (2.0)
5P0	5.0	2.2 (3.0)
8P0	8.0	4.0 (5.0)
011	11	5.5 (7.5)
014	14	7.5 (10)
022	22	11 (15)
027	27	15 (20)

❄ Must be specified.

§ Maximum continuous rating for Normal Duty drives.

c4

Amp Rating ❄§		
600V 60Hz Input		
Code	**Amps**	**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)

❄ Must be specified.

§ Maximum continuous rating for Normal Duty drives.

d

Enclosure ✶	
Code	**Enclosure**
AA1	IP 20 (NEMA Type 1), Style 1
AA2	IP 20 (NEMA Type 1), Style 2
AA3	IP 20 (NEMA Type 1), Style 3
AF	IP65, (NEMA Type 4/12 Indoor)
AH	IP65, (NEMA Type 3/4 Outdoor)

✶ Must be specified.

e

HIM ✶	
Code	**Interface Module**
H0	Blank HIM
H1	Digital LED HIM
H2	Digital LCD HIM
H3	Full Numeric LCD HIM
H4	Analog LCD HIM
H5	Prog. Only LCD HIM
C3	Full Numeric LCD - 4/12 Indoor
C5	Prog. Only LCD - 4/12 Indoor

✶ Must be specified.

f

Options (as required)	
Code	**Description**
BA	Auto Bypass Logic
BM1	Manual Bypass Normal Duty
BM2	Manual Bypass Heavy Duty
BR	Drive Mounted Brake Resistor
CB	Input Circuit Breaker
CF	115V Control Power
DS	Input Fused Disconnect Switch
D1A	Hand/Off/Auto
D2A	Drive Run P.L.
D2B	Drive Fault P.L.
D2C	At Speed P.L.
D2D	Drive Alarm P.L.
D3A	Control Power On P.L.
D4A	Drive Mode P.L. & Bypass Mode P.L.
D4B	Auto Bypass Enable On P.L. & Bypass Mode P.L.
D5A	Drive Disable M.H.P.B.
D6A	Motor Fault Pilot Light
ET	Nameplate, Door Mounted
FASP	Fire Alarm & Smoke Purge Logic
FB	Input Fusing
GC	ControlNet Comm Module
GD	DeviceNet Comm Module
GDN2	Johnson Controls Metasys Interface
GI	Interbus Comm Module
GP	Profibus Comm Module
GR	RIO Comm Module
JC	Control Power On Control Relay
JF	Drive Fault Control Relay
JM	Alarm Control Relay
JR	Drive Run Control Relay
JT	At Speed Control Relay
KD	Input Contactor
KM	Output Contactor
LQN	Output Line Reactor (Normal Duty)
LQH	Output Line Reactor (Heavy Duty)
LRN	Input Line Reactor (Normal Duty)
LRH	Input Line Reactor (Heavy Duty)
ME	Drive/Bypass Motor Run Time Meter
MH	Motor Heater Control, Remote Power
N1	Analog Input Isolator, 0-10V
N2	Analog Input Isolator, 4-20mA
N3	Analog Output Isolator, 0-10V
NP	No Drive Input Protection
PR1	Prog. Relay - Qty. 1
PR2	Prog. Relay - Qty. 1

PowerFlex 70 Quick Ship Program

The Quick Ship Program order entry system has been simplified, minimizing the time required to place an order. To enter your order, type in the first 14 characters of the string and the system will complete the rest.

Quick Ship Catalog Entry

Frame	Normal Duty Hp	Heavy Duty Hp	Type in Cat. No.	Name Plated Cat. No. ✶	Dimensions in	Approx. Weight lb
IP20, NEMA Type 1, 480V						
A	2.0	1.5	21AQD3P4-AA-DS	21AQD3P4-AA-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	225
B	5.0	3.0	21AQD8P0-AA-DS	21AQD8P0-AA-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	225
C	10	7.5	21AQD014-AA-DS	21AQD014-AA-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	235
D	20	15	21AQD027-AA-DS	21AQD027-AA-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	38h x 24w x 16d	250
IP65, NEMA Type 4/12, 480V						
A	2.0	1.5	21AQD3P4-AF-DS	21AQD3P4-AF-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	225
B	5.0	3.0	21AQD8P0-AF-DS	21AQD8P0-AF-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	225
C	10	7.5	21AQD014-AF-DS	21AQD014-AF-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	32h x 24w x 16d	235
D	20	15	21AQD027-AF-DS	21AQD027-AF-DS-C3-CF-D1A-D2A-D2B-D3A-JF-JR	38h x 24w x 16d	250

✶ Supports the Standard Control version of the PowerFlex 70.
Note: Consult factory for orders larger than 1 drive per frame size.

PowerFlex 70 Packaged Drives Programs

How to Order

- **Step 1.** Select the basic PowerFlex 70 drive catalog number based on application requirements (i.e. nominal Hp, voltage and duty cycle). The basic package for NEMA Type 1 applications will include a standard NEMA Type 1 drive mounted on a back plate. The basic package for NEMA Type 4/12 or 3/4 will include a flange mount drive mounted inside the enclosure.
- **Step 2.** Specify Options – The following pages list and describe the available mounted options. The listing is divided into simple categories to assist in quickly locating specific needs. Some options are horsepower and/or voltage specific, or will have special rules associated with them – Read all Footnotes.
- **Step 3.** Specify enclosure. NEMA Type 1 – All options will be further defined by an Area Factor. Area Factor is a representation of the mounting space required for a specific option. Total all the area factors of all the options selected and choose an enclosure option that is equal or larger in area factor.
  NEMA Type 4/12 Indoor or Type 3/4 Outdoor – Enclosure size will be dependent on the type of options selected. A combination of heat dissipation and physical space required has been calculated to determine optimal enclosure size. Select enclosure size - NEMA Type 1 area factors Do Not Apply.

Example: An application requires a variable speed control for an existing 3 Hp, 230V, normal duty, AC conveyor motor. The drive and motor will be located in a clean environment. Local control is required for programming, start, stop, speed and emergency stop. Operation across the line (with selection and mode indication at drive) is required. A system disconnect switch should be available. The speed reference will be supplied either local or from an isolated remote process control and should be selectable at the drive. Control power is required.

Description	Cat. No./Option Code	Area Factor
Basic Drive	21AB9P6	A0
Human Interface Module - LED	-H1	A0
“Drive Disable” Pushbutton	-D5A	A1
Bypass, Manual with D/O/B Switch	-BM1	A54
Drive & Bypass Mode Pilot Lights	-D4A	A1
Drive Disconnect Switch	-DS	A0
Hand/Off/Auto	-D1A	A1
Control Power	-CF	A16
Total Area Factor		A83
IP 20 (NEMA Type 1) Enclosure	-AA2	A130
21AB9P6-AA2-BM1-CF-DS-D1A-D4A-D5A-H1		

Product Selection

Output Amps			Ratings		Drive Frame Size	Base Enclosure (-AA1) IP20, NEMA Type 1 (Less HIM)		Base Enclosure ⌘ (-AF NEMA Type4/12 Indoor or -AH NEMA type 3/4 Outdoor) (Less HIM)	Factory Installed Options				
									Drive Input Protection (Must Choose One)				Optional
									Circuit Breaker, System (-CB)❄➤	Fused Disconnect Switch, System (-DS)	Drive Input Fusing (-FB)‡	Drive Input No Protection (-NP)♣	Input Contactor (-KD)
Cont.	1 Min.	3 Sec.	ND Hp	HD Hp		Cat. No.✶ 21A...	Area Fac.✦	Cat. No.✶ 21A...	Area Fac.✦	Area Fac.✦	Area Fac.✦	Area Fac.✦	Area Fac.✦
208V ac, Three-Phase Drives													
2.5	2.7	3.7	0.5	0.33	A	X2P2	A0	X2P2	A0	A0	A0	A0	A26
4.8	5.5	7.4	1.0	0.75	A	X4P2	A0	X4P2	A0	A0	A0	A0	A26
7.8	10.3	13.8	2.0	1.5	B	X6P8	A0	X6P8	A0	A0	A0	A0	A26
11	12.1	16.5	3.0	2.0	B	X9P6	A0	X9P6	A0	A0	A0	A0	A26
17.5	19.2	26.2	5.0	3.0	C	X015	A0	X015	A0	A0	A0	A0	A26
25.3	27.8	37.9	7.5	5.0	D	X022	A0	X022	A0	A0	A0	A0	A26
32.2	37.9	50.6	10	7.5	D	X028	A0	X028	A0	A0	A0	A0	A26
240V ac, Three-Phase Drives													
2.2	2.4	3.3	0.5	0.33	A	B2P2	A0	B2P2	A0	A0	A0	A0	A26
4.2	4.8	6.4	1.0	0.75	A	B4P2	A0	B4P2	A0	A0	A0	A0	A26
6.8	9.0	12	2.0	1.5	B	B6P8	A0	B6P8	A0	A0	A0	A0	A26
9.6	10.6	14.4	3.0	2.0	B	B9P6	A0	B9P6	A0	A0	A0	A0	A26
15.3	17.4	23.2	5.0	3.0	C	B015	A0	B015	A0	A0	A0	A0	A26
22	24.2	33	7.5	5.0	D	B022	A0	B022	A0	A0	A0	A0	A26
28	33	44	10	7.5	D	B028	A0	B028	A0	A0	A0	A0	A26
480V ac, Three-Phase Drives													
1.1	1.2	1.6	0.5	0.33	A	D1P1	A0	D1P1	A0	A0	A0	A0	A26
2.1	2.4	3.2	1.0	0.75	A	D2P1	A0	D2P1	A0	A0	A0	A0	A26
3.4	4.5	6.0	2.0	1.5	A	D3P4	A0	D3P4	A0	A0	A0	A0	A26
5.0	5.5	7.5	3.0	2.0	B	D5P0	A0	D5P0	A0	A0	A0	A0	A26
8.0	8.8	12	5.0	3.0	B	D8P0	A0	D8P0	A0	A0	A0	A0	A26
11	12.1	16.5	7.5	5.0	C	D011	A0	D011	A0	A0	A0	A0	A26
14	16.5	22	10	7.5	C	D014	A0	D014	A0	A0	A0	A0	A26
22	24.2	33	15	10	D	D022	A0	D022	A0	A0	A0	A0	A26
27	33	44	20	15	D	D027	A0	D027	A0	A0	A0	A0	A26
600V ac, Three-Phase Drives													
0.9	1.0	1.4	0.5	0.33	A	E0P9	A0	E0P9	A0	A0	A0	A0	A26
1.7	1.9	2.6	1.0	0.75	A	E1P7	A0	E1P7	A0	A0	A0	A0	A26
2.7	3.6	4.8	2.0	1.0	A	E2P7	A0	E2P7	A0	A0	A0	A0	A26
3.9	4.3	5.8	3.0	1.5	B	E3P9	A0	E3P9	A0	A0	A0	A0	A26
6.1	6.7	9.1	5.0	3.0	B	E6P1	A0	E6P1	A0	A0	A0	A0	A26
9.0	9.9	13.5	7.5	5.0	C	E9P0	A0	E9P0	A0	A0	A0	A0	A26
11	13.5	18	10	7.5	C	E011	A0	E011	A0	A0	A0	A0	A26
17	18.7	25.5	15	10	D	E017	A0	E017	A0	A0	A0	A0	A26
22	25.5	34	20	15	D	E022	A0	E022	A0	A0	A0	A0	A26

✶ Supports the Standard Control version of the PowerFlex 70. Base drive catalog number includes: PowerFlex 70 drive, base enclosure, and user manual.
❄ Does not include or require drive input fusing.
‡ When -FB is selected, the power disconnecting means is user supplied.
✦ Applies to NEMA Type 1 drives only.
♣ **Important:** If -CB, -DS or -FB is not selected, power disconnecting means and drive branch circuit protection must be supplied by user.
➤ 600V Only - Pricing does not apply to NEMA Type 1 drives (CB option not available for 600V NEMA Type 1 drives)
⌘ Indoor (-AF) – IP65, NEMA Type 4/12 or Outdoor (-AH) – IP65, NEMA Type 3/4.

Packaged Drives Programs

Product Selection (continued)									
Optional (Choose Any or All)									
Output Contactor (-KM)✶	Manual Bypass Choose One (-BM1 or -BM2) Adjustable Range in Amps❄♣➤			Drive Mounted Brake Resistor (-BR)	Line Reactor Input, 3%, Normal Duty (-LRN)	Line Reactor Input, 3%, Heavy Duty (-LRH)	Line Reactor Output, 3%, Normal Duty (-LQN)	Line Reactor Output, 3%, Heavy Duty (-LQH)	115V Control Power, Drive/Options Only (-CF)‡
Area Factor§	ND (-BM1)	HD (-BM2)	Area Factor✦	Area Factor✦	Area Factor✦	Area Factor✦	Area Factor✦	Area Factor✦	Area Factor✦
208V ac, Three-Phase Drives									
A26	2.4…4.0	1.6…2.4	A54	A0	A58	A58	A58	A58	A16
A26	4.0…6.0	2.4…4.0	A54	A0	A58	A58	A58	A58	A16
A26	6.0…10	6.0…10	A54	A0	A58	A58	A58	A58	A16
A26	10…16	6.0…10	A54	A0	A58	A58	A58	A58	A16
A26	16…24	10…16	A54	A0	A58	A58	A58	A58	A16
A26	18…30	16…24	A54	A0	A60	A60	A60	A60	A16
A26	30…45	18…30	A54	A0	A60	A60	A60	A60	A16
240V ac, Three-Phase Drives									
A26	1.6…2.4	1.6…2.4	A54	A0	A58	A58	A58	A58	A16
A26	4.0…6.0	2.4…4.0	A54	A0	A58	A58	A58	A58	A16
A26	6.0…10	4.0…6.0	A54	A0	A58	A58	A58	A58	A16
A26	6.0…10	6.0…10	A54	A0	A58	A58	A58	A58	A16
A26	10…16	6.0…10	A54	A0	A58	A58	A58	A58	A16
A26	16…24	10…16	A54	A0	A60	A58	A60	A60	A16
A26	18…30	18…30	A54	A0	A60	A60	A60	A60	A16
480V ac, Three-Phase Drives									
A26	1.0…1.6	0.6…1.0	A54	A0	A58	A58	A58	A58	A16
A26	1.6…2.4	1.0…1.6	A54	A0	A58	A58	A58	A58	A16
A26	2.4…4.0	2.4…4.0	A54	A0	A58	A58	A58	A58	A16
A26	4.0…6.0	2.4…4.0	A54	A0	A58	A58	A58	A58	A16
A26	6.0…10	4.0…6.0	A54	A0	A58	A58	A58	A58	A16
A26	10…16	6.0…10	A54	A0	A58	A58	A58	A58	A16
A26	10…16	10…16	A54	A0	A58	A58	A58	A58	A16
A26	16…24	10…16	A54	A0	A58	A58	A60	A60	A16
A26	18…30	18…30	A54	A0	A58	A58	A60	A60	A16
600V ac, Three-Phase Drives									
A26	0.6…1.0	0.6…1.0	A54	N/A	A58	A58	A58	A58	A16
A26	1.6…2.4	1.0…1.6	A54	N/A	A58	A58	A58	A58	A16
A26	2.4…4.0	1.6…2.4	A54	N/A	A58	A58	A58	A58	A16
A26	2.4…4.0	2.4…4.0	A54	N/A	A58	A58	A58	A58	A16
A26	6.0…10	4.0…6.0	A54	N/A	A58	A58	A58	A58	A16
A26	6.0…10	6.0…10	A54	N/A	A58	A58	A58	A58	A16
A26	10…16	6.0…10	A54	N/A	A58	A58	A58	A58	A16
A26	16…24	10…16	A54	N/A	A58	A58	A60	A60	A16
A26	16…24	16…24	A54	N/A	A58	A58	A60	A60	A16

✶ Option -JF is required. Cannot be used with -BM1, BM2 or BA.
❄ Cannot be used with -KM. -BM1 cannot be used with -BM2. Bypass duty cycle must match drive duty cycle.
‡ This option does not provide 115V AC control interface to the drive or -MH option.
✦ Applies to NEMA Type 1 drives only.
♣ Option includes “Drive-Off-Bypass” selector switch.
➤ Requires -CF option or customer-supplied 115V.

Factory Installed Options

Human Interface Modules

Cat. Code: H0
No HIM (Blank Cover)

Cat. Code: H1
LED Digital Speed

Cat. Code: H2
LCD Digital Speed

Cat. Code: H3
LCD Full Numeric

Cat. Code: H4
LCD Analog Speed

Cat. Code: H5
LCD Programmer Only

Cat. Code: C3
Remote Panel Mount
LCD Full Numeric

Cat. Code: C5
Remote Panel Mount
LCD Programmer Only

Human Interface Modules - LED/LCD (Must Choose One)

Description	Option Code	Area Factor
Drive Mounted		
No HIM (Blank Plate)	-H0	A0
LED Display, Digital Keypad	-H1	A0
LCD Display, Digital Keypad	-H2	A0
LCD Display, Full Numeric Keypad	-H3	A0
LCD Display, Analog Potentiometer	-H4	A0
LCD Display, Programming Only	-H5	A0
Door Mount		
LCD Display, Full Numeric Keypad, NEMA Type 4/12	-C3	N/A
LCD Display, Programming Only NEMA Type 4/12	-C5	N/A

Control Interface and Feedback Options

Description	Option Code	Area Factor‡
Drive Digital Output Options✶		
Control Relays		
Auxiliary Contacts, (2) Form C 2-N.O., 2-N.C.		
Alarm	-JM❄	A10
At Speed	-JT❄	A10
Drive Fault	-JF❄	A10
Drive Run	-JR❄	A10
Programmable Relay - Quantity 1	-PR1❄	A10
Programmable Relay - Quantity 1	-PR2❄	A10
Drive Output Pilot Lights		
Drive Run	-D2A❄	A1
Drive Fault	-D2B❄	A1
At Speed	-D2C❄	A1
Drive Alarm	-D2D❄	A1
Control Relay Option		
Control Power On	-JC	A10
Building Management Control Interface		
Fire Alarm and Smoke Purge Response	-FASP❄	A20
Analog Isolators		
Analog Input Isolator, 0-10V	-N1❄	A20
Analog Input Isolator, 4-20 mA	-N2❄	A20
Analog Output Isolator, 0-10V	-N3❄	A20
Auto Bypass Logic	-BA§	A2

✶ Maximum of two Drive Digital Output Options can be selected.
Note: D2A + JR = One Digital Output.
D2B + JF = One Digital Output.
D2C + JT = One Digital Output.
D2D + JM = One Digital Output.
All Other Combinations = One Digital Output.
❄ Requires user-supplied control power or the -CF option.
‡ Applies to NEMA Type 1 drives only.
§ Requires -JF option.

Communication Options

Description	Option Code	Area Factor
Communication Options (Drive Mounted)		
Communication Module, ControlNet	-GC	A0
Communication Module, DeviceNet	-GD	A0
Communication Module, Interbus	-GI	A0
Communication Module, PROFIBUS	-GP	A0
Communication Module, Remote I0	-GR	A0
Johnson Controls Metasys Interface (Panel Mount)	-GDN2❄	A20

❄ Requires user-supplied control power or the -CF option.

Motor Interface Options

Description	Option Code	Area Factor ➤
Motor Heater Control, 120V AC, 180 W,		
Remote Power	-MH⌘	A10

➤ Applies to NEMA Type 1 enclosures only.
⌘ Requires user-supplied control power.

Door Mounted Options

Description	Option Code	Area Factor ➤
Drive/Bypass - Motor Run Time Meter (Elapsed Hours) Non-Resettable	-ME✶	A1
Nameplate, Door Mounted 158.8 x 50.8 mm (6.25 x 2 in.) white Lamacoid with black letters	-ET✦	A0

✶ Requires user-supplied control power or the -CF option.
➤ Applies to NEMA Type 1 enclosures only.
✦ Actual message to be defined by user at order entry, otherwise will be supplied blank.

Operator Devices

The operator devices listed below are logically grouped into sets. Only one option code selection may be made from Set D4. Where possible, 800EP style devices will be supplied mounted and wired. Loose or individual devices are not available.

Option Set	Description M.H.P.B. = Mushroom Head Push Button	Option Code	Area Factor➤
D1	Hand/Off/Auto (Start/Stop/Speed Ref.)	-D1A	A1
D2	Drive Pilot Lights – See “Drive Digital Output Options”		
D3	Control Power On Pilot Light	-D3A✶	A1
D4	Drive Mode & Bypass Mode Pilot Lights	-D4A✶	A1
	Auto Bypass Enable On & Bypass Mode Pilot Lights❄‡	-D4B✶	A1
D5	Drive Disable (Push-Pull) M.H.P.B.	-D5A	A1
D6	Motor Fault Pilot Light❄	-D6A✶	A1

➤ Applies to NEMA Type 1 enclosures only.
✶ Requires user-supplied control power or the -CF option.
❄ Must be used with options -BM1 or BM2.
‡ Must be used with options -BA, BM1 or BM2.

Enclosures (Must Choose One)

Description & Approximate Dimensions in mm (in)	Option Code	Area Factor➤
IP 20/NEMA Type 1§		
667.8 x 220.7 x 293.1 (26.3 x 8.7. x 11.5), Style 1	-AA1	A0
667.8 x 441.5 x 293.1 (26.3 x 17.4. x 11.5), Style 2	-AA2	A130
667.8 x 662.2 x 293.1 (26.3 x 26.1. x 11.5), Style 3	-AA3	A360
IP 65/NEMA Type 4/12 Indoor (AF) & IP 65/NEMA Type 3/4 Outdoor (AH)♣		
457.2 x 304.8 x 304.8 (18 x 12 x 12), Style 1	-AF	N/A
457.2 x 406.4 x 304.8 (18 x 16 x 12), Style 2	-AF	
558.8 x 406.4 x 304.8 (22 x 16 x 12), Style 3	-AF	
812.8 x 330.2 x 304.8 (32 x 13 x 12), Style 4	-AF/AH	
812.8 x 609.6 x 406.4 (32 x 24 x 16), Style 5	-AF/AH	
965.2 x 609.6 x 406.4 (38 x 24 x 16), Style 6	-AF/AH	
1270.0 x 609.6 x 406.4 (50 x 24 x 16), Style 7	-AF/AH	
1117.6 x 914.4 x 406.4 (44 x 36 x 16), Style 8	-AH	
1270.0 x 914.4 x 406.4 (50 x 36 x 16), Style 9	-AH	
1574.8 x 914.4 x 406.4 (62 x 36 x 16), Style 10	-AH	

➤ Applies to NEMA Type 1 enclosures only.
§ NEMA Type 1 enclosure size will be dependent on the total option Area Factors. Add up all the option Area Factors to determine enclosure size. When exact dimensions are required, consult factory.
♣ See "Enclosure Selection" for proper NEMA Type 3/4 outdoor or 4/12 indoor enclosure selection.

Codes and Standards

Code/Standard	Action
CE (European Conformance Standard)	Not available on this product.
IEEE519 (Harmonic Distortion Levels)	Not available on this product.
UL, c-UL (CSA)	This program provides UL panel recognition from the factory as standard.

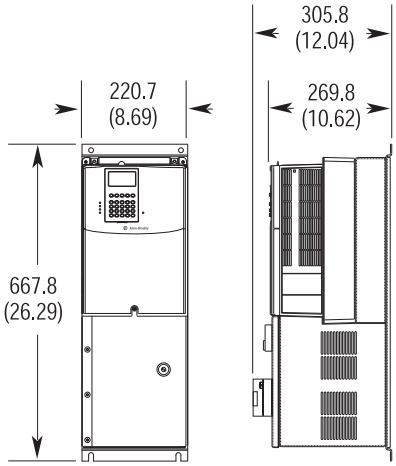
Drawing and Test Options

Description—One Set of...	Cat. No.
Manufacturing Drawings 279 x 432 mm (11 x 17 in) One set of schematics— **"Information Only — Manufacture Proceeding"** Not to be used as Approval Drawings	
Diskette	1301-MFDISK
Electronic Drawings	1301-MFDWG-E
Black & Whites	1301-MFDWG
Vellums	1301-MFRV
Final Drawings (as shipped) 279 x 432 mm (11 x 17 in) One set of schematics— **"Copy of Drawings that Shipped with the Job"**	
Diskette	1301-FINDISK
Electronic Drawings	1301-FINDWG-E
Black & Whites	1301-FINDWG
Vellums	1301-FINRV
Mylar	1301-FINRM
Test Report, Drive Only	1301-TESTR
Engineered Drives Program Only	
Approval Drawings 279 x 432 mm (11 x 17 in) One set of schematics— **"Manufacture Held Until Approved Prints are Received"**	
Diskette	1301-APPDISK
Electronic Drawings	1301-APPDWG-E
Black & Whites	1301-APPDWG
Vellums	1301-APPRV
As Commissioned Drawings 279 x 432 mm (11 x 17 in) One set of schematics — **"Provided after Field Changes are Returned to the Factory"**	
Black & Whites	1301-COMDWG
Certified Motor Dimension Drawing	1301-CERMTR
Certified Transformer Dimension Drawing	1301-CERXFR
Certified Line Reactor Dimension Drawing	1301-CERLR
Disk Copy of "Final As Shipped" Schematics (Autocad 2000)	1301-DISK
Witness Test, User Viewing of Rockwell Automation Standard Test Procedures	1301-WT ‡

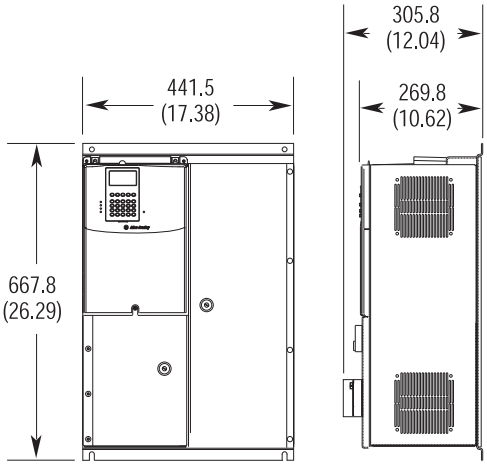
‡ Includes viewing Rockwell Automation standard test only. Any special requirements must be reviewed by Rockwell Automation for acceptance and possible price changes.

Dimensions

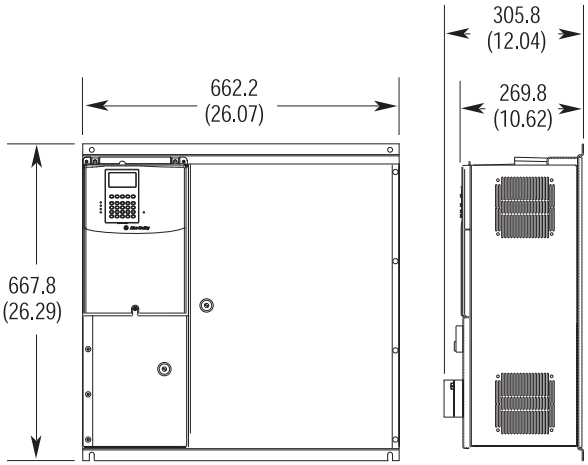
0.5-20 Hp NEMA Type 1, Style 1 (-AA1)
Maximum Area Factor = A0
Approximate Weight = 43 kg (95 lbs.)
millimeters (inches)



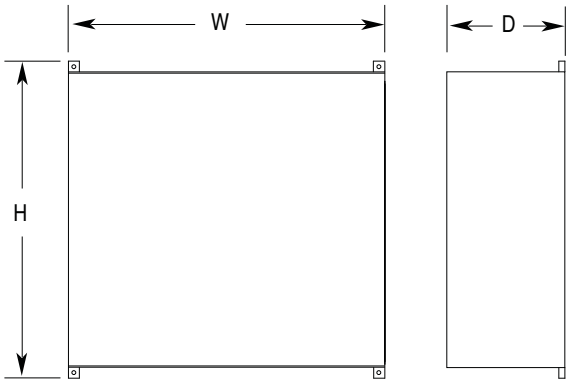
0.5-20 Hp NEMA Type 1, Style 2 (-AA2)
Maximum Area Factor = A130
Approximate Weight = 57 kg (125 lbs.)
millimeters (inches)



0.5-20 Hp NEMA Type 1, Style 3 (-AA3)
Maximum Area Factor = A270
Approximate Weight = 70 kg (155 lbs.)
millimeters (inches)



0.5-20 Hp NEMAType 3/4 outdoor or 4/12 (-AF)
indoor, Styles 1 through 10



Style	H		W		D	
	mm	in	mm	in	mm	in
1	457.2	18	304.8	12	304.8	12
2	457.2	18	406.4	16	304.8	12
3	558.8	22	406.4	16	304.8	12
4	812.8	32	330.2	13	304.8	12
5	812.8	32	609.6	24	406.4	16
6	965.2	38	609.6	24	406.4	16
7	1270.0	50	609.6	24	406.4	16
8	1117.6	44	914.4	36	406.4	16
9	1270.0	50	914.4	36	406.4	16
10	1574.8	62	914.4	36	406.4	16

Enclosure Selection

Ratings		Drive Frame Size	PowerFlex 70 Flange Drive Cat. No. *21A...*	Enclosure Style for Flange Mounted Drives						
				NEMA Type 4/12 Indoor (-AF)				NEMA Type 3/4 Outdoor (-AH)		
Normal Duty Hp	Heavy Duty Hp			Drive Mounted Options Only ✶	CB, DS, FB or NP & Drive Mounted Options, C3 or C5 ❄	All Options Less Line Reactor ‡	All Options §	CB, DS, FB or NP & Drive Mounted Options ♣	All Options, Less Line Reactor ➤	All Options ⌘
208V ac, Three-Phase Drive Enclosure Selection										
0.5	0.33	A	X2P2	1	4	5	5	4	5	5
1.0	0.75	A	X4P2	1	4	5	5	4	5	6
2.0	1.5	B	X6P8	1	4	5	6	4	5	7
3.0	2.0	B	X9P6	1	4	5	6	4	5	7
5.0	3.0	C	X015	2	4	5	6	5	5	8
7.5	5.0	D	X022	3	4	6	7	5	6	9
10	7.5	D	X028	3	4	6	7	5	6	10
240V ac, Three-Phase Drive Enclosure Selection										
0.5	0.33	A	B2P2	1	4	5	5	4	5	5
1.0	0.75	A	B4P2	1	4	5	5	4	5	6
2.0	1.5	B	B6P8	1	4	5	6	4	5	7
3.0	2.0	B	B9P6	1	4	5	6	4	5	7
5.0	3.0	C	B015	2	4	5	6	5	5	8
7.5	5.0	D	B022	3	4	6	7	5	6	9
10	7.5	D	B028	3	4	6	7	5	6	10
480V ac, Three-Phase Drive Enclosure Selection										
0.5	0.33	A	D1P1	1	4	5	5	4	5	5
1.0	0.75	A	D2P1	1	4	5	5	4	5	5
2.0	1.5	A	D3P4	1	4	5	5	4	5	6
3.0	2.0	B	D5P0	1	4	5	6	4	5	7
5.0	3.0	B	D8P0	1	4	5	6	4	5	7
7.5	5.0	C	D011	2	4	5	6	4	5	8
10	7.5	C	D014	2	4	5	6	5	5	8
15	10	D	D022	3	4	6	7	5	6	10
20	15	D	D027	3	4	6	7	5	6	10
600V ac, Three-Phase Drive Enclosure Selection										
0.5	0.33	A	E0P9	1	4	5	5	4	5	5
1.0	0.75	A	E1P7	1	4	5	5	4	5	5
2.0	1.0	A	E2P7	1	4	5	5	4	5	6
3.0	1.5	B	E3P9	1	4	5	6	4	5	7
5.0	3.0	B	E6P1	1	4	5	6	4	5	7
7.5	5.0	C	E9P0	2	4	5	6	4	5	8
10	7.5	C	E011	2	4	5	6	5	5	8
15	10	D	E017	3	4	6	7	5	6	10
20	15	D	E022	3	4	6	7	5	6	10

✶ Drive in-a-box includes viewing window as standard, flange mount drive, drive mounted HIM and drive mounted comm. Indoor only.
❄ Includes flange mount drive, drive mounted options or door mounted HIM and one drive input option (-CB, DS, FB or NP). No viewing window is provided. Indoor only.
‡ Same as footnote ❄ plus all options, less line reactor.
§ Same as footnote ❄ plus all options.
♣ Includes flange mount drive, drive mounted options and one drive input option (-CB, DS, FB or NP). No viewing window or door mounted HIM provided. Outdoor.
➤ Same as footnote ♣ plus all options, less line reactor.
⌘ Same as footnote ♣ plus all options.

PowerFlex 70 Configured Drive Enclosure Dimensions

Style	Dimensions	
	mm	in
1	457.2 x 304.8 x 304.8	18 x 12 x 12
2	457.2 x 406.4 x 304.8	18 x 16 x 12
3	558.8 x 406.4 x 304.8	22 x 16 x 12
4	812.8 x 330.2 x 304.8	32 x 13 x 12
5	812.8 x 609.6 x 406.4	32 x 24 x 16
6	965.2 x 609.6 x 406.4	38 x 24 x 16
7	1270.0 x 609.6 x 406.4	50 x 24 x 16
8	1117.6 x 914.4 x 406.4	44 x 36 x 16
9	1270.0 x 914.4 x 406.4	50 x 36 x 16
10	1574.8 x 914.4 x 406.4	62 x 36 x 16

Option Selection Reference Guide

Option	Must Be Used With...	Cannot Be Used With...
Any Base Drive	(1) of a -H0, H1, H2, H3, H4, H5, C3 or C5 and one of an -AA1, AA2, AA3, AF or AH.	
-AA1 -AA2 -AA3	-CB, DS, FB or NP -CB, DS, FB or NP -CB, DS, FB or NP	-AA2, AA3, AF, AH, C3, C5 -AA1, AA3, AF, AH, C3, C5 -AA1, AA2, AF, AH, C3, C5
-AF -AH	-CB, DS, FB or NP	-AA1, AA2, AA3, AH -AA1, AA2, AA3, AF, C3, C5
-BA -BM1 -BM2 -BR -CB -CF	-JF, BM1 or BM2	-AA1, KM* -AA1, BM2, KM, LQH, LRH* -AA1, BM1, KM, LQN, LRN* 600V AC -DS, FB, NP, 600V AC NEMA Type 1 -AA1*
-C3 -C5		-AA1, AA2, AA3, AH, C5, H0, H1, H2, H3, H4, H5 -AA1, AA2, AA3, AH, C3, H0, H1, H2, H3, H4, H5
-DS		-CB, FB, NP
-D1A		-AA1*
-D2A -D2B -D2C -D2D	Maximum of two -D2x options	-AA1* -AA1* -AA1* -AA1*
-D3A		-AA1*
-D4A -D4B	-BM1 or BM2 -BA	-AA1, BA* -AA1*
-D5A -D6A	-BA or BM1 or BM2	-AA1 -AA1
-ET		*
-FASP -FB		 -CB, DS, NP
-GC -GD -GDN2 -GP -GR		-GI, GD, GP, GR -AA1, GC, GI, GP, GR -AA1* -GC, GD, GI, GR -AA1, GC, GD, GI, GP
-H0 -H1 -H2 -H3 -H4 -H5		-C3, C5, H1, H2, H3, H4, H5 -C3, C5, H0, H2, H3, H4, H5 -C3, C5, H0, H1, H3, H4, H5 -C3, C5, H0, H1, H2, H4, H5 -C3, C5, H0, H1, H2, H3, H5 -C3, C5, H0, H1, H2, H3, H4
-JC -JF -JM -JR -JT		-AA1* -AA1* -AA1* -AA1* -AA1*
-KD -KM	 -JF	-AA1* -AA1, BA, BM1, BM2*
-LQH -LQN -LRH -LRN		-AA1, BM1, LRH, LRN* -AA1, BM2, LRH, LRN* -AA1, BM1, LQH, LQN* -AA1, BM2, LQH, LQN*
-ME -MH	-JR -JR	-AA1* -AA1*
-N1 -N2 -N3 -NP		-AA1* -AA1* -AA1* -CB, DS, FB
-PR1 -PR2		-AA1* -AA1*

* Can not be used with specific AF or AH options.

PowerFlex 700 AC Drive

Contents

Conformity to Standards

The PowerFlex 700 conforms to the following:

Conformity to:	Standard Product	Packaged Product
UL Listed	✓	See page 100
CSA Certified (c-UL)	✓	
IEC (Designed to Meet)	✓	
CE Approved	✓	
C-Tick	✓	

Drive Description

The PowerFlex 700 AC drive offers a flexible package of power, control and operator interface to meet the demands for space, flexibility and performance. The many features allow the user to easily configure the drive for most application needs including TorqProve™ which automates torque and brake proving thereby simplifying many lifting applications. Available ratings include: 0.5 to 100 Hp at 240V ac, 0.5 to 200 Hp at 480V ac, 1 to 150 Hp at 600V ac and 45 to 132 kW at 690V ac.

PowerFlex 700 AC drives are configurable for Volts-per-Hertz, Sensorless Vector and Vector Control with Force Technology™ to meet all application needs. This control is housed in a separately removable cassette which is the same for all drive ratings, simplifying installation and maintenance for the entire product line. I/O is available as 24V dc or 120V ac and an encoder interface option is also available.

Catalog Number Explanation

Position

1-3	*4*	*5-7*	*8*	*9*	*10*	*11*	*12*	*13*	*14*	*15*	*16*	*17-18*	*19-20*
20B	D	2P1	A	3	A	Y	N	A	R	C	0	NN	AD
a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*

a

Drive	
Code	**Type**
20B	PowerFlex 700

b

Voltage Rating			
Code	**Voltage**	**Ph.**	**Prechg.**
B	240V ac	3	-
C	400V ac	3	-
D	480V ac	3	-
E	600V ac	3	-
F	690V ac ⌘	3	-
H	540V dc ⌘	-	N
J	650V dc ⌘	-	N
P	540V dc ⌘	-	Y
R	650V dc ⌘	-	Y

⌘ Frames 5 & 6 Only.

c1

ND Rating			
208/240V, 60 Hz Input			
Code	**208V Amps**	**240V Amps**	**Hp**
2P2	2.5	2.2	0.5
4P2	4.8	4.2	1.0
6P8	7.8	6.8	2.0
9P6	11	9.6	3.0
015	17.5	15.3	5.0
022	25.3	22	7.5
028	32.2	28	10
042	48.3	42	15
052	56	52	20
070	78.2	70	25
080	92	80	30
104	120	104	40
130	130	130	50
154	177	154	60
192	221	192	75
260	260	260	100

c2

ND Rating		
400V, 50 Hz Input		
Code	**Amps**	**kW**
1P3	1.3	0.37
2P1	2.1	0.75
3P5	3.5	1.5
5P0	5.0	2.2
8P7	8.7	4.0
011	11.5	5.5
015	15.4	7.5
022	22	11
030	30	15
037	37	18.5
043	43	22
056	56	30
072	72	37
085	85	45
105	105	55
140	140	75
170	170	90
260	260	132

c3

ND Rating		
480V, 60 Hz Input		
Code	**Amps**	**Hp**
1P1	1.1	0.5
2P1	2.1	1.0
3P4	3.4	2.0
5P0	5.0	3.0
8P0	8.0	5.0
011	11	7.5
014	14	10
022	22	15
027	27	20
034	34	25
040	40	30
052	52	40
065	65	50
077	77	60
096	96	75
125	125	100
156	156	125
180	180	150
248	248	200

c4

ND Rating		
600V, 60 Hz Input		
Code	**Amps**	**Hp**
1P7	1.7	1.0
2P7	2.7	2.0
3P9	3.9	3.0
6P1	6.1	5.0
9P0	9.0	7.5
011	11	10
017	17	15
022	22	20
027	27	25
032	32	30
041	41	40
052	52	50
062	62	60
077	77	75
099	99	100
125	125	125
144	144	150

c5

ND Rating		
690V, 50 Hz Input		
Code	**Amps**	**kW**
052	52	45
060	60	55
082	82	75
098	98	90
119	119	110
142	142	132

d

Enclosure	
Code	**Enclosure**
A	IP21, NEMA Type 1
F	Flange Mount Front - IP20/NEMA Type Open Back/Heatsink - IP54/NEMA Type 12
G	Stand-Alone/Wall Mount IP54, NEMA Type 12

e

HIM	
Code	**Operator Interface**
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
4	Analog LCD
5	Prog. Only LCD
J ➤	Door Mount, IP66/NEMA Type 12 Full Numeric LCD HIM
K ➤	Door Mount, IP66/NEMA Type 12 Prog. Only LCD HIM

➤ Only available with Stand-Alone IP54 drives.

f

Documentation	
Code	**Type**
A	User Manual
N	No Manual

g

Brake	
Code	**w/Brake IGBT ❄**
Y	Yes
N	No

❄ Brake IGBT is standard on Frames 0-3 and optional on Frames 4-6.

h

Brake Resistor	
Code	**w/Resistor**
Y	Yes ✶
N	No

✶ Not available for Frame 3 drives or larger.

i

Emission		
Code	**CE Filter ‡**	**CM Choke**
A	Yes	Yes
B	Yes	No

‡ Note: CE Certification testing has not been performed on 600V class drives below 77 Amps.

j

Comm Slot	
Code	**Version**
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
R	RIO
S	RS-485
N	None

k

I/O		
Code	**Control**	**I/O Volts**
A	Std.	24V dc/ac
B	Std.	115V ac
C	Vector ♣	24V dc
D	Vector ♣	115V ac
N	Std.	None

♣ Vector Control Option utilizes DPI Only.

l

Feedback	
Code	**Type**
0	None
1	Encoder, 12V

m

Future Use

n

Custom Firmware	
Code	**Type**
AD ➤	60 Hz Maximum

➤ Must be used with Vector Control option C or D (Position k). Postions m-n are only required when custom firmware is supplied.

Standard Drives Selection

Wall Mount - IP21, NEMA Type 1 *(Position d = A)*

208/240V ac, Three-Phase Drives

240V ac Input ✶					208V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
2.2	2.4	3.3	0.5	0.33	2.5	2.8	3.8	0.37	—	20BB2P2A0AYNBNC0	0
4.2	4.8	6.4	1	0.75	4.8	5.6	7	0.75	0.37	20BB4P2A0AYNBNC0	0
6.8	9	12	2	1.5	7.8	10.4	13.8	1.5	0.75	20BB6P8A0AYNBNC0	1
9.6	10.6	14.4	3	2	11	12.1	17	2.2	1.5	20BB9P6A0AYNBNC0	1
15.3	16.8	23	5	3	17.5	19.3	26.3	4	2.2	20BB015A0AYNBNC0	1
22	24.2	33	7.5	5	25.3	27.8	38	5.5	4	20BB022A0AYNBNC0	1
28	33	44	10	7.5	32.2	38	50.6	7.5	5.5	20BB028A0AYNBNC0	2
42	46.2	63	15	10	48.3	53.1	72.5	11	7.5	20BB042A0AYNBNC0	3
52	63	80	20	15	56	64	86	15	11	20BB052A0AYNBNC0	3
70	78	105	25	20	78.2	86	117.3	18.5	15	20BB070A0ANNANC0	4
80	105	136	30	25	92	117.3	156.4	22	18.5	20BB080A0ANNANC0	4
104 (80) ❄	115 (120)	175 (160)	40	30	120 (92)	132 (138)	175 (175)	30	22	20BB104A0ANNANC0	5
130 (104) ❄	143 (156)	175 (175)	50	40	130 (104)	143 (156)	175 (175)	37	30	20BB130A0ANNANC0	5
154 (130) ❄	169 (195)	231 (260)	60	50	177 (150)	195 (225)	266 (300)	45	37	20BB154A0ANNANC0	6
192 (154) ❄	211 (231)	288 (308)	75	60	221 (177)	243 (266)	308 (308)	55	45	20BB192A0ANNANC0	6
260 (205) ❄	286 (305)	390 (410)	100	75	260 (205)	286 (305)	390 (410)	66	55	20BB260A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input						
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
1.1	1.2	1.6	0.5	0.33	1.3	1.4	1.9	0.37	0.25	20BD1P1A0AYNANC0	0
2.1	2.4	3.2	1	0.75	2.1	2.4	3.2	0.75	0.55	20BD2P1A0AYNANC0	0
3.4	4.5	6	2	1.5	3.5	4.5	6	1.5	0.75	20BD3P4A0AYNANC0	0
5	5.5	7.5	3	2	5	5.5	7.5	2.2	1.5	20BD5P0A0AYNANC0	0
8	8.8	12	5	3	8.7	9.9	13.2	4	2.2	20BD8P0A0AYNANC0	0
11	12.1	16.5	7.5	5	11.5	13	17.4	5.5	4	20BD011A0AYNANC0	0
14	16.5	22	10	7.5	15.4	17.2	23.1	7.5	5.5	20BD014A0AYNANC0	1
22	24.2	33	15	10	22	24.2	33	11	7.5	20BD022A0AYNANC0	1
27	33	44	20	15	30	33	45	15	11	20BD027A0AYNANC0	2
34	40.5	54	25	20	37	45	60	18.5	15	20BD034A0AYNANC0	2
40	51	68	30	25	43	56	74	22	18.5	20BD040A0AYNANC0	3
52	60	80	40	30	56	64	86	30	22	20BD052A0AYNANC0	3
65	78	104	50	40	72	84	112	37	30	20BD065A0AYNANC0	3
77 (65) ❄	85 (98)	116 (130)	60	50	85 (72) ➤	94 (108)	128 (144)	45	37	20BD077A0ANNANC0	4
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	20BD096A0ANNANC0	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	20BD125A0ANNANC0	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	20BD156A0ANNANC0	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) ✦	220 (255)	289 (313)	110	90	20BD180A0ANNANC0	6
248 (180) ❄➤	273 (270)	372 (360)	200	150	260 (205) ➤	286 (308)	390 (410)	132	110	20BD248A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 4, 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
➤ Rating is limited to 45°C surrounding air.
✦ Rating is limited to 40°C surrounding air.

600…690V ac, Three-Phase Drives

600V ac Input ✶					690V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
1.7	2	2.6	1	0.5	-	-	-	-	-	20BE1P7A0AYNANC0	0
2.7	3.6	4.8	2	1	-	-	-	-	-	20BE2P7A0AYNANC0	0
3.9	4.3	5.9	3	2	-	-	-	-	-	20BE3P9A0AYNANC0	0
6.1	6.7	9.2	5	3	-	-	-	-	-	20BE6P1A0AYNANC0	0
9	9.9	13.5	7.5	5	-	-	-	-	-	20BE9P0A0AYNANC0	0
11	13.5	18	10	7.5	-	-	-	-	-	20BE011A0AYNANC0	1
17	18.7	25.5	15	10	-	-	-	-	-	20BE017A0AYNANC0	1
22	25.5	34	20	15	-	-	-	-	-	20BE022A0AYNANC0	2
27	33	44	25	20	-	-	-	-	-	20BE027A0AYNANC0	2
32	40.5	54	30	25	-	-	-	-	-	20BE032A0AYNANC0	3
41	48	64	40	30	-	-	-	-	-	20BE041A0AYNANC0	3
52	61.5	82	50	40	-	-	-	-	-	20BE052A0AYNANC0	3
62	78	104	60	50	-	-	-	-	-	20BE062A0ANNANC0	4
77 (63) ❄	85 (94)	116 (126)	75	60	82 (60)	90 (90)	120 (123)	75	55	20BE077A0ANNANC0	5
99 (77) ❄✦	109 (116)	126 (138)	100	75	98 (82) ✦	108 (123)	127 (140)	90	75	20BE099A0ANNANC0	5
125 (99) ❄	138 (149)	188 (198)	125	100	119 (98)	131 (147)	179 (196)	110	90	20BE125A0ANNANC0	6
144 (125) ❄	158 (188)	216 (250)	150	125	142 (119)	156 (179)	213 (238)	132	110	20BE144A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
✦ Rating is limited to 40°C surrounding air.

325V dc Input Drives

325V dc Input ✶					280V dc Input					DC Pre-charge	IP20, NEMA Type 1	Frame Size
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW		Cat. No.	
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
104 (80)❄	115 (120)	175 (160)	40	30	120 (92)	132 (138)	175 (175)	30	22	Y	20BN104A0ANNANC0	5
130 (104)❄	143 (156)	175 (175)	50	40	130 (104)	143 (156)	175 (175)	37	30	Y	20BN130A0ANNANC0	5
154 (130)❄	169 (195)	231 (260)	60	50	177 (150)	195 (225)	266 (300)	45	37	Y	20BN154A0ANNANC0	6
192 (154)❄	211 (231)	288 (308)	75	60	221 (177)	243 (266)	308 (308)	55	45	Y	20BN192A0ANNANC0	6
260 (205)❄	286 (305)	390 (410)	100	75	260 (205)	286 (305)	390 (410)	66	55	Y	20BN260A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

650V dc Input Drives

650V dc Input ✶					540V dc Input					DC Pre-charge	IP20, NEMA Type 1	Frame Size
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW		Cat. No.	
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
96 (77)❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	N	20BJ096A0ANNANC0	5
96 (77)❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	Y	20BR096A0ANNANC0	5
125 (96)❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	N	20BJ125A0ANNANC0	5
125 (96)❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	Y	20BR125A0ANNANC0	5
156 (125)❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	N	20BJ156A0ANNANC0	6
156 (125)❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	Y	20BR156A0ANNANC0	6
180 (156)❄	198 (234)	270 (312)	150	125	205 (170)✦	220 (255)	289 (313)	110	90	N	20BJ180A0ANNANC0	6
180 (156)❄	198 (234)	270 (312)	150	125	205 (170)✦	220 (255)	289 (313)	110	90	Y	20BR180A0ANNANC0	6
248 (180)❄➤	273 (270)	372 (360)	200	150	260 (205)➤	286 (308)	390 (410)	132	110	N	20BJ248A0ANNANC0	6
248 (180)❄➤	273 (270)	372 (360)	200	150	260 (205)➤	286 (308)	390 (410)	132	110	Y	20BR248A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
✦ Rating is limited to 40°C surrounding air.

810V dc Input Drives

810V dc Input ✶					690V dc Input						IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	DC Pre-charge	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
99 (77)❄✦	109 (116)	126 (138)	100	75	98 (82)✦	108 (123)	127 (140)	90	75	Y	20BT099A0ANNANC0	5
144 (125)❄	158 (188)	216 (250)	150	125	142 (119)	156 (179)	213 (238)	132	110	Y	20BT144A0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
✦ Rating is limited to 40°C surrounding air.

Flange Mount
Front = IP20, NEMA Type Open, Back/Heatsink = IP54, NEMA Type 12 *(Position d = F)*

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input						
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	20BD096F0ANNANC0	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	20BD125F0ANNANC0	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	20BD156F0ANNANC0	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) ✦	220 (255)	289 (313)	110	90	20BD180F0ANNANC0	6
248 (180) ❄➤	273 (270)	372 (360)	200	150	260 (205) ➤	286 (308)	390 (410)	132	110	20BD248F0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
➤ Rating is limited to 45°C surrounding air.
✦ Rating is limited to 40°C surrounding air.

Stand-Alone/Wall Mount - IP54, NEMA Type 12 *(Position d = G)*

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input						
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	20BD096G0ANNANC0	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	20BD125G0ANNANC0	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	20BD156G0ANNANC0	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) ✦	220 (255)	289 (313)	110	90	20BD180G0ANNANC0	6
248 (180) ❄➤	273 (270)	372 (360)	200	150	260 (205) ➤	286 (308)	390 (410)	132	110	20BD248G0ANNANC0	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
➤ Rating is limited to 45°C surrounding air.
✦ Rating is limited to 40°C surrounding air.

User Installed Options

Human Interface and Wireless Interface Modules

No HIM (Blank Plate)
20-HIM-A0

LCD Digital Speed
20-HIM-A2

LCD Full Numeric
20-HIM-A3

LCD Programmer Only
20-HIM-A5

DPI NEMA 1 WIM
20-WIM-N1

Remote (Panel Mount)
Full Numeric
20-HIM-C3

Remote (Panel Mount)
Full Numeric
20-HIM-C3S

Remote (Panel Mount)
Programmer Only
20-HIM-C5

Remote (Panel Mount)
Programmer Only
20-HIM-C5S

DPI NEMA 4 WIM
Remote (Panel Mount)
20-WIM-N4S

Human Interface and Wireless Interface Modules (cont.)

Description	Handheld/Local (Drive Mount) Cat. No.	Remote (Panel Mount) IP66, UL Type 4x/12 ✶ Cat. No.
No HIM (Blank Plate)	20-HIM-A0	–
LCD Display, Digital Speed	20-HIM-A2	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3❄
		20-HIM-C3S‡
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5❄
		20-HIM-C5S‡
DPI NEMA 1 WIM	20-WIM-N1	–
DPI NEMA 4 WIM	–	20-WIM-N4S

✶ For indoor use only.
❄ Includes a PowerFlex HIM Interface Cable (20-HIM-H10).
‡ Includes a 1202-C30 interface cable (3 meters) for connection to drive.

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA 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
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).

Control Cassette Option Kits

Control with I/O	Cat. No.
Standard Control (No I/O)	20B-STD-N
Standard Control with 24V dc/ac	20B-STD-A0
Standard Control with 115V ac	20B-STD-B0
Vector Control (Series B) with 24V dc ✦	20B-VECTB-C0
Vector Control (Series B) with 115V ac ✦	20B-VECTB-D0

✦ Vector Control option utilizes DPI Only.

Encoder Option Kit (Vector Control Only)

Description	Cat. No.
12V Encoder	20B-ENC-1

I/O Option Kit (Standard Control Only)

Description	Cat. No.
24V dc/ac	20-DA1-A0
115V ac	20-DA1-B0

Communication Option Kits

Description	Cat. No.
ControlNet Communication Adapter (Coax)	20-COMM-C
DeviceNet Communication Adapter	20-COMM-D
EtherNet/IP Communication Adapter	20-COMM-E
HVAC Communication Adapter❖	20-COMM-H
Interbus Communication Adapter	20-COMM-I
LonWorks Communication Adapter♠	20-COMM-L
PROFIBUS DP Communication Adapter	20-COMM-P
ControlNet Communication Adapter (Fiber)	20-COMM-Q
Remote I/O Communication Adapter	20-COMM-R
RS-485 DF1 Communication Adapter	20-COMM-S
External Comms Power Supply	20-XCOMM-AC-PS1
External DPI Communications Kit	20-XCOMM-DC-BASE
External DPI I/O Option Board✦	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

✦ For use only with External DPI Communications Kits 20-XCOMM-DC-BASE.
❖ Only ModBus RTU can be used with Vector Control.
♠ Can only be used with Standard Control.

Internal Dynamic Brake Resistor Kits

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Brake Resistance Ω	Frame	Cat. No.
208…240V ac	62	0	20BB-DB1-0
	62	1 (2…5 Hp)	20BB-DB1-1
	22	1 (7.5 Hp)	20BB-DB2-1
	22	2	20BB-DB1-2
380…480V ac	115	0	20BD-DB1-0
	115	1	20BD-DB1-1
	68	2	20BD-DB1-2

Isolation Transformers

Motor Rating kW (Hp)	240V, 60 Hz, Three-Phase, 240V Primary & 240V Secondary IP32 (NEMA Type 3R) Cat. No.	460V, 60 Hz, Three-Phase, 460V Primary & 460V Secondary IP32 (NEMA Type 3R) Cat. No.	575V, 60 Hz, Three-Phase 575V Primary & 575V Secondary IP32 (NEMA Type 3R) Cat. No.
0.25 (0.33)	1321-3TW005-AA	1321-3TW005-BB	–
0.37 (0.5)	1321-3TW005-AA	1321-3TW005-BB	–
0.55 (0.75)	1321-3TW005-AA	1321-3TW005-BB	–
0.75 (1.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
1.1 (1.5)	1321-3TW005-AA	1321-3TW005-BB	–
1.5 (2.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
2.2 (3.0)	1321-3TW005-AA	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-AA	1321-3TW040-BB	1321-3TW040-CC
30 (40)	1321-3TW051-AA	1321-3TW051-BB	1321-3TW051-CC
37 (50)	1321-3TH063-AA	1321-3TH063-BB	1321-3TH063-CC
45 (60)	1321-3TH075-AA	1321-3TH075-BB	1321-3TH075-CC
55 (75)	1321-3TH093-AA	1321-3TH093-BB	1321-3TH093-CC
75 (100)	–	1321-3TH118-BB	1321-3TH118-CC
90 (125)	–	1321-3TH145-BB	1321-3TH145-CC
110 (150)	–	1321-3TH175-BB	1321-3TH175-CC
149 (200)	–	1321-3TH220-BB	–

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BB2P2	Heavy Duty	0.33	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20BB2P2	Normal Duty	0.5	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20BB4P2	Heavy Duty	0.75	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20BB4P2	Normal Duty	1	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20BB6P8	Heavy Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-A	1321-3RA8-A
20BB6P8	Normal Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R8-A	1321-3RA8-A
20BB9P6	Heavy Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R12-A	1321-3RA12-A
20BB9P6	Normal Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R12-A	1321-3RA12-A
20BB015	Heavy Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R18-A	1321-3RA18-A
20BB015	Normal Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R18-A	1321-3RA18-A
20BB022	Heavy Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R25-A	1321-3RA25-A
20BB022	Normal Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R25-A	1321-3RA25-A
20BB028	Heavy Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R35-A	1321-3RA35-A
20BB028	Normal Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R35-A	1321-3RA35-A
20BB042	Heavy Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R45-A	1321-3RA45-A
20BB042	Normal Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R45-A	1321-3RA45-A
20BB052	Heavy Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R55-A	1321-3RA55-A
20BB052	Normal Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R55-A	1321-3RA55-A
20BB070	Heavy Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R80-A	1321-3RA80-A
20BB070	Normal Duty	25	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20BB080	Heavy Duty	25	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20BB080	Normal Duty	30	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20BB104	Heavy Duty	30	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20BB104	Normal Duty	40	1321-3R100-A	1321-3RA100-A	1321-3R100-A	1321-3RA100-A
20BB130	Heavy Duty	40	1321-3R100-A	1321-3RA100-A	1321-3R100-A	1321-3RA100-A
20BB130	Normal Duty	50	1321-3R130-A	1321-3RA130-A	1321-3R130-A	1321-3RA130-A
20BB154	Heavy Duty	50	1321-3R130-A	1321-3RA130-A	1321-3R130-A	1321-3RA130-A
20BB154	Normal Duty	60	1321-3R160-A	1321-3RA160-A	1321-3R160-A	1321-3RA160-A
20BB192	Heavy Duty	60	1321-3R160-A	1321-3RA160-A	1321-3R160-A	1321-3RA160-A
20BB192	Normal Duty	75	1321-3R200-A	1321-3RA200-A	1321-3R200-A	1321-3RA200-A
20BB260	Heavy Duty	75	1321-3R200-A	1321-3RA200-A	1321-3R200-A	1321-3RA200-A
20BB260	Normal Duty	100	1321-3RB250-A	1321-3RAB250-A	1321-3RB250-A	1321-3RAB250-A

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BB2P2	Heavy Duty	0.33	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20BB2P2	Normal Duty	0.5	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20BB4P2	Heavy Duty	0.75	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20BB4P2	Normal Duty	1	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20BB6P8	Heavy Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20BB6P8	Normal Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20BB9P6	Heavy Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20BB9P6	Normal Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20BB015	Heavy Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20BB015	Normal Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20BB022	Heavy Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20BB022	Normal Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20BB028	Heavy Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R35-B	1321-3RA35-B
20BB028	Normal Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20BB042	Heavy Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20BB042	Normal Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20BB052	Heavy Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20BB052	Normal Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20BB070	Heavy Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20BB070	Normal Duty	25	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BB080	Heavy Duty	25	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BB080	Normal Duty	30	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BB104	Heavy Duty	30	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BB104	Normal Duty	40	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BB130	Heavy Duty	40	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BB130	Normal Duty	50	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BB154	Heavy Duty	50	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BB154	Normal Duty	60	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20BB192	Heavy Duty	60	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20BB192	Normal Duty	75	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
20BB260	Heavy Duty	75	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
20BB260	Normal Duty	100	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BD1P1	Heavy Duty	0.33	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20BD1P1	Normal Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20BD2P1	Heavy Duty	0.75	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20BD2P1	Normal Duty	1	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20BD3P4	Heavy Duty	1.5	1321-3R4-C	1321-3RA4-C	1321-3R4-B	1321-3RA4-B
20BD3P4	Normal Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20BD5P0	Heavy Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R8-C	1321-3RA8-C
20BD5P0	Normal Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20BD8P0	Heavy Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-B	1321-3RA8-B
20BD8P0	Normal Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20BD011	Heavy Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20BD011	Normal Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20BD014	Heavy Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20BD014	Normal Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20BD022	Heavy Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20BD022	Normal Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20BD027	Heavy Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20BD027	Normal Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R25-B	1321-3RA25-B
20BD034	Heavy Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20BD034	Normal Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20BD040	Heavy Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20BD040	Normal Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20BD052	Heavy Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20BD052	Normal Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20BD065	Heavy Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20BD065	Normal Duty	50	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BD077	Heavy Duty	50	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BD077	Normal Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BD096	Heavy Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BD096	Normal Duty	75	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BD125	Heavy Duty	75	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BD125	Normal Duty	100	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BD156	Heavy Duty	100	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BD156	Normal Duty	125	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20BD180	Heavy Duty	125	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20BD180	Normal Duty	150	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
20BD248	Heavy Duty	150	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
20BD248	Normal Duty	200	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BD1P1	Heavy Duty	0.33	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20BD1P1	Normal Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20BD2P1	Heavy Duty	0.75	1321-3R2-C	1321-3RA2-C	1321-3R2-B	1321-3RA2-B
20BD2P1	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20BD3P4	Heavy Duty	1.5	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20BD3P4	Normal Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20BD5P0	Heavy Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20BD5P0	Normal Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20BD8P0	Heavy Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-C	1321-3RA8-C
20BD8P0	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20BD011	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20BD011	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20BD014	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20BD014	Normal Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20BD022	Heavy Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R25-C	1321-3RA25-C
20BD022	Normal Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20BD027	Heavy Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20BD027	Normal Duty	20	1321-3R35-C‡	1321-3RA35-C‡	1321-3R25-C	1321-3RA25-C
20BD034	Heavy Duty	20	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C	1321-3RA35-C
20BD034	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20BD040	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R45-C	1321-3RA45-C
20BD040	Normal Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20BD052	Heavy Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20BD052	Normal Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
20BD065	Heavy Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R80-C	1321-3RA80-C
20BD065	Normal Duty	50	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BD077	Heavy Duty	50	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BD077	Normal Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BD096	Heavy Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BD096	Normal Duty	75	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20BD125	Heavy Duty	75	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20BD125	Normal Duty	100	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
20BD156	Heavy Duty	100	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
20BD156	Normal Duty	125	1321-3R160-C	1321-3RA160-C	1321-3R160-C	1321-3RA160-C
20BD180	Heavy Duty	125	1321-3R160-C	1321-3RA160-C	1321-3R160-C	1321-3RA160-C
20BD180	Normal Duty	150	1321-3R200-C	1321-3RA200-C	1321-3R200-C‡	1321-3RA200-C‡
20BD248	Heavy Duty	150	1321-3R200-C	1321-3RA200-C	1321-3R200-C‡	1321-3RA200-C‡
20BD248	Normal Duty	200	1321-3RB250-C	1321-3RAB250-C	1321-3RB250-C	1321-3RAB250-C

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ 4% impedance.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BE1P7	Heavy Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20BE1P7	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20BE2P7	Heavy Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R4-D	1321-3RA4-D
20BE2P7	Normal Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20BE3P9	Heavy Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-C	1321-3RA4-C
20BE3P9	Normal Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20BE6P1	Heavy Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R8-C	1321-3RA8-C
20BE6P1	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20BE9P0	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20BE9P0	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20BE011	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-B	1321-3RA12-B
20BE011	Normal Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20BE017	Heavy Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20BE017	Normal Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20BE022	Heavy Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20BE022	Normal Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20BE027	Heavy Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R35-C	1321-3RA35-C
20BE027	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20BE032	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-B	1321-3RA35-B
20BE032	Normal Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20BE041	Heavy Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20BE041	Normal Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20BE052	Heavy Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20BE052	Normal Duty	50	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20BE062	Heavy Duty	50	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20BE062	Normal Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BE077	Heavy Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BE077	Normal Duty	75	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BE099	Heavy Duty	75	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20BE099	Normal Duty	100	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BE125	Heavy Duty	100	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20BE125	Normal Duty	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BE144	Heavy Duty	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20BE144	Normal Duty	150	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20BE1P7	Heavy Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20BE1P7	Normal Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R2-C	1321-3RA2-C
20BE2P7	Heavy Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R4-D‡	1321-3RA4-D‡
20BE2P7	Normal Duty	2	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D‡	1321-3RA4-D‡
20BE3P9	Heavy Duty	2	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D	1321-3RA4-D
20BE3P9	Normal Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20BE6P1	Heavy Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20BE6P1	Normal Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20BE9P0	Heavy Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R12-C‡	1321-3RA12-C‡
20BE9P0	Normal Duty	7.5	1321-3R12-C‡	1321-3RA12-C‡	1321-3R12-C‡	1321-3RA12-C‡
20BE011	Heavy Duty	7.5	1321-3R12-C‡	1321-3RA12-C‡	1321-3R12-C	1321-3RA12-C
20BE011	Normal Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20BE017	Heavy Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20BE017	Normal Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20BE022	Heavy Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R25-C‡	1321-3RA25-C‡
20BE022	Normal Duty	20	1321-3R25-C‡	1321-3RA25-C‡	1321-3R25-C‡	1321-3RA25-C‡
20BE027	Heavy Duty	20	1321-3R25-C‡	1321-3RA25-C‡	1321-3R35-C‡	1321-3RA35-C‡
20BE027	Normal Duty	25	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20BE032	Heavy Duty	25	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20BE032	Normal Duty	30	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20BE041	Heavy Duty	30	1321-3R35-C‡	1321-3RA35-C‡	1321-3R45-C	1321-3RA45-C
20BE041	Normal Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20BE052	Heavy Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20BE052	Normal Duty	50	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
20BE062	Heavy Duty	50	1321-3R55-C	1321-3RA55-C	1321-3R80-C	1321-3RA80-C
20BE062	Normal Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BE077	Heavy Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BE077	Normal Duty	75	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BE099	Heavy Duty	75	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20BE099	Normal Duty	100	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20BE125	Heavy Duty	100	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20BE125	Normal Duty	125	1321-3R130-C‡	1321-3RA130-C‡	1321-3R130-C‡	1321-3RA130-C‡
20BE144	Heavy Duty	125	1321-3R130-C‡	1321-3RA130-C‡	1321-3R130-C‡	1321-3RA130-C‡
20BE144	Normal Duty	150	1321-3R160-C‡	1321-3RA160-C‡	1321-3R160-C‡	1321-3RA160-C‡

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ 4% impedance.

Factory Installed Options

Human Interface and Wireless Interface Modules IP20/NEMA Type 1 *(Position e)*

Catalog Code: 0
No HIM (Blank Cover)

Catalog Code: 2
LCD Digital Speed

Catalog Code: 3
LCD Full Numeric

Catalog Code: 5
LCD Programmer Only

Catalog Code: 8
DPI WIM

Catalog Code: J
Door Mounted LCD
Full Numeric
(IP66/NEMA Type 12)

Catalog Code: K
Door Mounted LCD
Programmer Only
(IP66/NEMA Type 12)

Documentation

Description	Cat. Code *(Position f)*
User Manual	A
No User Manual	N

Internal Dynamic Brake Resistors

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Frame	Brake Resistance Ω	Cat. Code *(Position h)*
208…240V ac	0	62	Y
	1 (2…5 Hp)	62	Y
	1 (7.5 Hp)	22	Y
	2	22	Y
380…480V ac	0	115	Y
	1	115	Y
	2	68	Y

Internal Brake IGBT ✶

Drive Input Voltage	Brake IGBT	Frame	Cat. Code *(Position g)*
208…480V ac	Standard	0…3	Y
208…480V ac	Optional	4	Y
208…690V ac	Optional	5	Y
208…690V ac	Optional	6	Y

✶ The Internal Brake IGBT option can not be field installed.

Internal EMC Filter and Common Mode Choke

Drive Input Voltage	Frame	CE Filter	Common Mode Choke	Cat. Code *(Position i)*
208…240V ac	3	with Filter	with Choke	A
208…240V ac	0…3	with Filter	No Choke	B
208…240V ac	4…6	with Filter	with Choke	A
380…480V ac	0…6	with Filter	with Choke	A
600…690V ac	0…6	with Filter❄	with Choke	A

❄ Note: CE Certification testing has not been performed on 600V class drives below 77 Amps.

Internal Communication Adapters

Description	Cat. Code *(Position j)*
ControlNet	C
DeviceNet	D
EtherNet/IP	E
HVAC	H
Remote I/O	R
RS-485 DF1	S

Control and I/O Options

Control	Cat. Code *(Position k)*
Standard Control (Open Loop) - No I/O	N
Standard Control (Open Loop) - 24V dc/ac	A
Standard Control (Open Loop) - 115V ac	B
Vector Control - 24V dc‡♣	C
Vector Control - 115V ac‡♣	D

‡ Vector Control option utilizes DPI Only.
♣ Only Series B Cassettes will ship from the factory after February 1, 2005.

Feedback Options (Vector Control Only)

Description	Cat. Code *(Position l)*
No Encoder	0
12V Encoder➤	1

➤ Encoder option can also be used as a pulse input.

Special Firmware

Description	Cat. Code *(Position m…n)*
60 Hz Maximum	NNAD⌘

⌘ Must be used with Vector Control option C or D (position k) in the catalog string.

Overview

The PowerFlex 700 Packaged Drives Program allows users to create drive packages based on their specific needs. This program enhances stand-a-lone drive functionality through additional control, power and packaging options which are ideal for OEM and end users with special installation needs.

The program has three levels:

- Quick Ship
- Standard Packaged Drives
- Engineered Drives

Quick Ship

Quick Ship products are intended to meet faster than normal delivery requirements. Pre-defined catalog strings are offered to support shipping one to three business days from date of order entry. The current offering is based on NEMA 1 (IP20), 480V, top of frame ratings (frame 0-3). These packages are manufactured the same as those used within the Standard Packaged Drives Program noted below and can be ordered through the order entry system.

Standard Packaged Drives

The Standard Packaged Drives Program allows users to create drive packages based on their specific needs. A complete drive package may be specified by assembling a single catalog number string that includes a base drive and all required options. Packaging is available for 480V requirements in NEMA Type 1(IP20) and NEMA 12 (IP54) Fan and Filter. The program consists of a fully defined catalog string identified within this price sheet. Focused on higher volume, repeat business, the standard designs provide consistent manufacturing and minimizes customer resources by reducing engineering, manufacturing and installation time. Typical delivery is 10-15 business days from order entry and can be ordered through the order entry system.

Engineered Drives

The Engineered Drives Program offers users the ability to create drive packages beyond the Standard Packaged Drives offering. Options may or may not be defined within this publication. Product can be ordered by:

- Assembling a catalog string from the options listed in this publication.
  Engineered options that are listed within this publication will be specified by the heading “Engineered Drives Program Only“ and will have varied lead-times.
- Entering a custom quote request for additional options not listed.
  A custom quote will require a Passport quote using “SP-SDB-CUSTOM” as the line item part number and entering a description of the base catalog string and custom options in the Competitive Summary. For questions or help with a custom quote please contact the Engineered Drives Group at 262-512-8415.

Catalog Number Explanation

Position	1-3	4	5-7	8	9	10	11	12	13	14	15	16	17-18	19-20		22-23
	21B	D	2P1	A	3	A	Y	N	A	R	C	0	NN	NN	-	ND
	a	*b*	*c*	*d*	*e*	*f*	*g*	*h*	*i*	*j*	*k*	*l*	*m*	*n*		*o*

a

Drive

Code	Type
21B	PowerFlex 700

b

Voltage Rating

Code	Voltage	Ph.	Type
D	480V ac	3	SA
B ♣	240V ac	3	SA
E ♣	600V ac	3	SA

♣ Engineered Drives Program Only.

c1

Rating

Output @ 480V, 60 Hz Input

Code	Amps ‡	ND Hp	HD Hp
1P1	1.1	0.5	0.33
2P1	2.1	1.0	0.75
3P4	3.4	2.0	1.5
5P0	5	3.0	2.0
8P0	8	5.0	3.0
011	11	7.5	5.0
014	14	10	7.5
022	22	15	10
027	27	20	15
034	34	25	20
040	40	30	25
052	52	40	30
065	65	50	40
077	77	60	50
096	96	75	60
125	125	100	75
156	156	125	100
180	180	150	125
248	248	200	150

‡ Normal duty continuous amps.

c2

Rating

Engineered Drives Program

Output @ 240V, 60 Hz Input ♣

Code	Amps ‡	ND Hp	HD Hp
2P2	2.2	0.5	0.33
4P2	4.2	1.0	0.75
6P8	6.8	2.0	1.5
9P6	9.6	3.0	2.0
015	15.3	5.0	3.0
022	22	7.5	5.0
028	28	10	7.5
042	42	15	10
052	52	20	15

‡ Normal duty continuous amps.
♣ Engineered Drives Program Only.

d

Enclosure

Code	Enclosure
A	IP 20 (NEMA Type 1)
H	IP 54 (NEMA Type 12) Fan & Filter

e

HIM

Code	Interface Module
3	Drive Mounted Full Numeric LCD HIM (NEMA Type 1/12)
A	Drive Mounted LCD Full Numeric & Door Mounted Bezel w/Blank Cover (NEMA Type 1)
B	Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Digital Speed (NEMA Type 1)
C	Door Mounted Bezel w/LCD Full Numeric (NEMA Type 1)
D	Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Analog Speed (NEMA Type 1)
E	Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Programmer Only (NEMA Type 1)
F	Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Full Numeric (NEMA Type 12)
G	Drive Mounted LCD Full Numeric & Door Mounted Programmer Only (NEMA Type 12)

f

Documentation

Code	Type
A	User Manual (Standard)

g

Brake

Code	w/Brake IGBT ❄
Y	Yes (Std. for 0-3)
N	No (Std. for 4-6)

❄ Brake IGBT is standard on Frames 0-3 and optional on Frame 4-6 drives.

h

Brake Resistor

Code	w/Resistor
Y ✶♣	Yes - Internal
N	No (Standard)

✶ Not available for Frame 3 drives or larger.
♣ Engineered Drives Program Only.

Packaged Drives Programs

i

Emission	
Code	**Rating**
A	Filter w/CM Choke (Std. 480V)
B ♣	Filter wo/CM Choke (Std. 240V)

♣ Engineered Drives Program Only.

j

Comm Slot	
Code	**Version**
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
I	Interbus
P	PROFIBUS
R	RIO
S	RS-485
N	None
H	HVAC
L ♣	LonWorks

♣ Engineered Drives Program Only.

k

I/O		
Code	**Control**	**I/O Volts**
A	Std.	24V dc/ac
B	Std.	115V ac
C	Vector	24V dc
D	Vector	115V ac

l

Feedback	
Code	**Type**
0	None
1	12V Encoder

m

Reserved

n

Special Options	
Code	**Type**
QS	Quick Ship

o

Options	
Code	**Description**
-ND §	Normal Duty
-HD §	Heavy Duty
-B0 §	Bypass Not Required
-B1 §	Manual Bypass
-B2	Auto Bypass
-C1 §	Drive Only Control Power
-C5 §	115V User Supplied Control Power
-E9	Enclosure Nameplate
-G1	Johnson Controls Metasys Interface
-J1	Aux. Contacts, Control Power On
-J2	Aux. Contacts, Drive Fault
-J3	Aux. Contacts, Alarm
-J4	Aux. Contacts, Run
-J5	Aux. Contacts, At Speed
-J6	Programmable Relay A
-J7	Programmable Relay B
-J8	Motor Heater Control
-L1	3% Input Line Reactor
-L2	3% Output Line Reactor
-M3	Motor Run Meter, Drive/Bypass
-N1	Isolated Analog Input, 0-10V DC
-N2	Isolated Analog Input, 4-20 mA
-N3	Isolated Analog Output, 0-10V DC
-N5	Building Mng. Control Interface
-P1 §	No Input Protection
-P2 §	Input Fuses, Drive
-P3 §	Circuit Breaker, Drive
-P4 §	Circuit Breaker, Drive/Bypass Mode
-P6 §	Drive Disconnect Switch
-P7 §	Drive/Bypass Mode Fused Disc.
-P11	Drive Input Contactor
-P12	Drive Output Contactor
-S1	H/O/A S.S. (Start/Stop/Spd. Ref.)
-S9	Run Pilot Light
-S10	Drive Fault Pilot Light
-S11	At Speed Pilot Light
-S12	Drive Alarm Pilot Light
-S13	Control Power On Pilot Light
-S14	Drive & Bypass Mode Pilot Lights
-S15	Bypass Mode & Auto Bypass En. P.L.
-S16	Drive Disable Mushroom P.B.
-S17	Motor Fault Pilot Light

§ Must select either -ND or HD, Bypass option -B0 or B1, Power Disconnecting Means option -P1, P2, P3, P4, P6 or P7, and Control Power option -C1 or C5.

PowerFlex 700 Quick Ship Program

The Quick Ship Program order entry system has been simplified, minimizing the time required to place an order. To enter your order, type in the first 20 characters of the string and the system will complete the rest.

Frame	Normal Duty Hp	Heavy Duty Hp	Type in Cat. No.	Name Plated Cat. No.	Dimensions H x W x D	Weight kg (lb)
0	7.5	5	21BD011A6AYNANB0NNQS	21BD011A6AYNANB0NNQS-ND-B0-C1-J2-J4-P6-S1-S10-S13-S9	813 x 610 x 422 mm (32.0 x 24.0 x 16.6 in.)	102.1 (225)
1	15	10	21BD022A6AYNANB0NNQS	21BD022A6AYNANB0NNQS-ND-B0-C1-J2-J4-P6-S1-S10-S13-S9	813 x 610 x 422 mm (32.0 x 24.0 x 16.6 in.)	102.1 (225)
2	25	20	21BD034A6AYNANB0NNQS	21BD034A6AYNANB0NNQS-ND-B0-C1-J2-J4-P6-S1-S10-S13-S9	965 x 610 x 422 mm (38.0 x 24.0 x 16.6 in.)	102.1 (225)
3	50	40	21BD065A6AYNANB0NNQS	21BD065A6AYNANB0NNQS-ND-B0-C1-J2-J4-P6-S1-S10-S13-S9	965 x 762 x 422 mm (38.0 x 30.0 x 16.6 in.)	127.0 (280)

Note: Consult factory for orders larger than 1 drive per frame size.

PowerFlex 700 Packaged Drives Programs

How to Order

- **Step 1.** Select the basic PowerFlex 700 Drive Catalog Number based on application requirements (i.e. nominal HP, voltage).
- **Step 2.** Specify Options – The following pages list and describe the available options. The listing is divided into simple categories to assist in quickly locating specific needs. Some options are horsepower and/or voltage specific, or will have special rules associated with them – Read all Footnotes.

Example: An application requires a variable speed control for an existing 3 Hp, 480V ac conveyor motor. Both drive and motor will be located in a clean environment. Local control is required for programming, start, stop, speed and emergency stop. Operation across the line (with selection and mode indication at drive) is required. A system disconnect switch should be available. Control power is required.

Description	Cat. No./Option Code	Position
Basic Drive w/IP 20 (NEMA Type 1 Enclosure)	21BD5P0A	a…c
Human Interface Module - LCD (Drive Mounted)	3	e
User Manual	A	f
w/Brake IGBT	Y	g
No Brake Resistor	N	h
Filtered w/Common Mode Choke	A	i
No Communication Module	N	j
115V Vector Control	D	k
No Feedback Option	0	l
Reserved for Future Options	NN	m
Special Options	NN	n
Normal Duty	-ND	p
Bypass, Manual with D/O/B Switch	-B1	
Control Power	-C1	
Drive/Bypass Fused Disconnect Switch	-P7	
Drive & Bypass Mode Pilot Lights	-S14	
“Drive Disable” Pushbutton	-S16	
21BD5P0A3AYNAND0NNNN-ND-B1-C1-P7-S14-S16		

Product Selection

480V ac, Three-Phase Drives

Output Amps			Nominal Ratings			IP20, NEMA Type 1 (less HIM)	IP54, NEMA Type 12 (less HIM) w/Fan & Filter
480V ac Input ✶			Normal Duty	Heavy Duty		Cat. No.	Cat. No.
Cont.	1 Min.	3 Sec.	Hp	Hp	Frame Size	*(Positions b…d)*	*(Positions b…d)*
1.1	1.2	1.6	0.5	0.33	0	21BD1P1A	21BD1P1H
2.1	2.4	3.2	1	0.75	0	21BD2P1A	21BD2P1H
3.4	4.5	6	2	1.5	0	21BD3P4A	21BD3P4H
5	5.5	7.5	3	2	0	21BD5P0A	21BD5P0H
8	8.8	12	5	3	0	21BD8P0A	21BD8P0H
11	12.1	16.5	7.5	5	0	21BD011A	21BD011H
14	16.5	22	10	7.5	1	21BD014A	21BD014H
22	24.2	33	15	10	1	21BD022A	21BD022H
27	33	44	20	15	2	21BD027A	21BD027H
34	40.5	54	25	20	2	21BD034A	21BD034H
40	51	68	30	25	3	21BD040A	21BD040H
52	60	80	40	30	3	21BD052A	21BD052H
65	78	104	50	40	3	21BD065A	21BD065H
77 (65)	85 (98)	116 (130)	60	50	4	21BD077A	21BD077H
96 (77)	106 (116)	144 (154)	75	60	5	21BD096A	21BD096H
125 (96)❄	138 (144)	163 (168)	100	75	5	21BD125A	21BD125H
156 (125)❄	172 (188)	233 (250)	125	100	6	21BD156A	21BD156H
180 (156)❄	198 (234)	270 (312)	150	125	6	21BD180A	21BD180H
248 (180)❄	273 (270)	372 (360)	200	150	6	21BD248A	21BD248H

✶ Base Drive Catalog Number Includes: PowerFlex 700 Drive, User Manual.
❄ Frames 4, 5 & 6 have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

240V ac, Three-Phase Drives

Output Amps			Nominal Ratings			IP20, NEMA Type 1 (less HIM)	IP54, NEMA Type 12 (less HIM) w/Fan & Filter
240V ac Input ✶			Normal Duty	Heavy Duty		Cat. No.	Cat. No.
Cont.	1 Min.	3 Sec.	Hp	Hp	Frame Size	*(Positions b…d)*	*(Positions b…d)*
Engineered Drives Program Only							
2.2	2.4	3.3	0.5	0.33	0	21B2P2A	21B2P2H
4.2	4.8	6.4	1	0.75	0	21B4P2A	21B4P2H
6.8	9	12	2	1.5	1	21B6P8A	21B6P8H
9.6	10.6	14.4	3	2	1	21B9P6A	21B9P6H
15.3	16.8	23	5	3	1	21B015A	21B015H
22	24.2	33	7.5	5	1	21B022A	21B022H
28	33	44	10	7.5	2	21B028A	21B028H
42	46.2	63	15	10	3	21B042A	21B042H
52	63	80	20	15	3	21B052A	21B052H

✶ Base Drive Catalog Number Includes: PowerFlex 700 Drive, User Manual.

Enclosure Dimensions *(Position d)*

Frame			Approximate Dimensions	
NEMA Type 1 Catalog Code "A" without Line Reactors	NEMA Type 1 Catalog Code "A" with Line Reactors	NEMA Type 12 Fan & Filter Catalog Code "H" with or without Line Reactors	H x W x D	Style
0 & 1	-	-	813 x 610 x 422 mm (32.0 x 24.0 x 16.6 in.)	Wall Mount
2	0	0	965 x 610 x 422 mm (38.0 x 24.0 x 16.6 in.)	Wall Mount
3	-	-	965 x 762 x 422 mm (38.0 x 30.0 x 16.6 in.)	Wall Mount
4	-	-	1270 x 762 x 422 mm (50.0 x 30.0 x 16.6 in.)	Wall Mount
-	1 & 2	1 & 2	1118 x 610 x 523 mm (44.0 x 24.0 x 20.6 in.)	Wall Mount
-	3	3	1270 x 762 x 523 mm (50.0 x 30.0 x 20.6 in.)	Wall Mount
-	4	4	1422 x 914 x 622 mm (56.0 x 36.0 x 24.5 in.)	Wall Mount
5	5	5	2200 x 800 x 600 mm (86.6 x 31.5 x 23.6 in.)	Floor Standing
6	6	6	2200 x 1000 x 600 mm (86.6 x 39.5 x 23.6 in.)	Floor Standing

Factory Installed Options

Human Interface Modules (HIM) - *Position e*

Catalog Code: 3
Drive Mounted LCD Full Numeric (NEMA Type 1/12)

Catalog Code: A
Drive Mounted LCD Full Numeric & Door Mounted Bezel w/Blank Cover (NEMA Type 1)

Catalog Code: B
Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Digital Speed (NEMA Type 1)

Catalog Code: C
Door Mounted Bezel w/LCD Full Numeric (NEMA Type 1)

Catalog Code: E
Drive Mounted LCD Full Numeric & Door Mounted Bezel w/LCD Programmer Only (NEMA Type 1)

Catalog Code: F
Drive Mounted LCD Full Numeric & Door Mounted LCD Full Numeric (NEMA Type 12)

Catalog Code: G
Drive Mounted LCD Full Numeric & Door Mounted Programmer Only (NEMA Type 12)

Packaged Drives Programs

Documentation

Description	Cat. Code (Position f)
User Manual (Standard)	A (Std)

Internal Brake IGBT

Frame	Cat. Code (Position g)
0…3	Y (Std)
4…6	N (Std)

Internal Dynamic Brake Resistors

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Frame	Brake Resistance Ω	Cat. Code (Position h)
480V ac	0…2	-	N (Std)
Engineered Drives Program Only			
240V ac	0	62	Y
	1 (2…5 Hp)	62	Y
	1 (7.5 Hp)	22	Y
	2	22	Y
480V ac	0	115	Y
	1	115	Y
	2	68	Y
240V ac	0…2	–	N (Std)

Internal EMC Filter

Drive Input Voltage	Frame	CE Filter	Common Mode Choke	Cat. Code (Position i)
480V ac	0…6	Yes	Yes	A (Std)
Engineered Drives Program Only				
240V ac	0…6	Yes	No	B (Std)

Internal Communication Adapters

Description	Cat. Code (Position j)
ControlNet	C
DeviceNet	D
EtherNet	E
HVAC	H
Interbus	I
No Adapter	N
PROFIBUS	P
Remote I/O	R
RS-485 DF1	S
Engineered Drives Program Only	
LonWorks	L

I/O Options

Description *(One Required)*	Cat. Code (Position k)
Standard 24V dc/ac ✶	A
Standard 115V ac ✶	B
Vector 24V dc ✶❄	C
Vector 115V ac ✶❄	D

✶ Drive input interface only. Other configured options may require option -C1 or user supplied 115V.
❄ Vector Control option utilizes DPI Only.

Feedback Options (Vector Control Only)

Description *(One Required)*	Cat. Code (Position l)
No Encoder	0 (Std)
12V Encoder	1

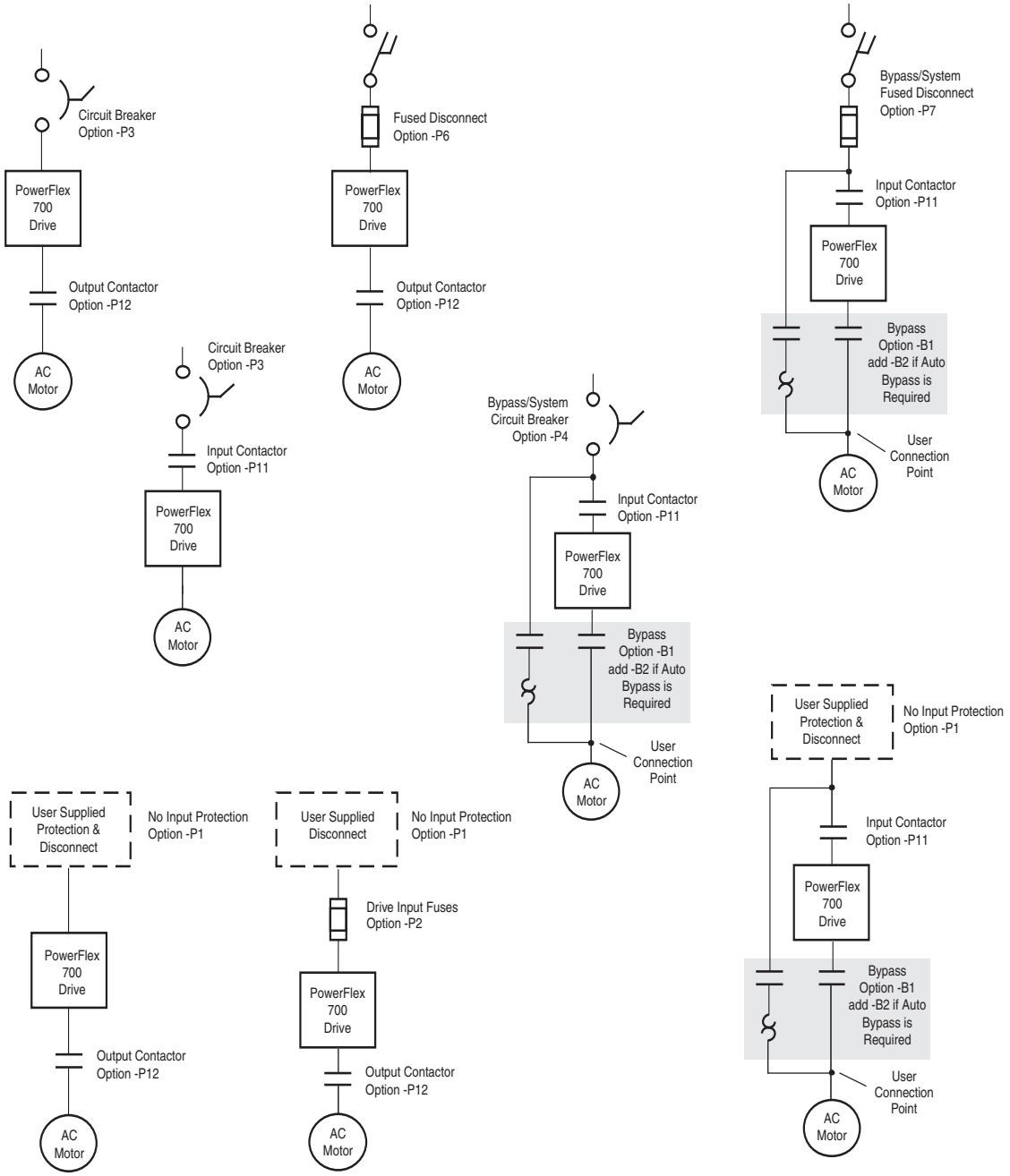
Special Options (Quick Ship Program)

Description *(One Required)*	Cat. Code (Position n)
No Special Option	NN (Std)
Quick Ship	QS

Drive Duty

Description *(One Required)*	Cat. Code (Position p)
Normal Duty	ND
Heavy Duty	HD

Suggested Power Distribution Schemes



Power Disconnecting Means

Important: Customer must select one of the following; -P1, P2, P3, P4, P6 or -P7. If option -P1 is selected, power disconnecting means and drive branch circuit protection must be supplied by user.

Description	Option Code
No Input Protection	-P1
Drive Input Fuses	-P2 ✶
Drive Circuit Breaker	-P3 ✶
Drive Bypass Mode, Circuit Breaker	-P4 ❄
Drive Disconnect Switch, Fused	-P6 ✶
Drive Bypass Mode, Fused Disconnect	-P7 ❄

✶ This option can not be used with Bypass.
❄ This option must be used in conjunction with a Bypass Option.

Power and Bypass Options

Description	Option Code
Contactor, Drive Input	-P11 ‡⌘
Contactor, Drive Output	-P12 ‡§⌘
No Bypass Required	-B0 ✦
Manual Bypass	-B1 ♣⌘✦
Automatic Bypass	-B2 ♣➤

‡ Either an input contactor or output contactor may be chosen, but not both when Bypass is selected.
§ This option must be used in conjunction with the Auxiliary Fault Contact option -J2.
♣ Includes a Class 10 Adjustable Thermal Overload Relay that does not require separate heater elements.
➤ This option includes "Drive-Off-Bypass" selector switch and must be used in conjunction with the Auxiliary Fault Contact option (-J2). Also requires option -B1.
⌘ Requires option -C1 or user supplied 115V (option -C5).
✦ B0 or B1 must be selected.

Control Power and Line Reactor Options

Description	Option Code
115V Control Power, Drive/Options Only	-C1 ❖
115V Control Power, User Supplied	-C5 ❖
3% Line Reactor Mounted in Enclosure	
Input	-L1
Output	-L2

❖ Option -C1 or -C5 must be selected.

Technical Information for Thermal Overload Relays

Class 10 (Bulletin 193) Relays:
- Will trip in 10 seconds or less at 600% of device current rating.
- Trip setting is adjustable per the range chart shown.
- Range is chosen to cover maximum drive current rating.
- If a motor outside the published adjustability range is to be used - enter customer order and provide complete motor data.

480V AC, Three-Phase Drives

Drive Rating ND Hp	Drive Rating HD Hp	Class 10 Adjustable Thermal Overload Relay - Electronic Adjustable Range (Amps) Normal Duty	Heavy Duty
0.5	0.33	1.0-2.9	0.32-1.0
1	0.75	1.0-2.9	1.0-2.9
2	1.5	1.6-5.0	1.6-5.0
3	2	1.6-5.0	1.6-5.0
5	3	3.7-12	1.6-5.0
7.5	5	3.7-12	3.7-12
10	7.5	12-32	3.7-12
15	10	13-37	13-37
20	15	13-37	13-37
25	20	13-37	13-37
30	25	14-45	14-45
40	30	26-85	26-85
50	40	26-85	26-85
60	50	26-85	26-85
75	60	66-110	26-85
100	75	57-180	66-110
125	100	57-180	57-180
150	125	57-180	57-180
200	150	96-300	57-180

240V AC, Three-Phase Drives

Drive Rating ND Hp	Drive Rating HD Hp	Class 10 Adjustable Thermal Overload Relay - Electronic Adjustable Range (Amps) Normal Duty	Heavy Duty
Engineered Drives Program Only			
0.5	0.33	1.0-2.9	1.0-2.9
1	0.75	1.6-5.0	1.6-5.0
2	1.5	3.7-12	3.7-12
3	2	3.7-12	3.7-12
5	3	12-32	3.7-12
7.5	5	12-32	12-32
10	7.5	13-37	13-37
15	10	14-45	14-45
20	15	26-85	26-85
25	20	–	–
30	25	–	–
40	30	–	–
50	40	–	–
60	50	–	–
75	60	–	–
100	75	–	–
125	100	–	–
150	125	–	–

Control Interface & Feedback Options

Description	Option Code
Analog Inputs/Outputs	
Isolated Analog Input, 0-10V dc	-N1 ❄
Isolated Analog Input, 4-20 mA	-N2 ❄
Isolated Analog Output, 0-10V dc	-N3 ❄
Control Relay Option	
Control Power On	-J1 ❄
Auxiliary Contacts, (2) Form C 2-N.O., 2-N.C. ✶	
Drive Fault	-J2 ❄
Alarm	-J3 ❄
Drive Run	-J4 ❄
At Speed	-J5 ❄
Programmable Relay A	-J6 ❄
Programmable Relay B	-J7 ❄
Building Management Control Interface	-N5 ❄
Communication Options Panel Mounted	
Johnson Controls Metasys Interface	-G1 ❄

✶ Maximum of two drive digital options can be selected.
NOTE: S9 + J4 = One Digital Output
S10 + J2 = One Digital Output
S11 + J5 = One Digital Output
S12 + J3 = One Digital Output
All other combinations = One Digital Output.
❄ This requires option -C1 or user supplied 115V (option -C5).

Motor Interface Options

Description	Option Code
Motor Heater Control	-J8 ‡

‡ Requires user supplied control power.

Operator Devices - Door Mounted

Description	Option Code
H/O/A S.S. (Start/Stop/Spd. Ref.)	-S1 ⌘
Run Pilot Light	-S9 ✶ ❄
Drive Fault Pilot Light	-S10 ✶ ❄
At Speed Pilot Light	-S11 ✶ ❄
Drive Alarm Pilot Light	-S12 ✶ ❄
Control Power On Pilot Light	-S13 ❄
Drive & Bypass Mode Pilot Lights	-S14 ❄ ♣
Bypass Mode & Auto Bypass En. P.L.	-S15 ❄➤
Drive Disable Mushroom P.B.	-S16 ⌘
Motor Fault Pilot Light	-S17 ❄♣

✶ Maximum of two drive digital options can be selected.
NOTE: S9 + J4 = One Digital Output
S10 + J2 = One Digital Output
S11 + J5 = One Digital Output
S12 + J3 = One Digital Output
All other combinations = One Digital Output.
❄ This requires option -C1 or user supplied 115V (option -C5).
♣ Option available when -B1 is selected.
➤ Option available when -B2 is selected.
⌘ Does not require option -C1 or user supplied power (-C5) if 24V ac/dc interface is selected. Requires option -C1 or user supplied power (-C5), if 115V ac interface is selected.

Meters - Door Mounted

Description	Option Code
Drive/Bypass Motor Run Time Meter (Elapsed Hours) Non-Resettable	-M3 ❄

❄ This requires option -C1 or user supplied 115V (option -C5).

Enclosure Options

Description	Option Code
Nameplate, Door Mounted 158.8 x 50.8 mm (6.25 x 2 in.) white Lamacoid with black letters)	-E9 ❖
UL Type 3/4/12	Consult Factory

❖ Actual message to be defined by user at order entry, otherwise will be supplied blank.

Codes and Standards

Code/Standard	Action
CE ✦ (European Conformance Standard)	Consult the factory with requirements to meet the separate Low Voltage and/or EMC directives.
IEEE519 ✦ (Harmonic Distortion Levels)	Provide a one-line power distribution drawing, and the associated specification to the factory, for review.
UL, c-UL (CSA)	This program provides UL panel recognition from the factory as standard.

✦ Engineered Drives Program Only

Drawing and Test Options (For Standard Packaged Drives Only)

Description — One Set of...	Cat. No.
Manufacturing Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Information Only - Manufacture Proceeding"** Not to be used as Approval Drawings	
Diskette	1301-MFDISK
Electronic Drawings	1301-MFDWG-E
Black & Whites	1301-MFDWG
Vellums	1301-MFRV
Final Drawings (as shipped) 279 x 432 mm (11 x 17 in.) One set of schematics — **" Copy of Drawings that Shipped with the Job"**	
Diskette	1301-FINDISK
Electronic Drawings	1301-FINDWG-E
Black & Whites	1301-FINDWG
Vellums	1301-FINRV
Mylar	1301-FINRM
Test Report, Drive Only	1301-TESTR
Engineered Drives Program Only	
Approval Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Manufacture Held Until Approved Prints are Received"**	
Diskette	1301-APPDISK
Electronic Drawings	1301-APPDWG-E
Black & Whites	1301-APPDWG
Vellums	1301-APPRV
As Commissioned Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Provided after Field Changes are Returned to the Factory"**	
Black & Whites	1301-COMDWG
Certified Motor Dimension Drawing	1301-CERMTR
Certified Transformer Dimension Drawing	1301-CERXFR
Certified Line Reactor Dimension Drawing	1301-CERLR
Disk Copy of "Final As Shipped" Schematics (Autocad 2000)	1301-DISK
Basic Harmonic Analysis - Pre-order review of customer's one line power distribution diagram.	1301-HARM1
Complete Harmonic Analysis - Post-order detailed harmonic spectrum analysis and a written report.	1301-HARM2
Deluxe Harmonic Analysis - Post-order site verification of actual harmonics, detailed spectrum analysis and a detailed written report.	1301-HARM3
Witness Test, User Viewing of Rockwell Automation Standard Test Procedures	1301-WT‡

‡ Includes viewing Rockwell Automation standard test only. Any special requirements must be reviewed by Rockwell Automation for acceptance and possible price changes.

Option Selection Reference Guide

Required Options
- Normal Duty or Heavy Duty
- Power Disconnecting Means
- Bypass or No Bypass
- Control Power or No Control Power when dependent options are selected

Description	Must be Used with . . .	Cannot be Used with . . .
Base Drive	Enclosure (A or H), HIM (3, A…G), Brake IGBT (Y or N), Emission (A or B), Comm Option (C, D, E, H, I, L, P, R, S or N), I/O Option (A, B, C or D), Feedback (0 or 1), ND or HD Option.	Vector Control drives cannot be used with Comm Options H, L or G1.
HIM Options (3, A…G)		Only one HIM option can be selected (3, A…G).
Comm Options		Only one drive mounted comm option can be selected.
I/O Options		Only one I/O option can be selected.
Feedback Options	Vector 24V dc or Vector 115V ac	Only one feedback option can be selected.
-B0		-B1
-B1	-C1 or C5	-B0, P2, P3, P6, P12
-B2	-B1 & J2	
-C1		-C5
-C5		-C1
-E9		
-G1		HIM codes 3, A…G, Vector Control I/O (C or D).
-HD	Any base drive unless ND is selected	-ND
-J1		
-J2		Only 2 drive digital outputs
-J3		Only 2 drive digital outputs
-J4		Only 2 drive digital outputs
-J5		Only 2 drive digital outputs
-J6		Only 2 drive digital outputs
-J7		Only 2 drive digital outputs
-J8	-J4	
-L1		
-L2		
-M3	-J4	
-N1		
-N2		
-N3		
-N5		
-ND	Any base drive unless HD is selected	-HD
-P1		-P2, P3, P4, P6, P7
-P2		-P1, P3, P4, P6, P7, B1
-P3		-P1, P2, P4, P6, P7, B1
-P4		-P1, P2, P3, P6, P7
-P6		-P1, P2, P3, P4, P7, B1
-P7		-P1, P2, P3, P4, P6
-P11	-C1 or C5	
-P12	-J2, C1 or C5	-B1, B2
-S1		
-S9		Only 2 drive digital outputs
-S10		Only 2 drive digital outputs
-S11		Only 2 drive digital outputs
-S12		Only 2 drive digital outputs
-S13		
-S14	-B1	-S15
-S15	-B2	-S14
-S16		
-S17	-B1	

PowerFlex Drive Packages for Fan & Pump Applications

PowerFlex Fan/Pump Family

Contents

Conformity to Standards

The PowerFlex Drive Packages for Fan and Pump Applications conform to the following:

Conformity to:	Drive Packages for Fan and Pump Applications
UL Listed	✓
CSA Certified (C-UL)	✓

Drive Description

PowerFlex® Drive Packages for Fan and Pump Applications are PowerFlex® 70 and PowerFlex® 700 drives packaged with input Disconnect and Contactor Bypass hardware to create pre-configured packages.

A limited factory installed option set is offered to optimize package configurations while providing a versatile and cost-effective solution.

Standard Features

- PowerFlex AC Drive
- NEMA Type 1 Wall Mount Package
- Documentation

Standard Options

- Choice of Human Interface Modules (One required)
- Choice of Internal Brake IGBT
- Choice of Internal Brake Resistor
- Choice of Communication Modules
- Choice of Packaging Selection (One required)

Overview

The Packaged Product program allows users to create Disconnect and Contactor Bypass packages based on their specific needs and requirements. A limited factory installed option set is offered to optimize package configurations while providing a versatile and cost-effective solution. All configurations feature wall mount NEMA Type 1 packaging.

The program has two levels:

Standard Packaged Drives

The Standard Packaged Drives Program allows users to create drive packages based on their specific needs. A complete drive package may be specified by assembling a single catalog number string that includes a base drive and all required options. Packaging is available for 208V, 480V, and 600V systems in NEMA Type 1 enclosures. The program consists of a fully defined catalog string identified within this price sheet. Three packaged configurations are offered which provide consistent manufacturing and minimize customer resources by reducing engineering, manufacturing and installation time. Typical delivery is 20 business days from order entry and can be ordered through the Passport order entry system.

Engineered Drives

The Engineered Drives Program offers users the ability to create drive packages beyond the Standard Packaged Drives offering. Options may or may not be defined within this publication. Product can be ordered by:

- Assembling a catalog string from the options listed in this publication.
  Engineered options that are listed within this publication will be specified by the heading *"Engineered Drives Program Only"* and will have varied lead-times.
- Entering a custom quote request for additional options not listed.
  A custom quote will require a Passport quote using "SP-SDB-CUSTOM" as the line item part number and entering a description of the base catalog string and custom options in the Competitive Summary. For questions or help with a custom quote please contact the Engineered Drives Group at 262-512-8415.

Catalog Number Explanation

Position

1-3	4	5-7	8	9	10	11	12	13	14	15	16	17	18	19
21V	D	2P1	A	3	A	Y	N	A	R	C	0	B	N	- LR
a	b	c	d	e	f	g	h	i	j	k	l	m	n	o

a

Drive

Code	Type
21V	PowerFlex 70 Drive
21W	PowerFlex 700 Drive

b

Voltage Rating

Code	Voltage	Ph.
X	208V ac	3
D	480V ac	3
E	600V ac	3

c1

ND Rating

208V, 60Hz Input

Code	Amps	Frame	kW (HP)
4P2	4.8	B	0.75 (1.0)
6P8	7.8	B	1.5 (2.0)
9P6	11	B	2.2 (3.0)
015	17.5	C	4.0 (5.0)
022	25.3	D	5.5 (7.5)
028	32.2	D	7.5 (10)
042	43	D	11 (15)

c2

ND Rating

480V, 60Hz Input

Code	Amps	Frame	kW (HP)
2P1	2.1	B	0.75 (1.0)
3P4	3.4	B	1.5 (2.0)
5P0	5.0	B	2.2 (3.0)
8P0	8.0	B	4.0 (5.0)
011	11	C	5.5 (7.5)
014	14	C	7.5 (10)
022	22	D	11 (15)
027	27	D	15 (20)
034	34	D	18.5 (25)
040	40	D	22 (30)
052	52	E	30 (40)
065	65	E	37 (50)
077 §	77	4	45 (60)
096 §	96	5	55 (75)
125 §	125	5	75 (100)
156 §	156	6	90 (125)
180 §	180	6	110 (150)
248 §	248	6	132 (200)

§ PowerFlex 700 options only.

c3

ND Rating

600V, 60Hz Input

Code	Amps	Frame	kW (HP)
3P9	3.9	B	2.2 (3.0)
6P1	6.1	B	4.0 (5.0)
9P0	9.0	C	5.5 (7.5)
011	11	C	7.5 (10)
017	17	D	11 (15)
022	22	D	15 (20)
027	27	D	18.5 (25)
032	32	D	22 (30)
041	41	E	30 (40)
052	52	E	37 (50)
062 §	62	4	45 (60)
077 §	77	5	55 (75)
099 §	99	5	75 (100)
125 §	125	6	90 (125)
144 §	144	6	110 (150)

§ PowerFlex 700 options only.

d

Enclosure

Code	Enclosure
A	IP 20, NEMA Type 1

e

HIM

Code	Operator Interface
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
4	Analog LCD
5	Prog. Only LCD

f

Documentation

Code	Type
A	User Manual

g

Brake IGBT

Code	w/Brake IGBT ❄
Y	Yes
N §	No

❄ Brake IGBT is standard on PowerFlex 70 Frames B, C, D and E, and optional on PowerFlex 700 Frames 4, 5 and 6.

§ PowerFlex 700 options only.

h

Internal Brake Resistor

Code	w/Resistor
Y	Yes∗
N	No

∗ Brake resistor only available for PowerFlex 70: 208V Frames B, C & D, 480V Frames B, C & D, 600V Frames B and C.

i

Emission

Code	CE Filter
A	Yes
N∗	No

∗ PowerFlex 70 600V ratings only.

j

Comm Slot

Code	Version
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
H	RS-485 HVAC
I	Interbus
L	LonWorks
P	PROFIBUS DP
Q	ControlNet (Fiber)
R	Remote I/O
S	RS-485 DF1
N	None

k

Control & I/O

Code	Control	I/O Volts
A∗	Standard	24V dc/ac
C❄	Enhanced	24V dc

∗ PowerFlex 700 options only.

❄ PowerFlex 70 options only.

l

Feedback

Code	Feedback
0	None

m

Package

Code	Description
A	Main Input Disconnect
B	3 Contactor Full Feature Bypass with Disconnect
C	3 Contactor Basic Bypass with Disconnect

n

Reserved

o

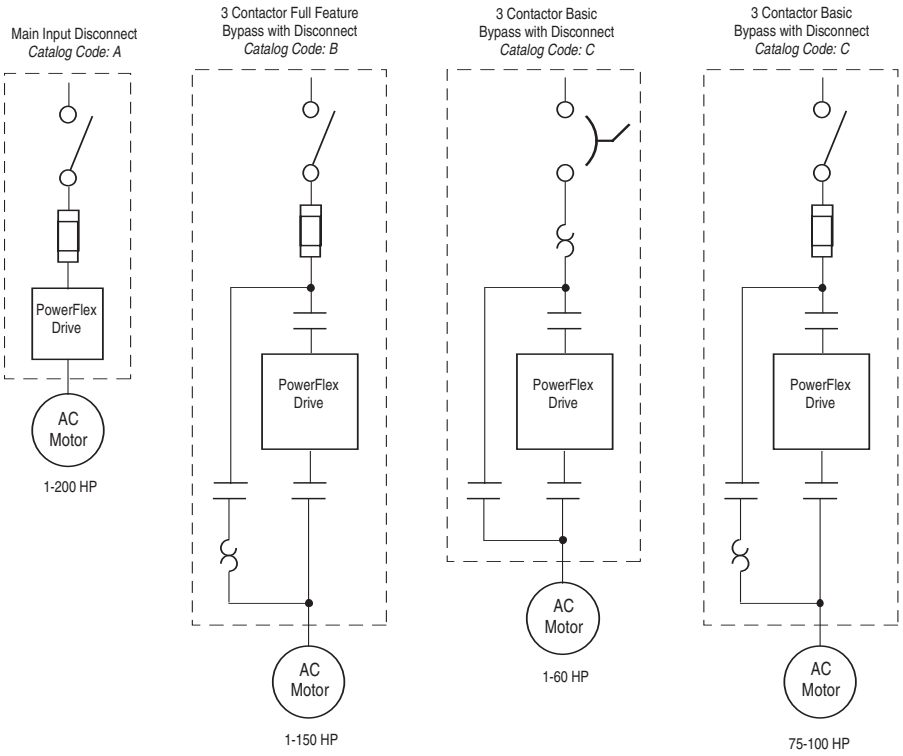
Options

Code	Description
LR	Input Line Reactor ∗

∗ Only available with Package Code A and B drives 1.0…10 HP @ 208V, 1.0…25 Hp @ 480V and 3.0…25 HP @ 600V.

Available Packaging Selections

(Position m)



Product Selection

208V ac, Main Input Disconnect (Package Code A)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
0.75	1.0	4.8	5.5	7.4	B	21VX4P2A0AYNANC0AN
1.5	2.0	7.8	10.3	13.8	B	21VX6P8A0AYNANC0AN
2.2	3.0	11	12.1	16.5	B	21VX9P6A0AYNANC0AN
4.0	5.0	17.5	19.2	26.2	C	21VX015A0AYNANC0AN
5.5	7.5	25.3	27.8	37.9	D	21VX022A0AYNANC0AN
7.5	10	32.2	37.9	50.6	D	21VX028A0AYNANC0AN
11	15	43	55.5	74	D	21VX042A0AYNANC0AN

208V ac, 3 Contactor Full Feature Bypass with Disconnect (Package Code B)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
0.75	1.0	4.8	5.5	7.4	B	21VX4P2A0AYNANC0BN
1.5	2.0	7.8	10.3	13.8	B	21VX6P8A0AYNANC0BN
2.2	3.0	11	12.1	16.5	B	21VX9P6A0AYNANC0BN
4.0	5.0	17.5	19.2	26.2	C	21VX015A0AYNANC0BN
5.5	7.5	25.3	27.8	37.9	D	21VX022A0AYNANC0BN
7.5	10	32.2	37.9	50.6	D	21VX028A0AYNANC0BN
11	15	43	55.5	74	D	21VX042A0AYNANC0BN

460V ac, Main Input Disconnect (Package Code A)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
0.75	1.0	2.1	2.4	3.2	B	21VD2P1A0AYNANC0AN
1.5	2.0	3.4	4.5	6.0	B	21VD3P4A0AYNANC0AN
2.2	3.0	5.0	5.5	7.5	B	21VD5P0A0AYNANC0AN
4.0	5.0	8.0	8.8	12	B	21VD8P0A0AYNANC0AN
5.5	7.5	11	12.1	16.5	C	21VD011A0AYNANC0AN
7.5	10	14	16.5	22	C	21VD014A0AYNANC0AN
11	15	22	24.2	33	D	21VD022A0AYNANC0AN
15	20	27	33	44	D	21VD027A0AYNANC0AN
18.5	25	34	40.5	54	D	21VD034A0AYNANC0AN
22	30	40	51	68	D	21VD040A0AYNANC0AN
30	40	52	60	80	E	21VD052A0AYNANC0AN
37	50	65	78	104	E	21VD065A0AYNANC0AN
45	60	77	85	116	4	21WD077A0AYNANA0AN
55	75	96	106	144	5	21WD096A0AYNANA0AN
75	100	125	138	163	5	21WD125A0AYNANA0AN
90	125	156	172	233	6	21WD156A0AYNANA0AN
110	150	180	198	270	6	21WD180A0AYNANA0AN
132	200	248	273	372	6	21WD248A0AYNANA0AN

460V ac, 3 Contactor Full Feature Bypass with Disconnect (Package Code B)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
0.75	1.0	2.1	2.4	3.2	B	21VD2P1A0AYNANC0BN
1.5	2.0	3.4	4.5	6.0	B	21VD3P4A0AYNANC0BN
2.2	3.0	5.0	5.5	7.5	B	21VD5P0A0AYNANC0BN
4.0	5.0	8.0	8.8	12	B	21VD8P0A0AYNANC0BN
5.5	7.5	11	12.1	16.5	C	21VD011A0AYNANC0BN
7.5	10	14	16.5	22	C	21VD014A0AYNANC0BN
11	15	22	24.2	33	D	21VD022A0AYNANC0BN
15	20	27	33	44	D	21VD027A0AYNANC0BN
18.5	25	34	40.5	54	D	21VD034A0AYNANC0BN
22	30	40	51	68	D	21VD040A0AYNANC0BN
30	40	52	60	80	E	21VD052A0AYNANC0BN
37	50	65	78	104	E	21VD065A0AYNANC0BN
45	60	77	85	116	4	21WD077A0AYNANA0BN
55	75	96	106	144	5	21WD096A0AYNANA0BN
75	100	125	138	163	5	21WD125A0AYNANA0BN
90	125	156	172	233	6	21WD156A0AYNANA0BN
110	150	180	198	270	6	21WD180A0AYNANA0BN

460V ac, 3 Contactor Basic Bypass with Disconnect (Package Code C)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
0.75	1.0	2.1	2.4	3.2	B	21VD2P1A0AYNANC0CN
1.5	2.0	3.4	4.5	6.0	B	21VD3P4A0AYNANC0CN
2.2	3.0	5.0	5.5	7.5	B	21VD5P0A0AYNANC0CN
4.0	5.0	8.0	8.8	12	B	21VD8P0A0AYNANC0CN
5.5	7.5	11	12.1	16.5	C	21VD011A0AYNANC0CN
7.5	10	14	16.5	22	C	21VD014A0AYNANC0CN
11	15	22	24.2	33	D	21VD022A0AYNANC0CN
15	20	27	33	44	D	21VD027A0AYNANC0CN
18.5	25	34	40.5	54	D	21VD034A0AYNANC0CN
22	30	40	51	68	D	21VD040A0AYNANC0CN
30	40	52	60	80	E	21VD052A0AYNANC0CN
37	50	65	78	104	E	21VD065A0AYNANC0CN
45	60	77	85	116	4	21WD077A0AYNANA0CN
55	75	96	106	144	5	21WD096A0AYNANA0CN
75	100	125	138	163	5	21WD125A0AYNANA0CN

600V ac, Main Input Disconnect (Package Code A)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
2.2	3.0	3.9	4.3	5.8	B	21VE3P9A0AYNNNC0AN
4.0	5.0	6.1	6.7	9.1	B	21VE6P1A0AYNNNC0AN
5.5	7.5	9.0	9.9	13.5	C	21VE9P0A0AYNNNC0AN
7.5	10	11	13.5	18	C	21VE011A0AYNNNC0AN
11	15	17	18.7	25.5	D	21VE017A0AYNNNC0AN
15	20	22	25.5	34	D	21VE022A0AYNNNC0AN
18.5	25	27	33	44	D	21VE027A0AYNNNC0AN
22	30	32	40.5	54	D	21VE032A0AYNNNC0AN
30	40	41	48	64	E	21VE041A0AYNNNC0AN
37	50	52	61.5	82	E	21VE052A0AYNNNC0AN
45	60	62	78	104	4	21WE062A0AYNANA0AN
55	75	77	85	116	5	21WE077A0AYNANA0AN
75	100	99	109	126	5	21WE099A0AYNANA0AN
90	125	125	138	188	6	21WE125A0AYNANA0AN
110	150	144	158	216	6	21WE144A0AYNANA0AN

600V ac, 3 Contactor Full Feature Bypass with Disconnect (Package Code B)

Drive Ratings					Frame Size	NEMA Type 1 without HIM & Communication Adapter
		Output Current				
kW	Hp	Cont.	1 Min.	3 Sec.		Cat. No.
2.2	3.0	3.9	4.3	5.8	B	21VE3P9A0AYNNNC0BN
4.0	5.0	6.1	6.7	9.1	B	21VE6P1A0AYNNNC0BN
5.5	7.5	9.0	9.9	13.5	C	21VE9P0A0AYNNNC0BN
7.5	10	11	13.5	18	C	21VE011A0AYNNNC0BN
11	15	17	18.7	25.5	D	21VE017A0AYNNNC0BN
15	20	22	25.5	34	D	21VE022A0AYNNNC0BN
18.5	25	27	33	44	D	21VE027A0AYNNNC0BN
22	30	32	40.5	54	D	21VE032A0AYNNNC0BN
30	40	41	48	64	E	21VE041A0AYNNNC0BN
37	50	52	61.5	82	E	21VE052A0AYNNNC0BN
45	60	62	78	104	4	21WE062A0AYNANC0BN
55	75	77	85	116	5	21WE077A0AYNANC0BN
75	100	99	109	126	5	21WE099A0AYNANA0BN
90	125	125	138	188	6	21WE125A0AYNANA0BN
110	150	144	158	216	6	21WE144A0AYNANA0BN

Factory Installed Options

Human Interface Modules (HIM) - IP20/NEMA Type 1 *(Position e)*

Catalog Code: 0
No HIM (Blank Cover)

Catalog Code: 2
LCD Digital Speed

Catalog Code: 3
LCD Full Numeric

Catalog Code: 4
LCD Analog Speed

Catalog Code: 5
LCD Programmer Only

Description	Cat. Code *(Position e)*
Blank Cover	0
LCD Display, Digital Speed	2
LCD Display, Full Numeric Keypad	3
LCD Display, Analog Speed Potentiometer	4
LCD Display, Programmer Only	5

Documentation

Description	Cat. Code *(Position f)*
User Manual	A

Internal Brake IGBT

Drive Input Voltage	Brake IGBT	Frame	Cat. Code *(Position g)*
208…600V ac	Standard	B, C, D, E	Y
208…600V ac❄	Optional	4	Y
208…600V ac❄	Optional	5	Y
208…600V ac❄	Optional	6	Y

❄ PowerFlex 700 options only.

Internal Dynamic Brake Resistors

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Frame	Brake Resistance Ω	Cat. Code *(Position h)*
208V ac	B	62	Y
	C	62	Y
	D	22	Y
480V ac	B	115	Y
	C	115	Y
	D	62	Y
600V ac	B	115	Y
	C	115	Y

Internal EMC Filter and Common Mode Choke

Drive Input Voltage	Frame	CE Filter	Cat. Code *(Position i)*
208V ac	B, C, D	Yes	A
480V ac	B, C, D, E	Yes	A
	4, 5, 6	Yes	A
600V ac	B, C, D, E	No	N
	4, 5, 6	Yes	A

Internal Communication Adapters

Description	Cat. Code *(Position j)*
ControlNet™ (Coax)	C
DeviceNet™	D
EtherNet/IP™	E
RS-485 HVAC	H
Interbus™	I
LonWorks™	L
PROFIBUS™ DP	P
ControlNet™ (Fiber)	Q
Remote I/O™	R
RS-485 DF1™	S
No Adapter	N

Control and I/O Options

Control	Frame	Cat. Code *(Position k)*
Enhanced Control without DriveGuard™	B, C, D, E	C
Standard Control with 24V DC/AC I/O ✶	4, 5, 6	A

✶ PowerFlex 700 options only.

Feedback Option

Description	Cat. Code *(Position l)*
None	0

Drawing Options (Engineered Drives Program Only)

Description — One Set of...	Cat. No.
Manufacturing Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Information Only - Manufacture Proceeding"** Not to be used as Approval Drawings	
Diskette	1301-MFDISK-FP
Electronic Drawings	1301-MFDWG-E-FP
Black & Whites	1301-MFDWG-FP
Final Drawings (as shipped) 279 x 432 mm (11 x 17 in.) One set of schematics — **"Copy of Drawings that Shipped with the Job"**	
Diskette	1301-FINDISK-FP
Electronic Drawings	1301-FINDWG-E-FP
Black & Whites	1301-FINDWG-FP
Approval Drawings 279 x 432 mm (11 x 17 in.) One set of schematics — **"Manufacture Held Until Approved Prints are Received"**	
Diskette	1301-APPDISK-FP
Electronic Drawings	1301-APPDWG-E-FP
Black & Whites	1301-APPDWG-FP

Isolation Transformers – NEMA 3R Standalone

Drive Cat. No.	Motor Rating kW (Hp)	208V, 60 Hz, Three-Phase Primary & Secondary IP32 (NEMA Type 3R) Cat. No.	460V, 60 Hz, Three-Phase Primary & Secondary IP32 (NEMA Type 3R) Cat. No.	575V, 60 Hz, Three-Phase Primary & Secondary IP32 (NEMA Type 3R) Cat. No.
21VD2P1	0.75 (1.0)	1321-3TW005-XX	1321-3TW005-BB	–
21VD3P4	1.5 (2.0)	1321-3TW005-XX	1321-3TW005-BB	–
21VD5P0	2.2 (3.0)	1321-3TW005-XX	1321-3TW005-BB	1321-3TW005-CC
21VD8P0	4.0 (5.0)	1321-3TW007-XX	1321-3TW007-BB	1321-3TW007-CC
21VD011	5.5 (7.5)	1321-3TW011-XX	1321-3TW011-BB	1321-3TW011-CC
21VD014	7.5 (10)	1321-3TW014-XX	1321-3TW014-BB	1321-3TW014-CC
21VD022	11 (15)	1321-3TW020-XX	1321-3TW020-BB	1321-3TW020-CC
21VD027	15 (20)	–	1321-3TW027-BB	1321-3TW027-CC
21WD034 ❄	18.5 (25)	–	1321-3TW034-BB	1321-3TW034-CC
21WD040 ❄	22 (30)	–	1321-3TW040-BB	1321-3TW040-CC
21WD052 ❄	30 (40)	–	1321-3TW051-BB	1321-3TW051-CC
21WD065 ❄	37 (50)	–	1321-3TH063-BB	1321-3TH063-CC
21WD077 ❄	50 (60)	–	1321-3TH075-BB	1321-3TH075-CC
21WD095 ❄	55 (75)	–	1321-3TH093-BB	1321-3TH093-CC
21WD052 ❄	75 (100)	–	1321-3TH118-BB	1321-3TH118-CC
21WD156 ❄	90 (125)	–	1321-3TH145-BB	1321-3TH145-CC
21WD180 ❄	110 (150)	–	1321-3TH175-BB	1321-3TH175-CC
21WD248 ❄	132 (200)	–	1321-3TH220-BB	–

❄ PowerFlex 700 options only.

Input and Output Line Reactors (Standalone)

208V, 60 Hz, Three-Phase

Drive Ratings			Input Line Reactor*		Output Line Reactor*	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.	Cat. No.	Cat. No.
			3% Impedance			
0.75	1.0	4.8	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
1.5	2.0	7.8	1321-3R8-A	1321-3RA8-A	1321-3R8-A	1321-3RA8-A
2.2	3.0	11	1321-3R12-A	1321-3RA12-A	1321-3R12-A	1321-3RA12-A
4.0	5.0	17.5	1321-3R18-A	1321-3RA18-A	1321-3R18-A	1321-3RA18-A
5.5	7.5	25.3	1321-3R25-A	1321-3RA25-A	1321-3R25-A	1321-3RA25-A
7.5	10	32.2	1321-3R35-A	1321-3RA35-A	1321-3R35-A	1321-3RA35-A
11	15	43	1321-3R45-A	1321-3RA45-A	1321-3R45-A	1321-3RA45-A
			5% Impedance			
0.75	1.0	4.8	1321-3R8-C	1321-3RA8-C	1321-3R8-B	1321-3RA8-B
1.5	2.0	7.8	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
2.2	3.0	11	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
4.0	5.0	17.5	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
5.5	7.5	25.3	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
7.5	10	32.2	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
11	15	43	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B

* Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rating output currents.

460V, 60 Hz, Three-Phase

Drive Ratings			Input Line Reactor*		Ouput Line Reactor*	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.	Cat. No.	Cat. No.
			3% Impedance			
0.75	1.0	2.1	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
1.5	2.0	3.4	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
2.2	3.0	5.0	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
4.0	5.0	8.0	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
5.5	7.5	11	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
7.5	10	14	1321-3R18-B	1321-3RA18-B	1321-3R18-C	1321-3RA18-C
11	15	22	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
15	20	27	1321-3R35-B	1321-3RA35-B	1321-3R25-B	1321-3RA25-B
18.5	25	34	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
22	30	40	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
30	40	52	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
37	50	65	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
45	60	77	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
55	75	96	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
75	100	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
90	125	156	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
110	150	180	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
132	200	248	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B
			5% Impedance			
0.75	1.0	2.1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
1.5	2.0	3.4	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
2.2	3.0	5.0	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
4.0	5.0	8.0	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
5.5	7.5	11	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
7.5	10	14	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
11	15	22	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
15	20	27	1321-3R35-C‡	1321-3RA35-C‡	1321-3R25-C	1321-3RA25-C
18.5	25	34	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
22	30	40	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
30	40	52	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
37	50	65	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
45	60	77	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
55	75	96	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
75	100	125	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
90	125	156	1321-3R160-C	1321-3RA160-C	1321-3R160-C	1321-3RA160-C
110	150	180	1321-3R200-C	1321-3RA200-C	1321-3R200-C‡	1321-3RA200-C‡
132	200	248	1321-3RB250-C	1321-3RAB250-C	1321-3RB250-C	1321-3RAB250-C

* Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rating output currents.
‡ 4% impedance reactor.

575V, 60 Hz, Three-Phase

Drive Ratings			Input Line Reactor*		Output Line Reactor*	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
kW	Hp	Amps	Cat. No.	Cat. No.	Cat. No.	Cat. No.
			3% Impedance			
2.2	3.0	3.9	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
4.0	5.0	6.1	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
5.5	7.5	9.0	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
7.5	10	11	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
11	15	17	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
15	20	22	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
18.5	25	27	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
22	30	32	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
30	40	41	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
37	50	52	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
45	60	62	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
55	75	77	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
75	100	99	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
90	125	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
110	150	144	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
			5% Impedance			
2.2	3.0	3.9	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
4.0	5.0	6.1	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
5.5	7.5	9.0	1321-3R12-C‡	1321-3RA12-C‡	1321-3R12-C‡	1321-3RA12-C‡
7.5	10	11	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
11	15	17	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
15	20	22	1321-3R25-C‡	1321-3RA25-C‡	1321-3R25-C‡	1321-3RA25-C‡
18.5	25	27	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
22	30	32	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
30	40	41	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
37	50	52	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
45	60	62	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
55	75	77	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
75	100	99	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
90	125	125	1321-3R130-C‡	1321-3RA130-C‡	1321-3R130-C‡	1321-3RA130-C‡
110	150	144	1321-3R160-C‡	1321-3RA160-C‡	1321-3R160-C‡	1321-3RA160-C‡

* Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rating output currents.
‡ 4% impedance reactor.

PowerFlex 700H AC Drive

Contents

Conformity to Standards

The PowerFlex 700H conforms to the following:

Conformity to:	Standard Product
UL Listed	✓
CSA Certified (c-UL)	✓
IEC (Designed to Meet)	✓
CE Approved	✓

Drive Description

The PowerFlex 700H AC drive offers a cost-effective, compact package for general purpose, variable speed applications. It is designed to meet the demands for space, flexibility and performance. The many features allow the user to easily configure the drive for most application needs. Available ratings include; 200 to 900 Hp at 480V ac, 150 to 900 Hp at 600V ac and 160 to 800 kW at 690V ac.

An LCD Human Interface Module (also used with the PowerFlex 70, 700 and 700S) provides multilingual text for startup, metering, programming, and troubleshooting.

PowerFlex 700H AC drives are configurable for Volts-per-Hertz or Sensorless Vector control modes to meet a wide variety of application needs. This control is housed in a module which is separately removable from the power structure. The control module is the same for all drive ratings, simplifying installation and maintenance for the entire product line. Optional I/O is available as 24V dc or 115V ac.

Optional internal communication modules are available as user-installed kits. These provide fast and efficient control and/or data exchange with host controllers over popular interfaces. These interfaces include; DeviceNet™, ControlNet™, EtherNet™/IP, PROFIBUS™ DP, Interbus, Remote I/O, Serial Communications and other open control and communication networks. PC tools such as DriveExplorer™ and DriveTools™ SP assist with programming, monitoring and troubleshooting the PowerFlex 700H.

Catalog Number Explanation

Position	1-3	4	5-7	8	9	10	11	12	13	14	15	16
	20C	D	261	A	3	A	Y	N	B	N	N	0
	a	b	c	d	e	f	g	h	i	j	k	l

a

Drive	
Code	**Type**
20C	PowerFlex 700H

b

Voltage Rating		
Code	**Voltage**	**Ph.**
C	400V ac	3
D	480V ac	3
E	600V ac	3
F	690V ac	3

c1

ND Rating		
400V, 50Hz Input		
Code	**Amps - ND (HD)**	**kW - ND (HD)**
261	261 (205)	132 (110)
300	300 (245)	160 (132)
385	385 (300)	200 (160)
460	460 (385)	250 (200)
500	500 (420)	250 (250)
590	590 (520)	315 (250)
650	650 (590)	355 (315)
730	730 (650)	400 (355)
820	820 (730)	450 (400)
920	920 (820)	500 (450)
1K0	1030 (920)	560 (500)

c2

ND Rating		
480V, 60Hz Input		
Code	**Amps - ND (HD)**	**Hp - ND (HD)**
261	261 (205)	200 (150)
300	300 (245)	250 (200)
385	385 (300)	300 (250)
460	460 (385)	350 (300)
500	500 (420)	450 (350)
590	590 (520)	500 (450)
650	650 (590)	500 (500)
730	730 (650)	600 (500)
820	820 (730)	700 (600)
920	920 (820)	800 (700)
1K0	1030 (920)	900 (800)

c3

ND Rating		
600V, 60Hz Input		
Code	**Amps - ND (HD)**	**Hp - ND (HD)**
170	170 (144)	150 (150)
208	208 (170)	200 (150)
261	261 (208)	250 (200)
325	325 (261)	350 (250)
385	385 (325)	400 (350)
416	416 (325)	450 (350)
460	460 (385)	450 (400)
502	502 (460)	500 (450)
590	590 (502)	600 (500)
650	650 (590)	700 (650)
750	750 (650)	800 (700)
820	820 (750)	900 (700)

c4

ND Rating		
690V, 50Hz Input		
Code	**Amps - ND (HD)**	**kW - ND (HD)**
170	170 (144)	160 (132)
208	208 (170)	200 (160)
261	261 (208)	250 (200)
325	325 (261)	315 (250)
385	385 (325)	355 (315)
416	416 (325)	400 (315)
460	460 (385)	450 (355)
500	502 (460)	500 (450)
590	590 (502)	560 (500)
650	650 (590)	630 (560)
750	750 (650)	710 (630)
820	820 (750)	800 (630)

d

Enclosure	
Code	**Enclosure**
A	IP 21, NEMA Type 1

e

HIM	
Code	**Operator Interface**
0	Blank Cover
3	Full Numeric LCD, Drive Mounted
C	Full Numeric LCD, Door Mount ✶

✶ Frame 10 & up only.

f

Documentation	
Code	**Type**
A	User Manual

g

Brake	
Code	**w/Brake IGBT ❄**
Y	Yes
N	No

❄ Brake IGBT is available on Frame 9 drives only.

h

Brake Resistor	
Code	**w/Resistor**
N	No

i

Emission		
Code	**CE Filter**	**CM Choke**
B	Yes	No
N ‡	No	No

‡ For use on ungrounded distribution systems (Frame 9 drives only).

j

Comm Slot	
Code	**Version**
N	None

k

I/O	
Code	**I/O Volts**
A	24V dc
B	115V ac
N	None

l

Feedback	
Code	**Type**
0	None

Product Selection

380…500V ac, Three-Phase Drives

480V ac Input					380…400V ac Input					IP21, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat No.	Frame Size
Cont. ✶	1 Min.	2 Sec. ❄			Cont.	1 Min.	2 Sec. ❄			20CD …(480V)	
261 (205)	287 (308)	349 (349)	200	150	261 (205)	287 (308)	349 (349)	132	110	261A0ANNBNN0	9
300 (245)	330 (368)	444 (444)	250	200	300 (245)	330 (368)	444 (444)	160	132	300A0ANNBNN0	9
385 (300)	424 (450)	540 (540)	300	250	385 (300)	424 (450)	540 (540)	200	160	385A0ANNBNN0	10
460 (385)	506 (578)	693 (693)	350	300	460 (385)	506 (578)	693 (693)	250	200	460A0ANNBNN0	10
500 (420)	550 (630)	828 (828)	450	350	500 (420)	550 (630)	828 (828)	250	250	500A0ANNBNN0	10
590 (520)	649 (780)	956 (956)	500	450	590 (520)	649 (780)	956 (956)	315	250	590A0ANNBNN0	11
650 (590)	715 (885)	1062 (1062)	500	500	650 (590)	715 (885)	1062 (1062)	355	315	650A0ANNBNN0	11
730 (650)	803 (975)	1095 (1170)	600	500	730 (650)	803 (975)	1095 (1170)	400	355	730A0ANNBNN0	11
820 (730)	902 (1095)	1230 (1314)	700	600	820 (730)	902 (1095)	1230 (1314)	450	400	820A0ANNBNN0	12
920 (820)	1012 (1230)	1380 (1476)	800	700	920 (820)	1012 (1230)	1380 (1476)	500	450	920A0ANNBNN0	12
1030 (920)‡	1133 (1370)	1555 (1600)	900	800	1030 (920)‡	1133 (1370)	1555 (1600)	560	500	1K0A0ANNBNN0	12

✶ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
❄ The 2 sec. output current is only available at initial start or drive operating at light load.
‡ Heavy duty rating is limited to 35° C surrounding air.

600…690V ac, Three-Phase Drives

600V ac Input					690V ac Input					IP21, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont. ✶	1 Min.	2 Sec. ❄			Cont. ✶	1 Min.	2 Sec. ❄			20CE …(600V)	
170 (144)	187 (216)	245 (245)	150	150	170 (144)	187 (216)	245 (245)	160	132	170A0ANNBNN0	9
208 (170)	230 (250)	289 (289)	200	150	208 (170)	230 (250)	289 (289)	200	160	208A0ANNBNN0	9
261 (208)	287 (312)	375 (375)	250	200	261 (208)	287 (312)	375 (375)	250	200	261A0ANNBNN0	10
325 (261)	358 (392)	470 (470)	350	250	325 (261)	358 (392)	470 (470)	315	250	325A0ANNBNN0	10
385 (325)	424 (488)	585 (585)	400	350	385 (325)	424 (488)	585 (585)	355	315	385A0ANNBNN0	10
416 (325)‡	458 (488)	585 (585)	450	350	416 (325)‡	458 (488)	585 (585)	400	315	416A0ANNBNN0	10
460 (385)	506 (578)	693 (693)	450	400	460 (385)	506 (578)	693 (693)	450	355	460A0ANNBNN0	11
502 (460)	552 (690)	828 (828)	500	450	502 (460)	552 (690)	828 (828)	500	450	502A0ANNBNN0	11
590 (502)	649 (753)	904 (904)	600	500	590 (502)	649 (753)	904 (904)	560	500	590A0ANNBNN0	11
650 (590)	715 (885)	1062 (1062)	700	650	650 (590)	715 (885)	1062 (1062)	630	560	650A0ANNBNN0	12
750 (650)	825 (975)	1170 (1170)	800	700	750 (650)	825 (975)	1170 (1170)	710	630	750A0ANNBNN0	12
820 (750)‡	902 (975)	1170 (1170)	900	700	820 (750)‡	902 (975)	1170 (1170)	800	630	820A0ANNBNN0	12

✶ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
❄ The 2 sec. output current is only available at initial start or drive operating at light load.
‡ Normal duty rating is limited to 35° C surrounding air.

User Installed Options

Human Interface and Wireless Interface Modules

No HIM (Blank Plate)
20-HIM-A0

LCD Digital Speed
20-HIM-A2

LCD Full Numeric
20-HIM-A3

LCD Programmer Only
20-HIM-A5

DPI NEMA 1 WIM
20-WIM-N1

Remote (Panel Mount)
Full Numeric
20-HIM-C3S

Remote (Panel Mount)
Programmer Only
20-HIM-C5S

DPI NEMA 4 WIM
Remote (Panel Mount)
20-WIM-N4S

Description	Handheld/Local (Drive Mount) Cat. No.	Remote (Panel Mount) IP66, UL Type 4x/12 ✶ Cat. No.
No HIM (Blank Plate)	20-HIM-A0	–
LCD Display, Digital Speed	20-HIM-A2	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3S❄
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5S❄
DPI NEMA 1 WIM	20-WIM-N1	–
DPI NEMA 4 WIM	–	20-WIM-N4S

✶ For indoor use only.
❄ Includes a 1202-C30 interface cable (3 meters) for connection to the drive.

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA 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
DPI/SCANport™ One to Two Port Splitter Cable	1203-S03

‡ 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).

Protective Cover for DC Bus or Internal Brake IGBT Terminals

Description	Frame	Cat. No.
Touch Cover - Converts IP00/Open Type drive to IP20/NEMA Type 1. No wiring space provided.	9	20-OPT-TC
Top Hat- Converts IP00/Open Type drive to IP20/NEMA Type 1. Allows for wiring space.	9	20-OPT-TH

Communication Option Kits

Description	Cat. No.
ControlNet Communication Adapter (Coax)	20-COMM-C
DeviceNet Communication Adapter	20-COMM-D
EtherNet/IP Communication Adapter	20-COMM-E
HVAC Communication Adapter	20-COMM-H
Interbus Communication Adapter	20-COMM-I
LonWorks Communication Adapter	20-COMM-L
PROFIBUS DP Communication Adapter	20-COMM-P
ControlNet Communication Adapter (Fiber)	20-COMM-Q
Remote I/O Communication Adapter	20-COMM-R
RS-485 DF1 Communication Adapter	20-COMM-S
External Comms Power Supply	20-XCOMM-AC-PS1
External DPI Communications Kit	20-XCOMM-DC-BASE
External DPI I/O Option Board✦	20-XCOMM-IO-OPT1
Serial Null Modem Adapter	1203-SNM
Smart Self-powered Serial Converter (RS-232) includes 1203-SFC and 1202-C10 Cables	1203-SSS
Compact I/O Module (3 Channel)	1769-SM1

✦ For use only with External DPI Communications Kits 20-XCOMM-DC-BASE.

Output Line Reactors - 480V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.
20CD261	Heavy Duty	150	1321-3R200-B	1321-3RA200-B
20CD261	Normal Duty	200	1321-3RB250-B	1321-3RAB250-B
20CD300	Heavy Duty	200	1321-3RB250-B	1321-3RAB250-B
20CD300	Normal Duty	250	1321-3RB320-B	1321-3RAB320-B
20CD385	Heavy Duty	250	1321-3RB320-B	1321-3RAB320-B
20CD385	Normal Duty	300	1321-3RB400-B	1321-3RAB400-B
20CD460	Heavy Duty	300	1321-3RB400-B	1321-3RAB400-B
20CD460	Normal Duty	350	1321-3R500-B	1321-3RA500-B
20CD500	Heavy Duty	350	1321-3RB400-B	1321-3RAB400-B
20CD500	Normal Duty	450	1321-3R500-B	1321-3RA500-B
20CD590	Heavy Duty	450	1321-3R500-B	1321-3RA500-B
20CD590	Normal Duty	500	1321-3R600-B	1321-3RA600-B
20CD650	Heavy Duty	500	1321-3R600-B	1321-3RA600-B
20CD650	Normal Duty	500	1321-3R750-B	1321-3RA750-B
20CD730	Heavy Duty	500	1321-3R750-B	1321-3RA750-B
20CD730	Normal Duty	600	1321-3R750-B	1321-3RA750-B
20CD820	Heavy Duty	600	1321-3R750-B	1321-3RA750-B
20CD820	Normal Duty	700	1321-3R850-B	1321-3RA850-B
20CD920	Heavy Duty	700	1321-3R850-B	1321-3RA850-B
20CD920	Normal Duty	800	1321-3R1000-B	1321-3RA1000-B
20CD1030	Heavy Duty	800	1321-3R1000-B	1321-3RA1000-B
20CD1030	Normal Duty	900	1321-3R1000-B	1321-3RA1000-B

❄ PowerFlex 700H has an integral input line reactor. Output line reactors were sized based on the VFD rated output currents.

Output Line Reactors - 480V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.
20CD261	Heavy Duty	150	1321-3R200-C	1321-3RA200-C
20CD261	Normal Duty	200	1321-3RB250-C	1321-3RAB250-C
20CD300	Heavy Duty	200	1321-3RB250-C	1321-3RAB250-C
20CD300	Normal Duty	250	1321-3RB320-C	1321-3RAB320-C
20CD385	Heavy Duty	250	1321-3RB320-C	1321-3RAB320-C
20CD385	Normal Duty	300	1321-3RB400-C	1321-3RAB400-C
20CD460	Heavy Duty	300	1321-3RB400-C	1321-3RAB400-C
20CD460	Normal Duty	350	1321-3R500-C	1321-3RA500-C
20CD500	Heavy Duty	350	1321-3RB400-C	1321-3RAB400-C
20CD500	Normal Duty	450	1321-3R500-C	1321-3RA500-C
20CD590	Heavy Duty	450	1321-3R500-C	1321-3RA500-C
20CD590	Normal Duty	500	1321-3R600-C	1321-3RA600-C
20CD650	Heavy Duty	500	1321-3R600-C	1321-3RA600-C
20CD650	Normal Duty	500	1321-3R750-C ‡	1321-3RA750-C ‡
20CD730	Heavy Duty	500	1321-3R750-C ‡	1321-3RA750-C ‡
20CD730	Normal Duty	600	1321-3R750-C	1321-3RA750-C
20CD820	Heavy Duty	600	1321-3R750-C	1321-3RA750-C
20CD820	Normal Duty	700	1321-3R850-C	1321-3RA850-C
20CD920	Heavy Duty	700	1321-3R850-C	1321-3RA850-C
20CD920	Normal Duty	800	1321-3R1000-C	1321-3RA1000-C
20CD1030	Heavy Duty	800	1321-3R1000-C	1321-3RA1000-C
20CD1030	Normal Duty	900	1321-3R1000-C	1321-3RA1000-C

❄ PowerFlex 700H has an integral input line reactor. Output line reactors were sized based on the VFD rated output currents.
‡ 4% impedance.

Output Line Reactors - 600V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.
20CD170	Heavy Duty	150	1321-3R160-C	1321-3RA160-C
20CD170	Normal Duty	150	1321-3R200-C	1321-3RA200-C
20CD208	Heavy Duty	150	1321-3R200-C	1321-3RA200-C
20CD208	Normal Duty	200	1321-3R200-B	1321-3RA200-B
20CD261	Heavy Duty	200	1321-3R200-B	1321-3RA200-B
20CD261	Normal Duty	250	1321-3RB250-B	1321-3RAB250-B
20CD325	Heavy Duty	250	1321-3RB250-B	1321-3RAB250-B
20CD325	Normal Duty	350	1321-3RB320-B	1321-3RAB320-B
20CD385	Heavy Duty	350	1321-3RB320-B	1321-3RAB320-B
20CD385	Normal Duty	400	1321-3RB400-B	1321-3RAB400-B
20CD416	Heavy Duty	350	1321-3RB320-B	1321-3RAB320-B
20CD416	Normal Duty	450	1321-3RB400-B	1321-3RAB400-B
20CD460	Heavy Duty	400	1321-3RB400-B	1321-3RAB400-B
20CD460	Normal Duty	450	1321-3R500-B	1321-3RA500-B
20CD502	Heavy Duty	450	1321-3RB400-B	1321-3RAB400-B
20CD502	Normal Duty	500	1321-3R500-B	1321-3RA500-B
20CD590	Heavy Duty	500	1321-3R500-B	1321-3RA500-B
20CD590	Normal Duty	600	1321-3R600-B	1321-3RA600-B
20CD650	Heavy Duty	650	1321-3R600-B	1321-3RA600-B
20CD650	Normal Duty	700	1321-3R750-C	1321-3RA750-C
20CD750	Heavy Duty	700	1321-3R750-C	1321-3RA750-C
20CD750	Normal Duty	800	1321-3R750-C	1321-3RA750-C
20CD820	Heavy Duty	700	1321-3R750-C	1321-3RA750-C
20CD820	Normal Duty	900	1321-3R850-C	1321-3RA850-C

❄ PowerFlex 700H has an integral input line reactor. Output line reactors were sized based on the VFD rated output currents.

Factory Installed Options

Human Interface and Wireless Interface Modules IP20/NEMA Type 1 *(Position e)*

Catalog Code: 0
No HIM (Blank Cover)

Catalog Code: 3
LCD Full Numeric

Catalog Code: C
Door Mounted LCD
Full Numeric
Frame 10 & Up

Catalog Code: 8
DPI WIM

Internal Brake IGBT

Brake IGBT	Frame	Cat. Code *(Position g)*
None	9, 10, 11	N
Optional	9	Y

Internal EMC Filter and Common Mode Choke

Drive Input Voltage	Frame	CE Filter	Common Mode Choke	Cat. Code *(Position i)*
380…500V ac & 600…690V ac	9, 10, 11	with Filter	No Choke	B
380…500V ac & 600…690V ac	9	No Filter	No Choke	N*

* For use with ungrounded distribution systems.

Control and I/O Options

Description	Cat. Code *(Position k)*
24V dc Digital Input w/Analog I/O & 115V ac Digital Output	A
115V ac Digital Input w/Analog I/O & 115V ac Digital Output	B
None	N

Notes

Expanded

Slim

Contents

Conformity to Standards

The PowerFlex® 700S conforms to the following:

Conformity to:	Standard Product
UL Listed	✓
c-UL Listed	✓
CE Approved	✓
C-Tick	✓
IEC (Designed to Meet)	✓

Drive Description

The PowerFlex 700S AC drive offers optimized integration for the most demanding drive control and drive system applications. The PowerFlex 700S with DriveLogix™ combines the powerful performance and flexible control of a PowerFlex AC drive with the high-performance Logix™ engine to produce a highly functional, cost-effective, drive and control solution. Available ratings include:

- 1 to 100 Hp at 240V ac
- 1 to 900 Hp at 480V ac
- 1 to 900 Hp at 600V ac
- 50 to 800 kW at 690V ac

An LCD Human Interface Module (also used with the PowerFlex 70, 700 and 700H) provides local startup, metering, programming and troubleshooting.

To meet a wide variety of application needs, the PowerFlex 700S AC drive is configurable for:

- Volts-per-Hertz
- Sensorless Vector
- Vector Control with Force Technology™
- Permanent Magnet Motor Control

The control is housed in a separately removable cassette which is the same for all drive ratings, simplifying installation and maintenance for the entire product line.

Optional internal communication modules provide fast and efficient control and/or data exchange over the following interfaces:

- DeviceNet™
- ControlNet™
- EtherNet/IP
- PROFIBUS
- Remote I/O
- Other open control and communication networks.
- PC tools such as DriveExplorer and DriveTools SP to assist with programming, monitoring and troubleshooting.

Phase II Features

Digital Inputs	(3) 24V dc and (3) 24V dc/120V ac (6) Programmable with (1) Configurable for HW Enable
Digital Outputs	(2) Open Collector, Max Load 750 mA (1) Relay, 24V dc/120V ac
Analog Inputs	(2) ±10V dc/0-20 mA Differential Inputs, 13 bit + sign (1) 0-10V dc Differential Input, 10 bit
Analog Outputs	(2) ±10V dc/0-20 mA Differential Outputs, 11 bit + sign
Encoder Inputs	(1) 5/12V Encoder Input Quadrature/Differential (Optional Second Encoder)
DriveLogix - I/O Option	Compact I/O - up to 2 racks, (16) modules

Phase II Catalog Number Explanation

Position	1-3	4	5-7	8	9	10	11	12	13	14	15	16	17
	20D	D	2P1	A	0	E	Y	N	A	N	A	N	E
	a	b	c	d	e	f	g	h	i	j	k	l	m

a

Drive	
Code	Type
20D	PowerFlex 700S

b

Voltage Rating			
Code	Voltage	Ph.	Prechg.
B §	240V ac	3	—
C §	400V ac	3	—
D §	480V ac	3	—
E ♣ §	600V ac	3	—
F ⌘	690V ac	3	—
H ⌘	540V dc	—	N
J ⌘	650V dc	—	N
K ⌘	810V dc	—	N
M ⌘	932V dc	—	N
P ➤	540V dc	—	Y
R ➤	650V dc	—	Y

♣ Note: CE Certification testing has not been performed on 600V class drives.

➤ Frames 5 & 6 Only.

⌘ Frames 5 & up.

§ For DC input on Frames 1…4, use the corresponding AC input code B, C, D, or E.

c1

ND Rating			
208/240V, 60Hz Input			
Code	208V Amps	240V Amps	Hp
4P2	4.8	4.2	1.0
6P8	7.8	6.8	2.0
9P6	11	9.6	3.0
015	17.5	15.3	5.0
022	25.3	22	7.5
028	32.2	28	10
042	48.3	42	15
052	56	52	20
070	78.2	70	25
080	92	80	30
104	120	104	40
130	130	130	50
154	177	154	60
192	221	192	75
260	260	260	100

c2

ND Rating		
400V, 50 Hz Input		
Code	Amps	kW
2P1	2.1	0.75
3P5	3.5	1.5
5P0	5.0	2.2
8P7	8.7	4.0
011	11.5	5.5
015	15.4	7.5
022	22	11
030	30	15
037	37	18.5
043	43	22
056	56	30
072	72	37
085	85	45
105	105	55
125	125	55
140	140	75
170	170	90
260	260	132
261	261	132
300	300	160
385	385	200
460	460	250
500	500	250
590	590	315
650	650	355
730	730	400
820 ♠	820	450
920 ♠	920	500
1K0 ♠	1030	560

♠ Release pending at date of printing. Verify before ordering.

c3

ND Rating		
480V, 60 Hz Input		
Code	Amps	Hp
2P1	2.1	1.0
3P4	3.4	2.0
5P0	5	3.0
8P0	8	5.0
011	11	7.5
014	14	10
022	22	15
027	27	20
034	34	25
040	40	30
052	52	40
065	65	50
077	77	60
096	96	75
125	125	100
156	156	125
180	180	150
248	248	200
261	261	200
300	300	250
385	385	300
460	460	350
500	500	450
590	590	500
650	650	500
730	730	600
820 ♠	820	700
920 ♠	920	800
1K0 ♠	1030	900

♠ Release pending at date of printing. Verify before ordering.

c4

ND Rating		
600V, 60Hz Input ♣		
Code	Amps	Hp
1P7	1.7	1
2P7	2.7	2
3P9	3.9	3
6P1	6.1	5
9P0	9	7.5
011	11	10
017	17	15
022	22	20
027	27	25
032	32	30
041	41	40
052	52	50
062	62	60
077	77	75
099	99	100
125	125	125
144	144	150
170	170	150
208	208	200
261	261	250
325	325	350
385	385	400
416	416	450
460 ♠	460	450
502 ♠	502	500
590 ♠	590	600
650 ♠	650	700
750 ♠	750	800
820 ♠	820	900

♣ CE Certification testing has not been performed on 600V class drives.

♠ Release pending at date of printing. Verify before ordering.

c5

ND Rating		
690V, 50 Hz Input ♣		
Code	Amps	Hp
052	52	45
060	60	55
082	82	75
098	98	90
119	119	110
142	142	132
170	170	160
208	208	200
261	261	250
325	325	315
385	385	355
416	416	400
460 ♠	460	450
502 ♠	502	500
590 ♠	590	560
650 ♠	650	630
750 ♠	750	710
820 ♠	820	800

♣ CE Certification testing has not been performed on 600V class drives.

♠ Release pending at date of printing. Verify before ordering.

d

Enclosure	
Code	Enclosure
A	IP20, NEMA Type 1
N ✦	Open/IP00
F ⌘	IP54, NEMA Type 12

✦ Frames 9 & up Only.

⌘ Frames 5 & 6 pending.

e

HIM	
Code	Operator Interface
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
5	Prog. Only LCD
C	Full Numeric LCD, Door Mount ❄

❄ Frames 10 & up only.

f

Documentation	
Code	Documents
E	Quick Start Guide
N	No Documentation

g

Brake	
Code	w/Brake IGBT ‡
Y	Yes
N	No

‡ Brake IGBT is standard on Frames 1-3 and optional on Frames 4-9 ONLY.

h

Brake Resistor	
Code	w/Resistor
Y	Yes ✶
N	No

✶ Not available for Frame 3 drives or larger.

i

Emission		
Code	CE Filter	CM Choke
A ❖	Yes	Yes
B ➤	Yes	No
N §	No	No

❖ Frames 1-6 Only.

➤ Frames 9 & up Only.

§ For use on ungrounded distribution systems (Frame 9 drives only).

j

Comm Slot	
Code	Version
N	None
C	DPI ControlNet (Coax)
D	DPI DeviceNet
E	DPI EtherNet/IP
Q	DPI ControlNet (Fiber)
R	DPI RIO
S	DPI RS-485 DF1
1	DriveLogix ControlNet (Coax)
2	DriveLogix ControlNet Redundant (Coax)
3	DriveLogix ControlNet (Fiber)
4	DriveLogix ControlNet Redundant (Fiber)
5	DriveLogix DeviceNet (Open Conn.)
6	DriveLogix EtherNet/IP

k

Control Options				
Code	Control Option	Logic Expansion	Synch -Link	Cassette
A	Phase II	No	No	Expanded
B	Phase II	No	Yes	Expanded
C	Phase II	Yes	No	Expanded
D	Phase II	Yes	Yes	Expanded
G	Phase II	N/A	No	Slim
H	Phase II	N/A	Yes	Slim

l

Feedback	
Code	Option
N	None
A ❖	Resolver
B ❖	Stegman Hi-Resolution Encoder
C ❖	Multi-Device Interface
E ❖	2nd Encoder
S ❖	Safe-Off (w/2nd Encoder)

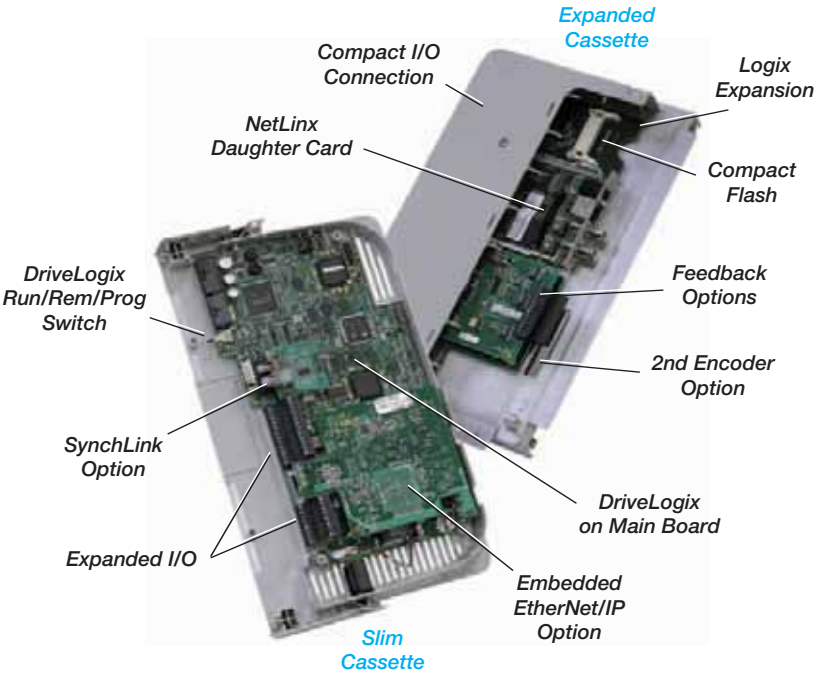
❖ Expanded cassette required.

m

Additional Config.	
Code	Description
E	Phase II Control
K	Phase II DriveLogix5730
L	Phase II DriveLogix5730 w/EtherNet/IP

Phase II Product Selection

- Slim Cassette Options
  - – Embedded EtherNet/IP
  - – DPI communication (20-Comm-xx)
  - – DriveLogix5730 controller
  - – SynchLink
- Expanded Cassette Options
  - – Speed & Position Feedback devices
    - 2nd Encoder
    - Resolver
    - Stegmann or Heidenhain
  - – DriveLogix Expansion board
    - NetLinx™ Communication (1788-xxxx)
    - Compact I/O connection
    - CompactFlash™



208/240V ac, Three-Phase Drives

240V ac Input ✶					208V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.			20D…	
4.2	4.8	6.4	1.0	0.75	4.8	5.6	7.0	0.75	0.37	B4P2A0EYNANANE	1
6.8	9.0	12	2.0	1.5	7.8	10.4	13.8	1.5	0.75	B6P8A0EYNANANE	1
9.6	10.6	14.4	3.0	2.0	11	12.1	17	2.2	1.5	B9P6A0EYNANANE	1
15.3	16.8	23	5.0	3.0	17.5	19.3	26.3	4.0	2.2	B015A0EYNANANE	1
22	24.2	33	7.5	5.0	25.3	27.8	38	5.5	4.0	B022A0EYNANANE	1
28	33	44	10	7.5	32.2	38	50.6	7.5	5.5	B028A0EYNANANE	2
42	46.2	63	15	10	48.3	53.1	72.5	11	7.5	B042A0EYNANANE	3
52	63	80	20	15	56	64	86	15	11	B052A0EYNANANE	3
70	78	105	25	20	78.2	86	117.3	18.5	15	B070A0ENNANANE	4
80	105	136	30	25	92	117.3	156.4	22	18.5	B080A0ENNANANE	4
104 (80) ❄	115 (120)	175 (160)	40	30	120 (92)	132 (138)	175 (175)	30	22	B104A0ENNANANE	5
130 (104) ❄	143 (156)	175 (175)	50	40	130 (104)	143 (156)	175 (175)	30	30	B130A0ENNANANE	5
154 (130) ❄	169 (195)	231 (260)	60	50	177 (150)	195 (225)	266 (300)	45	37	B154A0ENNANANE	6
192 (154) ❄	211 (231)	288 (308)	75	60	221 (177)	243 (266)	308 (308)	55	45	B192A0ENNANANE	6
260 (205) ❄	286 (305)	390 (410)	100	75	260 (205)	286 (305)	390 (410)	66	55	B260A0ENNANANE	6

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input					IP20, NEMA Type 1	
Output Amps			Normal	Heavy	Output Amps			Normal	Heavy	Cat. No.	Frame
Cont.	1 Min.	3 Sec.	Duty Hp	Duty Hp	Cont.	1 Min.	3 Sec.	Duty kW	Duty kW	20D…	Size
2.1	2.4	3.2	1	0.75	2.1	2.4	3.2	0.75	0.55	D2P1A0EYNANANE	1
3.4	4.5	6	2	1.5	3.5	4.5	6	1.5	0.75	D3P4A0EYNANANE	1
5	5.5	7.5	3	2	5	5.5	7.5	2.2	1.5	D5P0A0EYNANANE	1
8	8.8	12	5	3	8.7	9.9	13.2	4	2.2	D8P0A0EYNANANE	1
11	12.1	16.5	7.5	5	11.5	13	17.4	5.5	4	D011A0EYNANANE	1
14	16.5	22	10	7.5	15.4	17.2	23.1	7.5	5.5	D014A0EYNANANE	1
22	24.2	33	15	10	22	24.2	33	11	7.5	D022A0EYNANANE	1
27	33	44	20	15	30	33	45	15	11	D027A0EYNANANE	2
34	40.5	54	25	20	37	45	60	18.5	15	D034A0EYNANANE	2
40	51	68	30	25	43	56	74	22	18.5	D040A0EYNANANE	3
52	60	80	40	30	56	64	86	30	22	D052A0EYNANANE	3
65	78	104	50	40	72	84	112	37	30	D065A0EYNANANE	3
77 (65) ❄	85 (98)	116 (130)	60	50	85 (72) ‡	94 (108)	128 (144)	45	37	D077A0ENNANANE	4
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	D096A0ENNANANE	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	D125A0ENNANANE	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	D156A0ENNANANE	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) §	220 (255)	289 (313)	110	90	D180A0ENNANANE	6
248 (180) ❄	273 (270)	372 (360)	200	150	260 (205)	286 (308)	390 (410)	132	110	D248A0ENNANANE	6
261 (205) ❄	287 (308)	410 (410)	200	150	261 (205)	287 (308)	410 (410)	132	110	D261A0ENNBNANE	9
300 (245) ❄	330 (368)	450 (490)	250	200	300 (245)	330 (368)	450 (490)	160	130	D300A0ENNBNANE	9
385 (300) ❄	424 (450)	600 (600)	300	250	385 (300)	424 (450)	600 (600)	200	160	D385A0ENNBNANE	10
460 (385) ❄	506 (578)	770 (770)	350	300	460 (385)	506 (578)	770 (770)	250	200	D460A0ENNBNANE	10
500 (420) ❄	550 (630)	750 (840)	450	350	500 (420)	550 (630)	750 (840)	250	250	D500A0ENNBNANE	10
590 (520) ❄	649 (780)	956 (956)	500	450	590 (520)	649 (780)	956 (956)	315	250	D590A0ENNBNANE	11
650 (590) ❄	715 (885)	1062 (1062)	500	500	650 (590)	715 (885)	1062 (1062)	355	315	D650A0ENNBNANE	11
730 (650) ❄	803 (975)	1095 (1170)	600	500	730 (650)	803 (975)	1095 (1170)	400	355	D730A0ENNBNANE	11
820 (730) ❄♠	902 (1095)	1230 (1314)	700	600	820 (730)	902 (1095)	1230 (1314)	450	400	D820A0ENNBNANE	12
920 (820) ❄♠	1012 (1230)	1380 (1476)	800	700	920 (820)	1012 (1230)	1380 (1476)	500	450	D920A0ENNBNANE	12
1030 (920) ❄⌘♠	1133 (1370)	1555 (1600)	900	800	1030 (920)	1133 (1370)	1555 (1600)	560	500	D1K0A0ENNBNANE	12

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These drives have dual current ratings; one for normal duty applications, and one for heavy duty (in parenthesis). The drive may be operated at either rating.

‡ 380-400V, 85 A rating is limited to 45°C surrounding air.
§ 380-400V, 205 A rating is limited to 40°C surrounding air.
⌘ Rating is limited to 35°C surrounding air.
♠ Release pending at date of printing. Verify before ordering.

600…690V ac, Three-Phase Drives

600V ac Input ✶♣					690V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No. 20D…	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.				
1.7	2.0	2.6	1	0.5	–	–	–	–	–	E1P7A0EYNANANE	1
2.7	3.6	4.8	2	1	–	–	–	–	–	E2P7A0EYNANANE	1
3.9	4.3	5.9	3	2	–	–	–	–	–	E3P9A0EYNANANE	1
6.1	6.7	9.2	5	3	–	–	–	–	–	E6P1A0EYNANANE	1
9	9.9	13.5	7.5	5	–	–	–	–	–	E9P0A0EYNANANE	1
11	13.5	18	10	7.5	–	–	–	–	–	E011A0EYNANANE	1
17	18.7	25.5	15	10	–	–	–	–	–	E017A0EYNANANE	1
22	25.5	34	20	15	–	–	–	–	–	E022A0EYNANANE	2
27	33	44	25	20	–	–	–	–	–	E027A0EYNANANE	2
32	40.5	54	30	25	–	–	–	–	–	E032A0EYNANANE	3
41	48	64	40	30	–	–	–	–	–	E041A0EYNANANE	3
52	61.5	82	50	40	–	–	–	–	–	E052A0EYNANANE	3
62	78	104	60	50	–	–	–	–	–	E062A0EYNANANE	4
77 (63) ❄	85 (94)	116 (126)	75	60	82 (60)	90 (90)	120 (123)	75	55	E077A0ENNANANE	5
99 (77) ❄	109 (116)	126 (138)	100	75	98 (82) §	108 (123)	127 (140)	90	75	E099A0ENNANANE	5
125 (99) ❄	138 (149)	188 (198)	125	100	119 (98)	131 (147)	179 (196)	110	90	E125A0ENNANANE	6
144 (125) ❄	158 (188)	216 (250)	150	125	142 (119)	156 (179)	213 (238)	132	110	E144A0ENNANANE	6
170 (144) ❄	187 (216)	245 (245)	150	150	170 (144)	187 (216)	245 (245)	160	132	E170A0ENNBNANE	9
208 (170) ❄⌘	230 (250)	289 (289)	200	150	208 (170) ⌘	230 (250)	289 (289)	200	160	E208A0ENNBNANE	9
261 (208) ❄	287 (312)	375 (375)	250	200	261 (208)	287 (312)	375 (375)	250	200	E261A0ENNBNANE	10
325 (261) ❄	358 (392)	470 (470)	350	250	325 (261)	358 (392)	470 (470)	315	250	E325A0ENNBNANE	10
385 (325) ❄	424 (488)	585 (585)	400	350	385 (325)	424 (488)	585 (585)	355	315	E385A0ENNBNANE	10
416 (325) ❄	458 (488)	585 (585)	450	350	416 (325)	458 (488)	585 (585)	400	315	E416A0ENNBNANE	10
460 (385) ❄♠	506 (578)	693 (693)	450	400	460 (385)	506 (578)	693 (693)	450	355	E460A0ENNBNANE	11
502 (460) ❄♠	552 (690)	828 (828)	500	450	502 (460)	552 (690)	828 (828)	500	450	E502A0ENNBNANE	11
590 (502) ❄♠	649 (753)	904 (904)	600	500	590 (502)	649 (753)	904 (904)	560	500	E590A0ENNBNANE	11
650 (590) ❄♠	715 (885)	1062 (1062)	700	650	650 (590)	715 (885)	1062 (1062)	630	560	E650A0ENNBNANE	12
750 (650) ❄♠	825 (975)	1170 (1170)	800	700	750 (650)	825 (975)	1170 (1170)	710	630	E750A0ENNBNANE	12
820 (750) ❄⌘♠	902 (975)	1170 (1170)	900	700	820 (750)	902 (975)	1170 (1170)	800	630	E820A0ENNBNANE	12

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
§ Rating is limited to 40°C surrounding air.
♣ CE Certification testing has not been performed on 600V class drives.
⌘ Rating is limited to 35°C surrounding air.
♠ Release pending at date of printing. Verify before ordering.

DC Input Drives

DC input for Frames 1…4 use the same code as AC input. Refer to the tables below for frames 5 and 6.

325V dc Input Drives

325V dc Input ✶					280V dc Input						IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW		Cat. No. 20D…	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
104 (80)❄	115 (120)	175 (160)	40	30	120 (92)	132 (138)	175 (175)	30	22	Y	N104A0ENNANANE	5
130 (104)❄	143 (156)	175 (175)	50	40	130 (104)	143 (156)	175 (175)	37	30	Y	N130A0ENNANANE	5
154 (130)❄	169 (195)	231 (260)	60	50	177 (150)	195 (225)	266 (300)	45	37	Y	N154A0ENNANANE	6
192 (154)❄	211 (231)	288 (308)	75	60	221 (177)	243 (266)	308 (308)	55	45	Y	N192A0ENNANANE	6
260 (205)❄	286 (305)	390 (410)	100	75	260 (205)	286 (305)	390 (410)	66	55	Y	N260A0ENNANANE	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

650V dc Input Drives

650V dc Input ✶					540V dc Input						IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	DC Pre-charge	Cat. No. 20D…	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
96 (77)❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	N	J096A0ENNANANE	5
96 (77)❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	Y	R096A0ENNANANE	5
125 (96)❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	N	J125A0ENNANANE	5
125 (96)❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	Y	R125A0ENNANANE	5
156 (125)❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	N	J156A0ENNANANE	6
156 (125)❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	Y	R156A0ENNANANE	6
180 (156)❄	198 (234)	270 (312)	150	125	205 (170)✦	220 (255)	289 (313)	110	90	N	J180A0ENNANANE	6
180 (156)❄	198 (234)	270 (312)	150	125	205 (170)✦	220 (255)	289 (313)	110	90	Y	R180A0ENNANANE	6
248 (180)❄➤	273 (270)	372 (360)	200	150	260 (205)➤	286 (308)	390 (410)	132	110	N	J248A0ENNANANE	6
248 (180)❄➤	273 (270)	372 (360)	200	150	260 (205)➤	286 (308)	390 (410)	132	110	Y	R248A0ENNANANE	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
➤ Rating is limited to 45°C surrounding air.
✦ Rating is limited to 40°C surrounding air.

810V dc Input Drives

810V dc Input ✶					690V dc Input						IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	DC Pre-charge	Cat. No. 20D…	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.					
99 (77)❄✦	109 (116)	126 (138)	100	75	98 (82)✦	108 (123)	127 (140)	90	75	Y	T099A0ENNANANE	5
144 (125)❄	158 (188)	216 (250)	150	125	142 (119)	156 (179)	213 (238)	132	110	Y	T144A0ENNANANE	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
✦ Rating is limited to 40°C surrounding air.

Flange Mount
Front = IP20, NEMA Type Open, Back/Heatsink = IP54, NEMA Type 12 *(Position d = F)*

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input					Cat. No.	Frame Size
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW		
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.			20D…	
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	D096F0ENNANANE	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	D125F0ENNANANE	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	D156F0ENNANANE	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) ✦	220 (255)	289 (313)	110	90	D180F0ENNANANE	6
248 (180) ❄➤	273 (270)	372 (360)	200	150	260 (205) ➤	286 (308)	390 (410)	132	110	D248F0ENNANANE	6

✶ Catalog number corresponds to output amps in these columns. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ Frame 5 and 6 drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
➤ Rating is limited to 45°C surrounding air.
✦ Rating is limited to 40°C surrounding air.

Phase I PowerFlex 700S

Phase I Control

Phase I Features

Digital Inputs	(4) 24V dc Inputs (3) Programmable (1) Enable Inputs
Digital Outputs	(2) Open Collector, Max Load 25 mA (1) Relay, 24V dc
Analog Inputs	(2) ±10V dc/±1V dc Differential Inputs, 13 bit + sign
Analog Outputs	(2) ±10V dc Differential Outputs, 11 bit + sign
Encoder Inputs	(2) 5/12V Encoder Inputs Quadrature/Differential
DriveLogix - I/O Option	Flex I/O - up to 1 rail, (8) modules

Phase I Catalog Number Explanation

Position	1-3	4	5-7	8	9	10	11	12	13	14	15	16	17
	20D	D	2P1	A	0	E	Y	N	A	N	N	N	N
	a	b	c	d	e	f	g	h	i	j	k	l	m

a

Drive	
Code	Type
20D	PowerFlex 700S

b

Voltage Rating			
Code	Voltage	Ph.	Prechg.
B	240V ac	3	—
C	400V ac	3	—
D	480V ac	3	—
E	600V ac ♣	3	—
F	690V ac ➤	3	—
H	540V dc ⌘	—	N
J	650V dc ⌘	—	N
P	540V dc ➤	—	Y
R	650V dc ➤	—	Y

♣ Note: CE Certification testing has not been performed on 600V class drives.
➤ Frames 5 & 6 Only.
⌘ Frames 5 & up.

c1

ND Rating			
208/240V, 60Hz Input			
Code	208V Amps	240V Amps	Hp
4P2	4.8	4.2	1.0
6P8	7.8	6.8	2.0
9P6	11	9.6	3.0
015	17.5	15.3	5.0
022	25.3	22	7.5
028	32.2	28	10
042	48.3	42	15
052	56	52	20
070	78.2	70	25
080	92	80	30
104	120	104	40
130	130	130	50
154	177	154	60
192	221	192	75

c2

ND Rating		
400V, 50 Hz Input		
Code	Amps	kW
2P1	2.1	0.75
3P5	3.5	1.5
5P0	5.0	2.2
8P7	8.7	4.0
011	11.5	5.5
015	15.4	7.5
022	22	11
030	30	15
037	37	18.5
043	43	22
056	56	30
072	72	37
085	85	45
105	105	55
125	125	55
140	140	75
170	170	90
260	260	132
261	261	132
300	300	160
385	385	200
460	460	250
500	500	250
590	590	315
650	650	355
730	730	400

c3

ND Rating		
480V, 60 Hz Input		
Code	Amps	Hp
2P1	2.1	1.0
3P4	3.4	2.0
5P0	5	3.0
8P0	8	5.0
011	11	7.5
014	14	10
022	22	15
027	27	20
034	34	25
040	40	30
052	52	40
065	65	50
077	77	60
096	96	75
125	125	100
156	156	125
180	180	150
248	248	200
261	261	200
300	300	250
385	385	300
460	460	350
500	500	450
590	590	500
650	650	500
730	730	600

c4

ND Rating		
600V, 60Hz Input ♣		
Code	Amps	Hp
022	22	20
027	27	25
032	32	30
041	41	40
052	52	50
062	62	60
077	77	75
099	99	100
125	125	125
144	144	150

♣ CE Certification testing has not been performed on 600V class drives.

c5

ND Rating		
690V, 50 Hz Input ♣		
Code	Amps	Hp
052	52	45
060	60	55
082	82	75
098	98	90
119	119	110
142	142	132

♣ CE Certification testing has not been performed on 600V class drives.

d

Enclosure	
Code	Enclosure
A	IP20, NEMA Type 1
N	Open/IP00 ⌘

⌘ Frames 9 & up Only.

e

HIM	
Code	Operator Interface
0	Blank Cover
2	Digital LCD
3	Full Numeric LCD
5	Prog. Only LCD
C	Full Numeric LCD, Door Mount ❄

❄ Frames 10 & up only.

f

Documentation	
Code	Documents
E	Quick Start Guide
N	No Documentation

g

Brake	
Code	w/Brake IGBT ‡
Y	Yes
N	No

‡ Brake IGBT is standard on Frames 1-3 and optional on Frames 4-9 ONLY.

h

Brake Resistor	
Code	w/Resistor
Y	Yes ✶
N	No

✶ Not available for Frame 3 drives or larger.

i

Emission		
Code	CE Filter	CM Choke
A ❖	Yes	Yes
B ⌘	Yes	No
N §	No	No

❖ Frames 1-6 Only.
⌘ Frames 9 & up Only.
§ For use on ungrounded distribution systems (Frame 9 drives only).

j

Comm Slot	
Code	Version
N	None
C	DPI ControlNet (Coax)
D	DPI DeviceNet
E	DPI EtherNet/IP
Q	DPI ControlNet (Fiber)
R	DPI RIO
S	DPI RS-483 DF1
1	DriveLogix ControlNet (Coax)
2	DriveLogix ControlNet Redundant (Coax)
3	DriveLogix ControlNet (Fiber)
4	DriveLogix ControlNet Redundant (Fiber)
5	DriveLogix DeviceNet (Open Conn.)
6	DriveLogix EtherNet/IP

k

Control Options				
Code	Control Option	Logic Expansion	Synch -Link	Cassette
N	Phase I	N/A	Stand ard	None

l

Feedback	
Code	Option
N	None
A	Resolver
B	Stegman Hi-Resolution Encoder
C	Multi-Device Interface

m

Additional Config.	
Code	Description
N	Phase I Control
A	Phase I DriveLogix5720
B	Phase I DriveLogix5720 w/Expanded Memory

Phase I Product Selection

208/240V ac, Three-Phase Drives

240V ac Input ✶					208V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.			20D…	
4.2	4.8	6.4	1.0	0.75	4.8	5.6	7.0	0.75	0.37	B4P2A0EYNANNNN	1
6.8	9.0	12	2.0	1.5	7.8	10.4	13.8	1.5	0.75	B6P8A0EYNANNNN	1
9.6	10.6	14.4	3.0	2.0	11	12.1	17	2.2	1.5	B9P6A0EYNANNNN	1
15.3	16.8	23	5.0	3.0	17.5	19.3	26.3	4.0	2.2	B015A0EYNANNNN	1
22	24.2	33	7.5	5.0	25.3	27.8	38	5.5	4.0	B022A0EYNANNNN	1
28	33	44	10	7.5	32.2	38	50.6	7.5	5.5	B028A0EYNANNNN	2
42	46.2	63	15	10	48.3	53.1	72.5	11	7.5	B042A0EYNANNNN	3
52	63	80	20	15	56	64	86	15	11	B052A0EYNANNNN	3
70	78	105	25	20	78.2	86	117.3	18.5	15	B070A0ENNANNNN	4
80	105	136	30	25	92	117.3	156.4	22	18.5	B080A0ENNANNNN	4
104 (80) ❄	115 (120)	175 (160)	40	30	120 (92)	132 (138)	175 (175)	30	22	B104A0ENNANNNN	5
130 (104) ❄	143 (156)	175 (175)	50	40	130 (104)	143 (156)	175 (175)	30	30	B130A0ENNANNNN	5
154 (130) ❄	169 (195)	231 (260)	60	50	177 (150)	195 (225)	266 (300)	45	37	B154A0ENNANNNN	6
192 (154) ❄	211 (231)	288 (308)	75	60	221 (177)	243 (266)	308 (308)	55	45	B192A0ENNANNNN	6

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.

380…480V ac, Three-Phase Drives

480V ac Input ✶					380…400V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.			20D…	
2.1	2.4	3.2	1	0.75	2.1	2.4	3.2	0.75	0.55	D2P1A0EYNANNNN	1
3.4	4.5	6	2	1.5	3.5	4.5	6	1.5	0.75	D3P4A0EYNANNNN	1
5	5.5	7.5	3	2	5	5.5	7.5	2.2	1.5	D5P0A0EYNANNNN	1
8	8.8	12	5	3	8.7	9.9	13.2	4	2.2	D8P0A0EYNANNNN	1
11	12.1	16.5	7.5	5	11.5	13	17.4	5.5	4	D011A0EYNANNNN	1
14	16.5	22	10	7.5	15.4	17.2	23.1	7.5	5.5	D014A0EYNANNNN	1
22	24.2	33	15	10	22	24.2	33	11	7.5	D022A0EYNANNNN	1
27	33	44	20	15	30	33	45	15	11	D027A0EYNANNNN	2
34	40.5	54	25	20	37	45	60	18.5	15	D034A0EYNANNNN	2
40	51	68	30	25	43	56	74	22	18.5	D040A0EYNANNNN	3
52	60	80	40	30	56	64	86	30	22	D052A0EYNANNNN	3
65	78	104	50	40	72	84	112	37	30	D065A0EYNANNNN	3
77 (65) ❄	85 (98)	116 (130)	60	50	85 (72) ‡	94 (108)	128 (144)	45	37	D077A0ENNANNNN	4
96 (77) ❄	106 (116)	144 (154)	75	60	105 (85)	116 (128)	158 (170)	55	45	D096 A0ENNANNNN	5
125 (96) ❄	138 (144)	163 (168)	100	75	125 (96)	138 (144)	163 (168)	55	45	D125A0ENNANNNN	5
156 (125) ❄	172 (188)	233 (250)	125	100	170 (140)	187 (210)	255 (280)	90	75	D156A0ENNANNNN	6
180 (156) ❄	198 (234)	270 (312)	150	125	205 (170) §	220 (255)	289 (313)	110	90	D180A0ENNANNNN	6
248 (180) ❄	273 (270)	372 (360)	200	150	260 (205)	286 (308)	390 (410)	132	110	D248A0ENNANNNN	6
261 (205) ❄	287 (308)	410 (410)	200	150	261 (205)	287 (308)	410 (410)	132	110	D261A0ENNBNNNN	9 ♣
300 (245) ❄	330 (368)	450 (490)	250	200	300 (245)	330 (368)	450 (490)	160	132	D300A0ENNBNNNN	9 ♣
385 (300) ❄	424 (450)	600 (600)	300	250	385 (300)	424 (450)	600 (600)	200	160	D385A0ENNBNNNN	10 ♣
460 (385) ❄	506 (578)	770 (770)	350	300	460 (385)	506 (578)	770 (770)	250	200	D460A0ENNBNNNN	10 ♣
500 (420) ❄	550 (630)	750 (840)	450	350	500 (420)	550 (630)	750 (840)	250	200	D500A0ENNBNNNN	10 ♣
590 (520) ❄	649 (780)	1040 (1040)	500	450	590 (520)	649 (780)	1040 (1040)	315	250	D590A0ENNBNNNN	11 ♣
650 (590) ❄	715 (885)	1180 (1180)	500	500	650 (590)	715 (885)	1180 (1180)	355	315	D650A0ENNBNNNN	11 ♣
730 (650) ❄	803 (945)	1095 (1260)	600	500	730 (650)	803 (945)	1095 (1260)	400	355	D730A0ENNBNNNN	11 ♣

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These have dual current ratings; one for normal duty applications, and one for heavy duty (in parenthesis). The drive may be operated at either rating.
‡ 380-400V, 85 A rating is limited to 45°C surrounding air.
§ 380-400V, 205 A rating is limited to 40°C surrounding air.
♣ Rating is limited to 40°C surrounding air.

600…690V ac, Three-Phase Drives

600V ac Input ✶♣					690V ac Input					IP20, NEMA Type 1	
Output Amps			Normal Duty Hp	Heavy Duty Hp	Output Amps			Normal Duty kW	Heavy Duty kW	Cat. No.	Frame Size
Cont.	1 Min.	3 Sec.			Cont.	1 Min.	3 Sec.			20D…	
22	25.5	34	20	15	–	–	–	–	–	E022A0ENYANNNN	2
27	33	44	25	20	–	–	–	–	–	E027A0ENYANNNN	2
32	40.5	54	30	25	–	–	–	–	–	E032A0ENYANNNN	3
41	48	64	40	30	–	–	–	–	–	E041A0ENYANNNN	3
52	61.5	82	50	40	–	–	–	–	–	E052A0ENYANNNN	3
62	78	104	60	50	–	–	–	–	–	E062A0ENNANNNN	4
77 (63) ❄	85 (94)	116 (126)	75	60	82 (60)	90 (90)	120 (123)	75	55	E077A0ENNANNNN	5
99 (77) ❄	109 (116)	126 (138)	100	75	98 (82) §	108 (123)	127 (140)	90	75	E099A0ENNANNNN	5
125 (99) ❄	138 (149)	188 (198)	125	100	119 (98)	131 (147)	179 (196)	110	90	E125A0ENNANNNN	6
144 (125) ❄	158 (188)	216 (250)	150	125	142 (119)	156 (179)	213 (238)	132	110	E144A0ENNANNNN	6

✶ Catalog number corresponds to output amps in this column. Drive must be programmed to lower voltage to obtain higher currents shown at right.
❄ These drives have dual current ratings; one for normal duty applications, and one for heavy duty applications (in parenthesis). The drive may be operated at either rating.
§ Rating is limited to 40°C surrounding air.
♣ CE Certification testing has not been performed on 600V class drives.

User Installed Options - Phase I & II Drives

Human Interface and Wireless Interface Modules

No HIM (Blank Plate)
20-HIM-A0

LCD Digital Speed
20-HIM-A2

LCD Full Numeric
20-HIM-A3

LCD Programmer Only
20-HIM-A5

DPI NEMA 1 WIM
20-WIM-N1

Remote (Panel Mount)
Full Numeric
20-HIM-C3

Remote (Panel Mount)
Full Numeric
20-HIM-C3S

Remote (Panel Mount)
Programmer Only
20-HIM-C5

Remote (Panel Mount)
Programmer Only
20-HIM-C5S

DPI NEMA 4 WIM
Remote (Panel Mount)
20-WIM-N4S

Description	Handheld/Local (Drive Mount) Cat. No.	Remote (Panel Mount) IP66, UL Type 4x/12 ✶ Cat. No.
Blank Plate	20-HIM-A0	–
LCD Display, Digital Speed	20-HIM-A2	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3 ❄
		20-HIM-C3S ‡
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5 ❄
		20-HIM-C5S ‡
DPI NEMA 1 WIM	20-WIM-N1	–
DPI NEMA 4 WIM	–	20-WIM-N4S

✶ For indoor use only.
❄ Includes a PowerFlex HIM Interface Cable (20-HIM-H10).
‡ Includes a 1202-C30 cable (3 meters).

Human Interface Module Accessories

Description	Cat. No.
Bezel Kit for LCD HIMs, NEMA 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
DPI/SCANport™ One to Two Port Splitter Cable	1203-S03

§ Includes an interface cable (1202-C30) 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).

Communication Option Kits

Description	Cat. No.
ControlNet (Coax) Communication Adapter - DPI	20-COMM-C
DeviceNet Communication Adapter - DPI	20-COMM-D
EtherNet/IP Communication Adapter - DPI	20-COMM-E
Interbus Communication Adapter - DPI	20-COMM-I
PROFIBUS Communication Adapter - DPI	20-COMM-P
ControlNet (Fiber) Communication Adapter - DPI	20-COMM-Q
Remote I/O Communication Adapter - DPI	20-COMM-R
RS-485 DF1 Communication Adapter - DPI	20-COMM-S
DriveLogix ControlNet Communication Adapter ✶❖	1788-CNC
DriveLogix Comm Option, ControlNet Redundant (Coax) ✶❖	1788-CNCR
DriveLogix Comm Option, ControlNet (Fiber) ✶❖	1788-CNF
DriveLogix Comm Option, ControlNet Redundant (Fiber) ✶❖	1788-CNFR
DriveLogix Comm Option, DeviceNet (Open Conn.) ✶❖	1788-DNBO
DriveLogix Comm Option, EtherNet/IP (Twisted Pair) ✶❖	1788-ENBT
DriveLogix5730 Comm Option, Embedded EtherNet/IP ⌘	20D-DL2-ENET0
External DPI Communications Kit	20-XCOMM-DC-BASE
External DPI I/O Option Board ✦	20-XCOMM-IO-OPT1
External Comms Power Supply	20-XCOMM-AC-PS1
Compact I/O Module (3 Channel)	1769-SM1

✶ For use with DriveLogix option only.
✦ For use only with External DPI Communications Kits 20-XCOMM-DC-BASE.
⌘ For use with Phase II Control ONLY.
❖ Requires Logix Expansion Board (20D-DL2-LEB0) when used with Phase II Control.

Communication Accessories

Description	Cat. No.
Smart Self-powered Serial Converter (RS-232) includes 1203-SFC and 1202-C10 Cables	1203-SSS
Serial Null Modem Adapter	1203-SNM
ControlNet T-Tap/Right Angle 1 Meter Coax Cable Assembly	1786-TPR

Accessories

Note: Please refer to publication number 1756-TD008 for details on SynchLink.

Description	Cat. No.
SynchLink Board for Phase II Control ⌘	20D-P2-SLB0
SynchLink Base Block (up to 4 splitter blocks)	1751SLBA/A
SynchLink 4 Port Splitter Block	1751SL4SP/A
SynchLink Bypass Switch Block	1751SLBP/A
2x1 Meter Fiber Link for Power Monitor/SynchLink	1403CF001
2x3 Meter Fiber Link for Power Monitor/SynchLink	1403CF003
2x5 Meter Fiber Link for Power Monitor/SynchLink	1403CF005
10 Meter Fiber Link for Power Monitor/SynchLink	1403CF010
20 Meter Fiber Link for Power Monitor/SynchLink	1403CF020
50 Meter Fiber Link for Power Monitor/SynchLink	1403CF050
100 Meter Fiber Link for Power Monitor/SynchLink	1403CF100
250 Meter Fiber Link for Power Monitor/SynchLink	1403CF250

⌘ For use with Phase II Control ONLY.

Feedback Option Kits

Description	Cat. No.
2nd Encoder, 5V/12V ➤⌘	20D-P2-ENC0
Resolver ➤	20D-RES-A1
Stegmann High Resolution Hyperface Encoder ➤	20D-STEG-B1
Multi-Device Interface ➤	20D-MDI-C1
Drive Guard Safe-Off (w/2nd Encoder)	20D-P2-DG01

➤ Requires Expanded Cassette when used with Phase II Control.
⌘ For use with Phase II Control ONLY.

Auxiliary Control Power Supply

Description	Cat. No.
Auxiliary Control Power Supply	20-24V-AUX1

DriveLogix Option Kits

Description	Cat. No.
Logix Expansion board for DriveLogix5730 ❄‡	20D-DL2-LEB0
Industrial CompactFlash - 64 Mb for DriveLogix5730 ‡	1784-CF64
DriveLogix5720 Controller, 256k bytes of User Available Memory	20D-DL-A0
DriveLogix5720 Memory Expansion, 512k bytes	20D-DL-ME1

❄ Requires Expanded Cassette when used with Phase II Control.
‡ For use with Phase II Control ONLY.

DriveLogix I/O Cables

Description	Cat. No.
DriveLogix5730 - Compact I/O cable, 3.28 ft. (1 meter), Left Bus Cap ❄‡§	20D-DL2-CL3
DriveLogix5730 - Compact I/O cable, 3.28 ft. (1 meter), Right Bus Cap ❄‡§	20D-DL2-CR3
DriveLogix 3 Meter RS-232 Programming Cable	1756-CP3
DriveLogix5720 Flex I/O Cable 91.4 cm (36 in.) ✶	4100-CCF3
Phase I Control Assembly Cover Kit	20D-CVR-CA1
DriveLogix5720 Flex I/O Cable w/Assembly Cover	20D-DL-FLX0

✶ Requires Control Assembly Cover Kit, 20D-CVR-CA1.
❄ Requires Expanded Cassette when used with Phase II Control.
‡ For use with Phase II Control ONLY.
§ Refer to Publication 1769-SG001 for details and selection of Compact I/O.

Phase II Drive Control Upgrade Kits

Description	Cat. No.
PowerFlex 700S Phase II Control with Expanded Cassette	20D-P2-CKE0
PowerFlex 700S DriveLogix5730 Phase II Control with Expanded Cassette	20D-DL2-CKE0

Internal Dynamic Brake Resistor Kits

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Brake Resistance Ω	Frame	Cat. No.
208…240V ac	62	1 (0.5…5.0 Hp)	20BB-DB1-1
	22	1 (7.5 Hp)	20BB-DB2-1
	22	2	20BB-DB1-2
380…480V ac	115	1	20BD-DB1-1
	68	2	20BD-DB1-2

Isolation Transformers

	240V, 60 Hz, Three-Phase, 240V Primary & 240V Secondary	460V, 60 Hz, Three-Phase, 460V Primary & 460V Secondary	575V, 60 Hz, Three-Phase 575V Primary & 575V Secondary
	IP32 (NEMA Type 3R)	IP32 (NEMA Type 3R)	IP32 (NEMA Type 3R)
Motor Rating kW (Hp)	Cat. No.	Cat. No.	Cat. No.
0.25 (0.33)	1321-3TW005-AA	1321-3TW005-BB	–
0.37 (0.5)	1321-3TW005-AA	1321-3TW005-BB	–
0.55 (0.75)	1321-3TW005-AA	1321-3TW005-BB	–
0.75 (1.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
1.1 (1.5)	1321-3TW005-AA	1321-3TW005-BB	–
1.5 (2.0)	1321-3TW005-AA	1321-3TW005-BB	1321-3TW005-CC
2.2 (3.0)	1321-3TW005-AA	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-AA	1321-3TW040-BB	1321-3TW040-CC
30 (40)	1321-3TW051-AA	1321-3TW051-BB	1321-3TW051-CC
37 (50)	1321-3TH063-AA	1321-3TH063-BB	1321-3TH063-CC
45 (60)	1321-3TH075-AA	1321-3TH075-BB	1321-3TH075-CC
55 (75)	1321-3TH093-AA	1321-3TH093-BB	1321-3TH093-CC
75 (100)	–	1321-3TH118-BB	1321-3TH118-CC
90 (125)	–	1321-3TH145-BB	1321-3TH145-CC
110 (150)	–	1321-3TH175-BB	1321-3TH175-CC
149 (200)	–	1321-3TH220-BB	–

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DB2P2	Heavy Duty	0.33	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20DB2P2	Normal Duty	0.5	1321-3R2-D	1321-3RA2-D	1321-3R2-D	1321-3RA2-D
20DB4P2	Heavy Duty	0.75	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20DB4P2	Normal Duty	1	1321-3R4-A	1321-3RA4-A	1321-3R4-A	1321-3RA4-A
20DB6P8	Heavy Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-A	1321-3RA8-A
20DB6P8	Normal Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R8-A	1321-3RA8-A
20DB9P6	Heavy Duty	2	1321-3R8-A	1321-3RA8-A	1321-3R12-A	1321-3RA12-A
20DB9P6	Normal Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R12-A	1321-3RA12-A
20DB015	Heavy Duty	3	1321-3R12-A	1321-3RA12-A	1321-3R18-A	1321-3RA18-A
20DB015	Normal Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R18-A	1321-3RA18-A
20DB022	Heavy Duty	5	1321-3R18-A	1321-3RA18-A	1321-3R25-A	1321-3RA25-A
20DB022	Normal Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R25-A	1321-3RA25-A
20DB028	Heavy Duty	7.5	1321-3R25-A	1321-3RA25-A	1321-3R35-A	1321-3RA35-A
20DB028	Normal Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R35-A	1321-3RA35-A
20DB042	Heavy Duty	10	1321-3R35-A	1321-3RA35-A	1321-3R45-A	1321-3RA45-A
20DB042	Normal Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R45-A	1321-3RA45-A
20DB052	Heavy Duty	15	1321-3R45-A	1321-3RA45-A	1321-3R55-A	1321-3RA55-A
20DB052	Normal Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R55-A	1321-3RA55-A
20DB070	Heavy Duty	20	1321-3R55-A	1321-3RA55-A	1321-3R80-A	1321-3RA80-A
20DB070	Normal Duty	25	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20DB080	Heavy Duty	25	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20DB080	Normal Duty	30	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20DB104	Heavy Duty	30	1321-3R80-A	1321-3RA80-A	1321-3R80-A	1321-3RA80-A
20DB104	Normal Duty	40	1321-3R100-A	1321-3RA100-A	1321-3R100-A	1321-3RA100-A
20DB130	Heavy Duty	40	1321-3R100-A	1321-3RA100-A	1321-3R100-A	1321-3RA100-A
20DB130	Normal Duty	50	1321-3R130-A	1321-3RA130-A	1321-3R130-A	1321-3RA130-A
20DB154	Heavy Duty	50	1321-3R130-A	1321-3RA130-A	1321-3R130-A	1321-3RA130-A
20DB154	Normal Duty	60	1321-3R160-A	1321-3RA160-A	1321-3R160-A	1321-3RA160-A
20DB192	Heavy Duty	60	1321-3R160-A	1321-3RA160-A	1321-3R160-A	1321-3RA160-A
20DB192	Normal Duty	75	1321-3R200-A	1321-3RA200-A	1321-3R200-A	1321-3RA200-A
20DB260	Heavy Duty	75	1321-3R200-A	1321-3RA200-A	1321-3R200-A	1321-3RA200-A
20DB260	Normal Duty	100	1321-3RB250-A	1321-3RAB250-A	1321-3RB250-A	1321-3RAB250-A

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 240V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DB2P2	Heavy Duty	0.33	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20DB2P2	Normal Duty	0.5	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20DB4P2	Heavy Duty	0.75	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20DB4P2	Normal Duty	1	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20DB6P8	Heavy Duty	1.5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20DB6P8	Normal Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20DB9P6	Heavy Duty	2	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20DB9P6	Normal Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20DB015	Heavy Duty	3	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20DB015	Normal Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20DB022	Heavy Duty	5	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20DB022	Normal Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20DB028	Heavy Duty	7.5	1321-3R25-B	1321-3RA25-B	1321-3R35-B	1321-3RA35-B
20DB028	Normal Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20DB042	Heavy Duty	10	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20DB042	Normal Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20DB052	Heavy Duty	15	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20DB052	Normal Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20DB070	Heavy Duty	20	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20DB070	Normal Duty	25	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DB080	Heavy Duty	25	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DB080	Normal Duty	30	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DB104	Heavy Duty	30	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DB104	Normal Duty	40	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DB130	Heavy Duty	40	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DB130	Normal Duty	50	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DB154	Heavy Duty	50	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DB154	Normal Duty	60	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20DB192	Heavy Duty	60	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20DB192	Normal Duty	75	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
20DB260	Heavy Duty	75	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
20DB260	Normal Duty	100	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DD1P1	Heavy Duty	0.33	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20DD1P1	Normal Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20DD2P1	Heavy Duty	0.75	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20DD2P1	Normal Duty	1	1321-3R2-A	1321-3RA2-A	1321-3R2-A	1321-3RA2-A
20DD3P4	Heavy Duty	1.5	1321-3R4-C	1321-3RA4-C	1321-3R4-B	1321-3RA4-B
20DD3P4	Normal Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R4-B	1321-3RA4-B
20DD5P0	Heavy Duty	2	1321-3R4-B	1321-3RA4-B	1321-3R8-C	1321-3RA8-C
20DD5P0	Normal Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20DD8P0	Heavy Duty	3	1321-3R8-C	1321-3RA8-C	1321-3R8-B	1321-3RA8-B
20DD8P0	Normal Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R8-B	1321-3RA8-B
20DD011	Heavy Duty	5	1321-3R8-B	1321-3RA8-B	1321-3R12-B	1321-3RA12-B
20DD011	Normal Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20DD014	Heavy Duty	7.5	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20DD014	Normal Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20DD022	Heavy Duty	10	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20DD022	Normal Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20DD027	Heavy Duty	15	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20DD027	Normal Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R25-B	1321-3RA25-B
20DD034	Heavy Duty	20	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20DD034	Normal Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20DD040	Heavy Duty	25	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20DD040	Normal Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20DD052	Heavy Duty	30	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20DD052	Normal Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20DD065	Heavy Duty	40	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20DD065	Normal Duty	50	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DD077	Heavy Duty	50	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DD077	Normal Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DD096	Heavy Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DD096	Normal Duty	75	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DD125	Heavy Duty	75	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DD125	Normal Duty	100	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DD140	Heavy Duty	75	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DD140	Normal Duty	100	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DD156	Heavy Duty	100	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DD156	Normal Duty	125	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20DD180	Heavy Duty	125	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B
20DD180	Normal Duty	150	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
20DD248	Heavy Duty	150	1321-3R200-B	1321-3RA200-B	1321-3R200-C	1321-3RA200-C
20DD248	Normal Duty	200	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B
20DD261	Heavy Duty	150	1321-3R200-B	1321-3RA200-B	1321-3R200-B	1321-3RA200-B
20DD261	Normal Duty	200	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B
20DD300	Heavy Duty	200	1321-3RB250-B	1321-3RAB250-B	1321-3RB250-B	1321-3RAB250-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 480V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DD1P1	Heavy Duty	0.33	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20DD1P1	Normal Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20DD2P1	Heavy Duty	0.75	1321-3R2-C	1321-3RA2-C	1321-3R2-B	1321-3RA2-B
20DD2P1	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20DD3P4	Heavy Duty	1.5	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20DD3P4	Normal Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20DD5P0	Heavy Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20DD5P0	Normal Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20DD8P0	Heavy Duty	3	1321-3R8-D	1321-3RA8-D	1321-3R8-C	1321-3RA8-C
20DD8P0	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20DD011	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20DD011	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20DD014	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20DD014	Normal Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20DD022	Heavy Duty	10	1321-3R18-C	1321-3RA18-C	1321-3R25-C	1321-3RA25-C
20DD022	Normal Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20DD027	Heavy Duty	15	1321-3R25-C	1321-3RA25-C	1321-3R25-C	1321-3RA25-C
20DD027	Normal Duty	20	1321-3R35-C‡	1321-3RA35-C‡	1321-3R25-C	1321-3RA25-C
20DD034	Heavy Duty	20	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C	1321-3RA35-C
20DD034	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20DD040	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R45-C	1321-3RA45-C
20DD040	Normal Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20DD052	Heavy Duty	30	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20DD052	Normal Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
20DD065	Heavy Duty	40	1321-3R55-C	1321-3RA55-C	1321-3R80-C	1321-3RA80-C
20DD065	Normal Duty	50	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DD077	Heavy Duty	50	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DD077	Normal Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DD096	Heavy Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DD096	Normal Duty	75	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20DD125	Heavy Duty	75	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20DD125	Normal Duty	100	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
20DD140	Heavy Duty	75	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20DD140	Normal Duty	100	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
20DD156	Heavy Duty	100	1321-3R130-C	1321-3RA130-C	1321-3R130-C	1321-3RA130-C
20DD156	Normal Duty	125	1321-3R160-C	1321-3RA160-C	1321-3R160-C	1321-3RA160-C
20DD180	Heavy Duty	125	1321-3R160-C	1321-3RA160-C	1321-3R160-C	1321-3RA160-C
20DD180	Normal Duty	150	1321-3R200-C	1321-3RA200-C	1321-3R200-C‡	1321-3RA200-C‡
20DD248	Heavy Duty	150	1321-3R200-C	1321-3RA200-C	1321-3R200-C‡	1321-3RA200-C‡
20DD248	Normal Duty	200	1321-3RB250-C	1321-3RAB250-C	1321-3RB250-C	1321-3RAB250-C
20DD261	Heavy Duty	200	1321-3R200-C	1321-3RA200-C	1321-3R200-C	1321-3RA200-C
20DD261	Normal Duty	200	1321-3RB250-C	1321-3RAB250-C	1321-3RB250-C	1321-3RAB250-C
20DD300	Heavy Duty	150	1321-3RB250-C	1321-3RAB250-C	1321-3RB250-C	1321-3RAB250-C

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ 4% impedance.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 3% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DE1P7	Heavy Duty	0.5	1321-3R1-C	1321-3RA1-C	1321-3R2-B	1321-3RA2-B
20DE1P7	Normal Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R2-B	1321-3RA2-B
20DE2P7	Heavy Duty	1	1321-3R2-B	1321-3RA2-B	1321-3R4-D	1321-3RA4-D
20DE2P7	Normal Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20DE3P9	Heavy Duty	2	1321-3R4-D	1321-3RA4-D	1321-3R4-C	1321-3RA4-C
20DE3P9	Normal Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R4-C	1321-3RA4-C
20DE6P1	Heavy Duty	3	1321-3R4-C	1321-3RA4-C	1321-3R8-C	1321-3RA8-C
20DE6P1	Normal Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R8-C	1321-3RA8-C
20DE9P0	Heavy Duty	5	1321-3R8-C	1321-3RA8-C	1321-3R12-C	1321-3RA12-C
20DE9P0	Normal Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20DE011	Heavy Duty	7.5	1321-3R12-C	1321-3RA12-C	1321-3R12-B	1321-3RA12-B
20DE011	Normal Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R12-B	1321-3RA12-B
20DE017	Heavy Duty	10	1321-3R12-B	1321-3RA12-B	1321-3R18-B	1321-3RA18-B
20DE017	Normal Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R18-B	1321-3RA18-B
20DE022	Heavy Duty	15	1321-3R18-B	1321-3RA18-B	1321-3R25-B	1321-3RA25-B
20DE022	Normal Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R25-B	1321-3RA25-B
20DE027	Heavy Duty	20	1321-3R25-B	1321-3RA25-B	1321-3R35-C	1321-3RA35-C
20DE027	Normal Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-C	1321-3RA35-C
20DE032	Heavy Duty	25	1321-3R35-C	1321-3RA35-C	1321-3R35-B	1321-3RA35-B
20DE032	Normal Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R35-B	1321-3RA35-B
20DE041	Heavy Duty	30	1321-3R35-B	1321-3RA35-B	1321-3R45-B	1321-3RA45-B
20DE041	Normal Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R45-B	1321-3RA45-B
20DE052	Heavy Duty	40	1321-3R45-B	1321-3RA45-B	1321-3R55-B	1321-3RA55-B
20DE052	Normal Duty	50	1321-3R55-B	1321-3RA55-B	1321-3R55-B	1321-3RA55-B
20DE062	Heavy Duty	50	1321-3R55-B	1321-3RA55-B	1321-3R80-B	1321-3RA80-B
20DE062	Normal Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DE077	Heavy Duty	60	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DE077	Normal Duty	75	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DE099	Heavy Duty	75	1321-3R80-B	1321-3RA80-B	1321-3R80-B	1321-3RA80-B
20DE099	Normal Duty	100	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DE125	Heavy Duty	100	1321-3R100-B	1321-3RA100-B	1321-3R100-B	1321-3RA100-B
20DE125	Normal Duty	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DE144	Heavy Duty	125	1321-3R130-B	1321-3RA130-B	1321-3R130-B	1321-3RA130-B
20DE144	Normal Duty	150	1321-3R160-B	1321-3RA160-B	1321-3R160-B	1321-3RA160-B

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.

Input and Output Line Reactors - 600V, 60 Hz, Three-Phase, 5% Impedance

Drive Cat. No.	Duty	Hp	Input Line Reactor ❄		Output Line Reactor ❄	
			IP00 (Open Style)	IP11 (NEMA Type 1)	IP00 (Open Style)	IP11 (NEMA Type 1)
			Cat. No.	Cat. No.	Cat. No.	Cat. No.
20DE1P7	Heavy Duty	0.5	1321-3R1-B	1321-3RA1-B	1321-3R2-C	1321-3RA2-C
20DE1P7	Normal Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R2-C	1321-3RA2-C
20DE2P7	Heavy Duty	1	1321-3R2-C	1321-3RA2-C	1321-3R4-D‡	1321-3RA4-D‡
20DE2P7	Normal Duty	2	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D‡	1321-3RA4-D‡
20DE3P9	Heavy Duty	2	1321-3R4-D‡	1321-3RA4-D‡	1321-3R4-D	1321-3RA4-D
20DE3P9	Normal Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R4-D	1321-3RA4-D
20DE6P1	Heavy Duty	3	1321-3R4-D	1321-3RA4-D	1321-3R8-D	1321-3RA8-D
20DE6P1	Normal Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R8-D	1321-3RA8-D
20DE9P0	Heavy Duty	5	1321-3R8-D	1321-3RA8-D	1321-3R12-C‡	1321-3RA12-C‡
20DE9P0	Normal Duty	7.5	1321-3R12-C‡	1321-3RA12-C‡	1321-3R12-C‡	1321-3RA12-C‡
20DE011	Heavy Duty	7.5	1321-3R12-C‡	1321-3RA12-C‡	1321-3R12-C	1321-3RA12-C
20DE011	Normal Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R12-C	1321-3RA12-C
20DE017	Heavy Duty	10	1321-3R12-C	1321-3RA12-C	1321-3R18-C	1321-3RA18-C
20DE017	Normal Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R18-C	1321-3RA18-C
20DE022	Heavy Duty	15	1321-3R18-C	1321-3RA18-C	1321-3R25-C‡	1321-3RA25-C‡
20DE022	Normal Duty	20	1321-3R25-C‡	1321-3RA25-C‡	1321-3R25-C‡	1321-3RA25-C‡
20DE027	Heavy Duty	20	1321-3R25-C‡	1321-3RA25-C‡	1321-3R35-C‡	1321-3RA35-C‡
20DE027	Normal Duty	25	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20DE032	Heavy Duty	25	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20DE032	Normal Duty	30	1321-3R35-C‡	1321-3RA35-C‡	1321-3R35-C‡	1321-3RA35-C‡
20DE041	Heavy Duty	30	1321-3R35-C‡	1321-3RA35-C‡	1321-3R45-C	1321-3RA45-C
20DE041	Normal Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R45-C	1321-3RA45-C
20DE052	Heavy Duty	40	1321-3R45-C	1321-3RA45-C	1321-3R55-C	1321-3RA55-C
20DE052	Normal Duty	50	1321-3R55-C	1321-3RA55-C	1321-3R55-C	1321-3RA55-C
20DE062	Heavy Duty	50	1321-3R55-C	1321-3RA55-C	1321-3R80-C	1321-3RA80-C
20DE062	Normal Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DE077	Heavy Duty	60	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DE077	Normal Duty	75	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DE099	Heavy Duty	75	1321-3R80-C	1321-3RA80-C	1321-3R80-C	1321-3RA80-C
20DE099	Normal Duty	100	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20DE125	Heavy Duty	100	1321-3R100-C	1321-3RA100-C	1321-3R100-C	1321-3RA100-C
20DE125	Normal Duty	125	1321-3R130-C‡	1321-3RA130-C‡	1321-3R130-C‡	1321-3RA130-C‡
20DE144	Heavy Duty	125	1321-3R130-C‡	1321-3RA130-C‡	1321-3R130-C‡	1321-3RA130-C‡
20DE144	Normal Duty	150	1321-3R160-C‡	1321-3RA160-C‡	1321-3R160-C‡	1321-3RA160-C‡

❄ Input line reactors were sized based on the NEC fundamental motor amps. Output line reactors were sized based on the VFD rated output currents.
‡ 4% impedance.

Drive Application Software

Drive Application Software brings together an outstanding range of application experience and performance drive products to provide the user with pre-engineered and cost effective drive application solutions.

The following Application Modules are available for installation and use exclusively in the PowerFlex 700S AC drives with DriveLogix™ that are provided to customers. The Drive Application Software is licensed and cannot be transferred or resold. On site commissioning and support services are not included with Drive Application Software.

- Application Module — Center Winder/Unwind is used for center driven variable diameter process line applications requiring Loadcell, Dancer, or Open Loop web tension control.
- Application Module — Inline Tensioning is used for constant diameter process line applications requiring Loadcell, Dancer, or Draw web tension control.
- Application Module — Lead Line Control is used for lead section control and line coordination with support for progressive and regressive draw. This Application Module works with the Center Winder/Unwind and Inline Tensioning Application Modules.
- Application Module — Positioning (Point to Point) is used for point to point position control with support for selectable target positions, Learn Target function and Homing functions.
- Function Module — Spindle orient is used to position a motor to a precise location regardless of whether the motor is starting from standstill or rotating at high speed. The location is defined by a marker pulse.
- Function Module — TorqueProv is used to automate torque and brake proving for lifting applications.
- Process Line Suite of Application Modules includes the Lead Line Control, Inline Tensioning, and Center Winder/Unwind application modules.

Product Selection

Application Module ✶	Cat. No.	Phone Support ❄
Center Winder/Unwind ‡♣	9329-KAA12A	5 hours
Inline Tensioning ‡♣	9329-KAA12B	3 hours
Lead Line Control	9329-KAA12C	2 hours
Positioning (Point to Point)	9329-KAA11D	3 hours
Process Line Suite ‡♣	9329-KAA12E	10 hours
Function Modules		
Spindle Orient		None
Torque Prove		None

✶ DriveLogix is required for use with the Drive Application Software — Application Modules.
❄ Phone support is application related technical phone support and is in addition to standard drives support included with hardware purchases.
‡ Restricted Access, Contact Drive Application Software Product Manager or Drives Negotiation Team to place order.
♣ These programs are available to OEMs and System Integrators with in-house services capable of on-site commissioning, complete support and service of the applications.

Media

Application Modules — User Manuals are distributed on CD-ROM. The License Agreement with Serial Number is also provided for downloading the software from the Internet at http://www.ab.com/drives/drvappsw.

Function Modules — User Manuals are located on the internet at http://www.ab.com/drives/drvappsw. A serial number is not needed for download.

Rockwell Automation is committed to maintaining and supporting Allen-Bradley drives and installations. Included in this commitment is start-up support and consultation for drive applications.

ProtectionPlus Drive Start-Up

With ProtectionPlus Drive Start-Up Services from Rockwell Automation, users can leverage the extensive product and industry experience of Rockwell Automation technicians to quickly commission drives and reduce the time between integration and actual start-up.

ProtectionPlus Drive Start-Up Services verify drive installation to ensure proper electrical, mechanical and environmental criteria are met. This includes verification of power and I/O wiring to the drive, custom drive configuration/tuning to meet application specific requirements, and diagnosing/troubleshooting problems that occur during a standalone drive start-up. ProtectionPlus can also extend an eligible product parts warranty and add a labor warranty. For more information about ProtectionPlus Drive Services, contact your local Rockwell Automation sales office or authorized distributor, or visit: http://support.rockwellautomation.com/SupportPrograms.

SupportPlus

For consultation on high performance drive applications, the SupportPlus program is offered. SupportPlus uses expert level Rockwell Automation system engineers to support the user's engineering team. SupportPlus engineers will work with the end user to layout the appropriate architecture, configure drives, recommend programming techniques and provide application assistance on the most effective ways to implement the control solution. For more information, please call 262-512-8176 or refer to www.ab.com/support/abdrives.

Factory Installed Options - Phase I & II Drives

Human Interface and Wireless Interface Modules IP20/NEMA Type 1 *(Position e)*

Catalog Code: 0
No HIM (Blank Cover)

Catalog Code: 2
LCD Digital Speed

Catalog Code: 3
LCD Full Numeric

Catalog Code: 5
LCD Programmer Only

Catalog Code: C
Door Mounted LCD Full Numeric - Frame 10 & Up

Catalog Code: 8
DPI WIM

Documentation

Description	Cat. Code *(Position f)*
Quick Start Guide and CD	E
No Documentation	N

Internal Brake IGBT

Drive Input Voltage	Brake IGBT	Frame	Cat. Code *(Position g)*
208…480V ac	Standard	1…3	Y
	Optional	4	Y
		5	Y
		4…6	N
		6	Y
		9	Y

Internal Dynamic Brake Resistors

These resistors have a limited duty cycle. Refer to the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor will be sufficient for your application. An external resistor may be required.

Drive Input Voltage	Frame	Brake Resistance Ω	Cat. Code (Position h)
208…240V ac	1 (0.5-5.0 Hp)	62	Y
	1 (7.5 Hp)	22	Y
	2	22	Y
380…480V ac	1	115	Y
	2	62	Y
	All	–	N

Internal EMC Filter

Drive Input Voltage	CE Filter	Frame	Cat. Code (Position i)
208/240V ac	Standard	1…6	A
380…480V ac	Standard	1…6	A
380…500V ac ∗	No	9 ❄	N
380…500V ac	Standard	9 & Up ❄	B
600…690V ac	Standard	1…6	A

∗ For use on ungrounded distribution systems.
❄ For use with Phase I Control ONLY.

Internal Communication Adapters

Description	Cat. Code (Position j)
None	N
ControlNet (Coax) Communication Adapter - DPI	C
DeviceNet Communication Adapter - DPI	D
EtherNet/IP Communication Adapter - DPI	E
ControlNet (Fiber) Communication Adapter - DPI	Q
Remote I/O Communication Adapter - DPI	R
RS-485 DF1 Communication Adapter - DPI	S
DriveLogix Comm Option, ControlNet (Coax) ‡§	1
DriveLogix Comm Option, ControlNet Redundant (Coax) ‡§	2
DriveLogix Comm Option, ControlNet (Fiber) ‡§	3
DriveLogix Comm Option, ControlNet Redundant (Fiber) ‡§	4
DriveLogix Comm Option, DeviceNet (Open Conn.) ‡§	5
DriveLogix Comm Option, EtherNet/IP (Twisted Pair) ‡§	6

‡ Must have the DriveLogix option.
§ Requires Expanded Cassette when used with Phase II Control.

Control Options - Phase II Control

Control Option	Cassette	Logix Expansion Board	SynchLink	Catalog Code (Position k)
Phase I Control	N/A	N/A	Standard	N
Phase II Control	Expanded	No	No	A
	Expanded	No	Yes	B
	Expanded	Yes	No	C
	Expanded	Yes	Yes	D
	Slim	N/A	No	G
	Slim	N/A	Yes	H

Feedback Options

Description	Cat. Code (Position l)
None	N
Resolver, 10…26V, 10 kHz, 10…16 bit §	A
Stegman - High Resolution Encoder Hyperface, 8.5V DC, 20 bit, 100k/r §	B
Multi-Device Interface - for Stegmann or Linear Temposonics §	C
2nd Encoder, 5V or 12V Configurable by the Drive §♣	E
Drive Guard Safe-Off (w/2nd Encoder)	S

§ Requires Expanded Cassette when used with Phase II Control.
♣ For use with Phase II Control Only.

Additional Configurations

Description	Embedded Communication	Cat. Code (Position m)
Phase I Control	N/A	N
Phase I Control, with DriveLogix5720 Controller, 256k bytes of User Memory	N/A	A
Phase I Control, with DriveLogix5720 Controller, 768k bytes of User Memory	N/A	B
Phase II Control	No	E
Phase II Control, with DriveLogix5730 Controller	No	K
Phase II Control, with DriveLogix5730 Controller	EtherNet/IP	L

Notes

PowerFlex 7000 Medium Voltage Drives

The Allen-Bradley PowerFlex 7000 medium voltage drives family incorporates leading-edge technology, embedded communications, and significant commonality across multiple platforms, networks, operator interface programming and hardware. Designed for end users, solution providers and OEMs, the PowerFlex 7000 air-cooled and liquid-cooled medium voltage drives meet applications ranging from fractional to 6340kW (8500 hp).

PowerFlex 7000 medium voltage drives control speed, torque, direction, starting and stopping of standard asynchronous or synchronous AC motors. PowerFlex 7000 drives adhere to the most common worldwide standards including NEC, IEC, NEMA, UL, and CSA and are available with supply voltages at medium voltage from 2400-6600 volts.

PowerFlex 7000 medium voltage drives are designed for high reliability, ease of use and lower total cost of ownership.

Benefits of PowerFlex Medium Voltage Drives:

1. Reduced costs

- Energy savings on fans, pumps, compressors
- Reduce maintenance costs on mechanical equipment
- Increase life of mechanical equipment

2. Improve process control

- Increase productivity
- Greater flexibility
- Environmental compliance

3. Starting large motors on weak power systems

- Eliminate voltage flicker
- Reduce inrush current
- Higher starting torque than reduced voltage starter

For more information on PowerFlex 7000 Medium Voltage drives, visit the Allen-Bradley web site:

http://www.ab.com/drives/powerflex/Products/7000.htm

Notes

DriveTools™ SP Software

DriveTools SP is a family of software tools designed for Microsoft® Windows® NT v4.0/2000/XP operating systems (DriveExecutive alone will also run on Windows 98/ME). These applications provide a Simplified Programming interface for programming, troubleshooting, and maintaining your Allen-Bradley AC and DC drive products. Easy to use menus, dialogs, wizards, and graphic displays help you quickly start up your Allen-Bradley drive product. Powerful diagnostic features simplify diagnosing drive as well as system problems.

DriveTools SP goes beyond the successes of DriveTools32™ by offering more user conveniences such as user files that automatically embed necessary database files, single-communication set up, and more built-in intelligence. DriveTools SP uses RSLinx® Lite for communications.

DriveExecutive™

DriveExecutive™

This software is an online/offline drive and adapter configuration tool that leverages Windows Explorer-style navigation, built-in html product help, and handy diagnostic and setup wizards. A state-of-the-art comparison tool lets you look at differences and make two devices/files the same.

DriveObserver™

DriveObserver™

This software provides real-time chart displays of drive performance to help you set up, tune, and troubleshoot your drive applications. Charts can contain parameters from multiple drives and/or adapters from multiple networks as needed. Files save data for offline viewing and chart set up for collecting new data later.

Product Selection

Application	Cat. No.	No. of Licenses
DriveExecutive	9303-4DTE01ENE	1
DriveTools SP Suite -includes DriveExecutive, DriveObserver	9303-4DTS01ENE	1
DriveTools SP Suite Upgrade from DriveExecutive -includes DriveExecutive, DriveObserver	9303-4DTE2S01ENE	1

Media

DriveExecutive and DriveTools SP distribution media is CD-ROM, and the language supported is English.

DriveTools32

This suite is a family of software tools designed for Microsoft® Windows 95, Windows 98 and Windows NT® 4.0 operating systems. These applications provide you with an intuitive means for programming, troubleshooting and maintaining your legacy Allen-Bradley AC and DC drive products. Easy-to-use menus, dialogs and graphic displays help you to quickly start up your Allen-Bradley drive product. Powerful diagnostic features simplify diagnosing drive as well as system problems.

DriveManager32™

This software is the primary product in the DriveTools32 family. It provides you with all the easy-to-use tools you'll need to create and edit online or offline drive data tables which are used to configure the drive for your application. Whether it's your first Allen-Bradley drive, or you manage a plant full, the online product help, easy-to-use search capabilities, graphic analog metering, and a logic probe tool, help to make drive start-ups simple. File compare utilities help to assure drive data integrity and extensive documentation options keep your maintenance records simple and complete.

DriveMonitor32™

An optional tool within the DriveTools32 family, provides you with an advanced method of graphically monitoring drive data. You can also chart controller data points when connected to a network such as Data Highway Plus™ or ControlNet™. You can easily display live data values in a graphic format. The display options in this software tool allow you to easily manipulate how data is graphed.

DrivePanel32™

This is the graphical implementation of the Human Interface Module (HIM) used with Allen-Bradley AC and DC drive products. It duplicates the programming and control functions available with the HIM, and includes some special features only available with DrivePanel32 software.

DriveTrending32™

This software provides a simple-to-use method for programming the internal drive trending functions supported by certain Allen-Bradley drives as well as displaying the data stored within the internal drive trend buffers.

DriveBlockEditor32™

This software uses a graphical format to create and monitor function block programs supported by certain Allen-Bradley drives. Pictorial flow diagrams allow you to easily follow the data flow within your uniquely designed drive application. Powerful features such as Composite Blocks, multiple level undo/redo, auto routing and user-defined libraries allow you to create, modify and maintain highly complex programs with ease.

Product Selection

The DriveTools32 software has been packaged so that you can purchase either the entire Suite, individual software applications within the family, or a convenient Lite Bundle of the most popular applications. Catalog numbers used for the DriveTools32 application are dependent on the specific options selected as listed in the following table.

Application	Cat. No.	No. of Licenses
DriveTools32 Suite - includes: DriveManager32, DriveMonitor32, DrivePanel32, DriveBlockEditor32, DriveTrending32	9303-3CS0EFF	1
DriveTools32 Lite Bundle - includes: DriveManager32, DriveMonitor32, DrivePanel32	9303-3CS0E31	1
DriveManager32	9303-3CS0E10	1
DriveMonitor32	9303-3CS0E20	1
DrivePanel32	9303-3CS0E01	1
DriveTrending32	9303–3CS0E80	1

Media

DriveTools32 distribution media is CD-ROM, and the language supported is English.

Important: Refer to publication 9303-BR001B for System Requirements.

DriveTools for Windows 3.1

The DriveTools software has been packaged so that you can purchase either the entire family, or individual software applications within the family. In all cases you must own a copy of the DriveManager application as it maintains the drive database and provides the base level of functional support for all products. Catalog numbers used for the DriveTools applications are dependent on the specific options selected as shown in the following table:

Product Selection

Application	Cat. No.	No. of Licenses
DriveTools Suite - includes: DriveManager, DriveMonitor, DrivePanel, DriveBlockEditor, DriveTrending	9303-23SOEFF	1
DriveManager	9303-23S0E10	1
DriveMonitor	9303-23S0E20	1
DrivePanel	9303-23S0E01	1
DriveTrending	9303-23S0E80	1

Media

The DriveTools applications are compatible with Windows 3.1 operating system. The distribution media is 3.5” HD floppy disks, and the language supported is English.

DriveExplorer™ Software

DriveExplorer software is an easy-to-use, cost effective application that provides you with an intuitive means for monitoring and configuring your Allen-Bradley drives and communication adapters.

DriveExplorer software is available in two different versions:

- DriveExplorer for PC (full version) with all features
- DriveExplorer Lite (freeware)

DriveExplorer software is designed for the following Microsoft operating systems:

- Windows 95
- Windows 98
- Windows ME
- Windows NT (4.0 or greater)
- Windows 2000

Product Selection

Application	Cat. No.	No. of Licenses
DriveExplorer for PC	9306-4EXP02ENE	1
DriveExplorer Lite	NA ✶	1

✶Download at http://www.ab.com/drives/driveexplorer. A CD is also included with 1203-SSS and 22-SCM-232 Serial Converters.

Distribution Media

All DriveExplorer versions are distributed on CD-ROM in the supported language of English.

Pocket DriveExplorer™ Software

Pocket DriveExplorer is an easy-to-use software tool for monitoring and configuring Allen-Bradley drives and communication adapters.

Pocket DriveExplorer software is available in two different versions, both available on the same CD:

- Pocket DriveExplorer for Pocket PC
  This Windows Mobile™ version works with Pocket PCs such as the Dell™ Axim and Hewlett-Packard® iPAQ. Connectivity is via serial, Wi-Fi (EtherNet/IP) and Bluetooth® wireless technology.
- Pocket DriveExplorer for Windows CE
  This Windows CE version works with:
  – VersaView® CE Integrated Display Computers running Windows CE 3.0/4.1.
  – HPC's, such as an HPC Pro using a SH3 processor and a HPC Pro or HPC 2000 using a StrongARM processor.

Product Selection

Application	Cat. No.	No. of Licenses
Pocket DriveExplorer	9306-4PXP01ENE	1

Distribution Media

All DriveExplorer versions are distributed on CD-ROM in the supported language of English.

Rockwell Automation is committed to maintaining and supporting your Allen-Bradley drives and installations. This commitment includes support for active products, support for products that are no longer manufactured and consultation for high performance drive applications. Our Technical Support Center has knowledgeable and experienced specialists who have the expertise, equipment and documentation to answer your product questions accurately and efficiently. To help minimize the expense of production downtime, our call center provides technical assistance weekdays from 7:00 a.m. to 6:00 p.m. CST. For technical support 24 hours a day, 7 days a week, a TechConnect™ support agreement can be purchased which ensures after hours assistance. For more information on Rockwell Automation's Technical Support offering for Drives, please visit: **http://www.ab.com/support/abdrives/**.

Active/Inactive Product Support

All current drive products receive support at no charge.

Discontinued/Obsolete Product Support

Description	Cat. No.
Single Incident Support	
Stand-alone Drive	TS-SISAD
Custom Drive	TS-SICD
Annual Site Contract	
One Year, Stand-alone Drive	TS-OYSAD
One Year, Custom Drive	TS-OYCD

ProtectionPlus™ Drive Start-Up

With ProtectionPlus Drive Start-Up Services from Rockwell Automation, users can leverage the extensive product and industry experience of Rockwell Automation technicians to quickly commission drives and reduce the time between integration and actual start-up.

ProtectionPlus Drive Start-Up Services verify drive installation to ensure proper electrical, mechanical and environmental criteria are met. This includes verification of power and I/O wiring to the drive, custom drive configuration/tuning to meet application specific requirements, and diagnosing/troubleshooting problems that occur during a standalone drive start-up. ProtectionPlus can also extend an eligible product parts warranty and add a labor warranty. For more information about ProtectionPlus Drive Services, contact your local Rockwell Automation sales office or authorized distributor, or visit: **http://support.rockwellautomation.com/SupportPrograms/**.

SupportPlus™

For consultation on high performance drive applications, the SupportPlus program is offered. SupportPlus uses expert level Rockwell Automation system engineers to support the user's engineering team. SupportPlus engineers will work with the end user to layout the appropriate architecture, configure drives, recommend programming techniques and provide application assistance on the most effective ways to implement the control solution.

For more information, please visit **http://www.ab.com/support/abdrives/files/supportplus.pdf**.

Description	Cat. No.
One Hour Design Consultation	TS-SP1HR
Two Hour Design Consultation	TS-SP2HR
On-Site Power Analysis	TS-PASIOS

Contents

Important User Information

This guide has been developed as a quick reference tool to Allen-Bradley industrial automation controls and factory assemblies. It is not intended to replace factory user manuals or technical documentation supplied with Allen-Bradley equipment.

Because of the variety of uses for the products described in this publication, those responsible for the application and use of these products must satisfy themselves that all necessary steps have been taken to assure that each application and use meets all performance and safety requirements, including any applicable laws, regulations, codes, and standards. Factory provided user manuals and technical documentation should not be solely relied on for those purposes.

Rockwell Automation reserves the right to change the features or characteristics of its products at any time. Therefore, the information contained in this publication is subject to change at any time without notice.

The illustrations, charts, diagrams, and layout examples shown in this guide are intended solely as examples. Since there are many variables and requirements associated with any particular installation, Rockwell Automation can not assume responsibility or liability (including intellectual property infringement liability) for actual use based upon the examples shown in this publication.

Allen-Bradley Publication SGI-1.1 "General Information Safety Guidelines for Solid-State Control" (available from you local Rockwell Automation office) describes some important differences between solid-state equipment and electromechanical devices, which should be taken into consideration when applying products such as those described in this publication.

Metric Conversion Chart

Metric Conversion Factors		
From	To	Multiply by
Length		
Inches (in)	Millimeters (mm)	25.4
Inches (in)	Centimeters (cm)	2.54
Feet (ft)	Meters (m)	0.305
Yards (yd)	Meters (m)	0.914
Millimeters (mm)	Inches (in)	0.0394
Centimeters (cm)	Inches (in)	0.394
Meters (m)	Feet (ft)	3.28
Meters (m)	Yards (yd)	1.09
Area		
Square inches (in^2)	Square millimeters (mm^2)	645
Square inches (in^2)	Square centimeters (cm^2)	6.45
Square feet (ft^2)	Square meters (m^2)	0.0929
Square yards (yd^2)	Square meters (m^2)	0.836
Square millimeters (mm^2)	Square inches (in^2)	0.00155
Square centimeters (cm^2)	Square inches (in^2)	0.155
Square meters (m^2)	Square feet (ft^2)	10.8
Square meters (m^2)	Square yards (yd^2)	1.20
Weight		
Ounces (oz)	Grams (g)	28.3
Pounds (lb)	Kilograms (kg)	0.454
Grams (g)	Ounces (oz)	0.0353
Kilograms (kg)	Pounds (lb)	2.20
Volume		
Cubic inches (in^3)	Cubic centimeters (cm^3)	16.4
Cubic feet (ft^3)	Cubic meters (m^3)	0.0283
Cubic inches (in^3)	Liters (L)	0.0164
Cubic feet (ft^3)	Liters (L)	28.3
Gallons (Imp)	Liters (L)	4.55
Gallons (US)	Liters (L)	3.79
Cubic centimeters (cm^3)	Cubic inches (in^3)	0.061
Cubic meters (m^3)	Cubic feet (ft^3)	35.3
Liters (L)	Cubic inches (in^3)	61.0
Liters (L)	Cubic feet (ft^3)	0.0353
Liters (L)	Gallons (Imp)	0.220
Liters (L)	Gallons (US)	0.264
Pressure		
Pounds/square inch (psi)	Kilopascals (kPa)	6.89
Pounds/square inch (psi)	Bars (Bar)	0.0689
Kilopascals (kPa)	Pounds/square inch (psi)	0.145
Bars (Bar)	Pounds/square inch (psi)	14.5
Torque		
Pound inch (lb in)	Newton meters (N•m)	0.113
Newton meters (N•m)	Pound inch (lb in)	8.85
Temperature		
Degrees Fahrenheit (°F)	Degrees Celsius (°C)	✶
Degrees Celsius (°C)	Degrees Fahrenheit (°F)	❄

✶ Conversion Formula: 5/9 (°F – 32 °F) = °C.
❄ Conversion Formula: 9/5 (°C) + 32 °F = °F.

Conformal Coating Offering

Rockwell Automation offers a conformal coating solution on selected Allen-Bradley products to satisfy customers who demand that their automation equipment have additional protection against corrosive elements, such as sulfuric acid, chlorine, fungus, salt, and other chemicals and gases.

Rockwell Automation reviews conformal coating opportunities on an individual basis and provides customer pricing. To receive a quote, please contact your local Rockwell Automation Sales Office.

Service and Installation Conditions

Unless otherwise noted, the products described in this publication are designed to meet "usual service and installation conditions" as defined in NEMA (National Electrical Manufacturers Association) Standards Publication - Part ICS 1-108. Open-style devices must be provided with environmental and safety protection by proper mounting in enclosures designed for specific application conditions. See NEMA Standards Publication 250 and IEC Publication 529, as applicable, for explanations of the degrees of protection provided by different types of enclosures.

Performance Data

Performance data given in this publication is provided only as a guide for the user in determining suitability and do not constitute a performance warranty of any kind. Such data may represent the results of accelerated testing at elevated stress levels, and the user is responsible for correlating the data to actual application requirements. ALL WARRANTIES AS TO ACTUAL PERFORMANCE, WHETHER EXPRESS OR IMPLIED, ARE EXPRESSLY DISCLAIMED.

GENERAL TERMS AND CONDITIONS OF SALE

These general terms and conditions of sale only apply to purchases of Allen-Bradley and Rockwell Software branded products and related services made directly from Rockwell Automation. Purchases made from appointed distributors or other independent resellers will be subject to terms and conditions of sale as may be separately established by each such distributor or reseller, which will in no event be binding upon Rockwell Automation unless otherwise expressly agreed to. Sales outside of North America, as well as sales of other Rockwell Automation products and services, may be subject to separate or supplemental terms and conditions of sale. For further information, please consult your nearest Rockwell Automation sales office.

General

These general terms and conditions of sale (along with any associated written specification, quotation and/or supplemental terms and conditions provided by Seller) exclusively will govern the sale or licensing by Seller of all goods and services (including without limitation, hardware, firmware and software products, training, programming, maintenance, engineering, parts, repair and remanufacturing services – hereinafter, "Products") furnished to Buyer hereunder, whether such sale or licensing is effected by paper-based transactions or via facsimile or other forms of electronic data interchange (“EDI”) or electronic commerce, and represents the entire agreement between Buyer and Seller with respect thereto. Buyer’s receipt or acceptance of delivery of any of the Products ordered or purchased hereunder will constitute its acceptance of these terms and conditions. No addition or modification to these terms and conditions will be binding on Seller unless agreed to in writing signed by an authorized representative at Seller’s headquarters. Seller objects to and rejects other terms and conditions that may be proposed by Buyer or that appear on or are referenced in Buyer’s purchase order or requisition that are in addition to or otherwise not consistent with the terms and conditions set forth or referenced herein.

Payment Terms

Net thirty (30) days from date of invoice with ongoing approved credit as determined by Seller. Seller may render partial invoices and require progressive payments. Seller reserves the right to render invoices electronically and to receive payment by way of electronic funds transfer. Payment by credit card, when permitted, is subject to credit card validation and authorization both at time of agreement and immediately prior to shipment. Seller reserves the right to suspend any further performance hereunder or otherwise in the event payment is not made when due. No payment by offset is permitted. Interest charges will be added to overdue invoices at the rate of 1.5% per month (subject to any limit imposed by applicable law).

Delivery Terms

Delivery terms are Ex Works Seller’s plant or warehouse (per current Incoterms) or as otherwise agreed to as evidenced by Seller’s order acknowledgment. In all cases title transfers to Buyer upon the earlier of Seller’s delivery to Buyer or receipt by the first carrier for transport to Buyer, except that title to all intellectual property rights associated with the Products remains with Seller or its suppliers and licensors. Acknowledged shipping dates are approximate only and based on prompt receipt of all necessary information from Buyer. Seller disclaims all liability for late delivery. Where applicable, prepaid shipping will be billed as a separate invoice item.

Warranty

(a) Hardware: Seller warrants that new hardware Products furnished hereunder will be free from defects in material, workmanship and design for a period of one (1) year from the date of invoice from Seller or its appointed distributor, as the case may be. Repaired or replacement Products provided as a result of this warranty subparagraph are similarly warranted for a period of six (6) months from the date of shipment to Buyer or the remainder of the original warranty term for that particular Product, whichever is longer.

(b) Software and Firmware: Unless otherwise provided in a Seller or third party license, Seller warrants that standard software or

firmware Products furnished hereunder, when used with Seller-specified hardware, will perform in accordance with published specifications prepared, approved, and issued by Seller for a period of one (1) year from the date of invoice from Seller or its appointed distributor, as the case may be. Seller makes no representation or warranty, express or implied, that the operation of the software or firmware Products will be uninterrupted or error free, or that the functions contained therein will meet or satisfy Buyer's intended use or requirements.

(c) Non-Warranty Factory Remanufacture, Repair and Field Exchange: Seller warrants that non-warranty factory remanufactured or field exchanged hardware Products or repaired hardware Product components will be free from defects in material and workmanship for a period of one (1) year from the date of invoice from Seller or its appointed distributor, as the case may be. Repaired or replacement Products provided as a result of this warranty subparagraph are warranted for a period of thirty (30) days from the date of shipment to Buyer or the remainder of the original warranty term, whichever is longer.

(d) Services: Seller warrants that Products comprised solely of services (e.g., training, on-site repair, engineering and custom application programming services) will be performed by appropriately skilled personnel employed or retained by Seller.

(e) “Open Box” Products: Seller warrants that hardware Products sold as “Open Box” (e.g., customer and distributor returns, factory refurbished or reconditioned, etc.) will be free from defects in material and workmanship for a period of ninety (90) days from the date of invoice from Seller or its appointed distributor, as the case may be. “Open Box” Products, while serviceable, may not reflect the latest series or revision. Repaired or replacement Products provided as a result of this warranty subparagraph are similarly warranted for a period of thirty (30) days from the date of shipment to Buyer or the remainder of the original ninety-day warranty term for that particular Product, whichever is longer.

(f) Buyer Specifications/Compatibility: Seller does not warrant and will not be liable for any design, materials, construction criteria or goods furnished or specified by Buyer (including that sourced from other manufacturers or vendors specified by Buyer). Any warranty applicable to such Buyer-specified items will be limited solely to the warranty, if any, extended by the original manufacturer or vendor directly or indirectly to Buyer. Seller does not warrant the compatibility of its Products with the goods of other manufacturers or Buyer’s application except to the extent expressly represented in Seller’s published specifications or written quotation.

(g) Recyclable Materials: In keeping with environmental policies and practices, Seller reserves the right to utilize in its product manufacturing, repair and remanufacturing processes certain recyclable materials (e.g., fasteners, plastics and the like) or remanufactured parts equivalent to new in performance or parts which may have been subject to incidental use. However, such utilization will not affect any provided Product warranty or published reliability statistics.

(h) Remedies: Remedies under the above warranties will be limited, at Seller’s option, to the replacement, repair, re-performance or modification of, or issuance of a credit for the purchase price, of the Products involved, and where applicable, only after the return of such Products pursuant to Seller's instructions. Replacement Products may be new, remanufactured, refurbished or reconditioned at Seller’s discretion. Buyer requested on-site warranty service (consisting of time, travel and expenses related to such services) will be at Buyer’s expense. The foregoing will be the exclusive remedies for any breach of warranty or breach of contract arising therefrom.

(i) General: Warranty satisfaction is available only if (a) Seller is provided prompt written notice of the warranty claim and (b) Seller’s examination discloses that any alleged defect has not been caused by misuse; neglect; improper installation, operation, maintenance, repair, alteration or modification by other than Seller; accident; or unusual deterioration or degradation of the Products or parts thereof due to physical environment or electrical or electromagnetic noise environment.

(j) THE ABOVE WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES AND CONDITIONS, WHETHER EXPRESSED, IMPLIED OR STATUTORY, INCLUDING IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR USE, OR PERFORMANCE OR APPLICATION WARRANTIES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW. Rights under the above warranties (subject to noted limitations) extend to Buyer’s customers if Buyer is a Seller-appointed distributor for the Products.

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Buyer-specified packing or marking may be subject to additional charges not otherwise included in the price of the Products.

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Published or advertised weights and dimensions are estimates or approximations only and are not warranted.

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Prices and other information shown in any Seller publication (including product catalogs and brochures) are subject to change without notice and to confirmation by specific quotation. Such publications are not offers to sell and are maintained only as a source of general information. Prices do not include sales, use, excise, customs, value-added or similar taxes. Buyer will pay or reimburse Seller for all such taxes as may be applicable. Time and material services will be provided in accordance with Seller's published service rates (including applicable overtime and travel expenses) in effect as of the date such services are provided, unless otherwise confirmed by Seller's written quotation or order acknowledgment. Billable service time includes travel time to and from the job site and all time Seller's representatives are available for work and waiting (whether on or off the job site) to perform the services.

Changes and Substitutions

Buyer-requested order changes, including those affecting the identity, scope and delivery of the Products, must be documented in writing and are subject to Seller's prior approval and adjustments in price, scheduling and other affected terms and conditions. In any event, Seller reserves the right to reject any change that it deems unsafe, technically inadvisable or inconsistent with established engineering or quality guidelines and standards, or incompatible with Seller's design or manufacturing capabilities. Seller further reserves the right to substitute using the latest superseding revision or series or equivalent Product having comparable form, fit and function.

Returns

All returns of Products will be pursuant to Seller's instructions. Non-warranty returns of unused and resalable Products for credit will be subject to Seller's return policies in effect at the time, including applicable restocking charges and other conditions of return. Products returned under warranty must be properly packed and shipped to Seller-specified locations. Shipping containers must be clearly marked per Seller's instruction and shipped freight prepaid by Buyer. Notwithstanding the foregoing, all sales of "Open Box" Products and any third-party branded products are final and do not qualify for non-warranty return.

Order Cancellation

Cancellation by Buyer prior to shipment is permitted only by written notice and upon payment to Seller of reasonable cancellation and restocking charges, including reimbursement for direct costs. Cancellation charges associated with orders for custom Products or Products specifically manufactured to Buyer's specification may equal the actual selling price of the Products. Seller has the right to cancel an order for cause at any time by written notice, and Seller will be entitled to cancellation and restocking charges as identified above. No termination by Buyer for cause will be effective unless and until Seller has failed to correct such alleged cause within forty five (45) days after receipt of Buyer's written notice specifying such cause.

Force Majeure

Seller will not be liable for any loss, damage or delay arising out of its failure (or that of its subcontractors) to perform hereunder due to causes beyond its reasonable control, including without limitation, acts of God, acts or omissions of Buyer, acts of civil or military authority, fires, strikes, floods, epidemics, quarantine restrictions, war, riots, acts of terrorism, delays in transportation, or transportation embargoes. In the event of such delay, Seller's performance date(s) will be extended for such length of time as may be reasonably necessary to compensate for the delay.

Government Clauses and Contracts

Application of government contract regulations and clauses to the Products or the agreement evidenced by these terms and conditions are subject to the separate review and consent by an authorized representative at Seller's headquarters. Products sold or licensed hereunder are not intended to be used, nor should they be used, in any nuclear-related application either as a "Basic Component" as defined under United States nuclear regulations or under similar nuclear laws and regulations of any other country or otherwise.

Export Control

Products and associated materials supplied or licensed hereunder may be subject to various export laws and regulations. It is the responsibility of the exporter to comply with all such laws and regulations. Notwithstanding any other provision herein to the contrary, in the event that U.S. or local law requires export authorization for the export or re-export of any Product or associated technology, no delivery can be made until such export authorization is obtained, regardless of any otherwise promised delivery date. In the event that any required export authorization is denied, Seller will be relieved of any further obligation relative to the sale and/or license and delivery of the Product(s) subject to such denial without liability of any kind relative to Buyer or any other party. Seller will not comply with boycott related requests except to the extent permitted by U.S. law and then only at Seller's discretion.

Disputes

The parties will attempt in good faith promptly to resolve any dispute arising hereunder by negotiations between representatives of the parties who have authority to settle the dispute. If unsuccessful, the parties further will attempt in good faith to settle the dispute by non-binding third-party mediation, with mediator fees and expenses apportioned equally to each side. Any dispute not so resolved by negotiation or mediation may then be submitted to a court of competent jurisdiction in accordance with the terms hereof. These procedures are the exclusive procedures for the resolution of all such disputes between the parties.

Governing Law and Forum

The agreement evidenced hereby and all disputes arising thereunder will be governed by and interpreted in accordance with the internal laws and will be subject to the exclusive jurisdiction of the courts of the state, province or other governmental jurisdiction in which Seller's principal place of business resides, but specifically excluding the provisions of the 1980 UN Convention on Contracts for the International Sales of Goods. Should any term or provision hereof be held wholly or partly invalid or unenforceable under applicable law, the remainder of the agreement evidenced hereby will not be affected thereby.

Assignment

The agreement evidenced hereby may not be assigned by either party without the written consent of the other (which consent will not be unreasonably withheld). However, consent will not be required for internal transfers and assignments as between Seller and its parent company, subsidiaries or affiliates as part of a consolidation, merger or any other form of corporate reorganization.

Language

The parties acknowledge that they have required that the agreement evidenced hereby be drawn up in English. Les parties reconnaissent avoir exigé la rédaction en anglais du Contrat. In the event of a conflict between the English and other language versions, the English version will prevail.

Preventive Maintenance and Repair

Maintenance of Solid-State Control

This section is excerpted from Rockwell Automation publication SGI-1.1, Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control and parts of Section 5 of NEMA Standards Publication No. ICS 1.1-1987, titled Safety Guidelines for the Application, Installation, and Maintenance of Solid-State Control. The text from the NEMA Standard has been reprinted verbatim with NEMA's permission. Text set off from the NEMA standard content under the heading Information contains Rockwell Automation comments for the NEMA content immediately preceding it. The comments provide information to help readers better understand the characteristics of industrial equipment employing solid-state technology. NEMA text is provided solely as a convenience to the reader, and Rockwell Automation assumes no responsibility for its completeness or validity.

NEMA Standards Publication No. ICS 1.1-1984, Rev. No. 1 - October 1987, is available from the National Electrical Manufacturers Association, 2101 L Street, N.W., Washington, DC 20037. Allen-Bradley Publication SGI-1.1 is available from www.rockwellautomation.com/literature.

5.1 General

A well-planned and executed maintenance program is essential to the satisfactory operation of solid-state electrical equipment. The kind and frequency of the maintenance operation will vary with the kind and complexity of the equipment as well as with the nature of the operating conditions. Maintenance recommendations of the manufacturer or appropriate product standards should be followed.

Useful reference publications for setting up a maintenance program are NFPA 70B-1983, Maintenance of Electrical Equipment, and NFPA 70E-1983, Electrical Safety Requirements for Employee Workplaces.

5.2 Preventive Maintenance

The following factors should be considered when formulating a maintenance program:

1. Maintenance must be performed by qualified personnel familiar with the construction, operation, and hazards involved with the control.

2. Maintenance should be performed with the control out of operation and disconnected from all sources of power. If maintenance must be performed while the control is energized, the safety related practices of NFPA 70E should be followed.

3. Care should be taken when servicing electrostatic sensitive components. The manufacturer's recommendations for these components should be followed.

4. Ventilation passages should be kept open. If the equipment depends upon auxiliary cooling, e.g., air, water, or oil, periodic inspection (with filter replacement when necessary) should be made of these systems.

5. The means employed for grounding or insulating the equipment from ground should be checked to assure its integrity (see 4.5).

6. Accumulations of dust and dirt on all parts, including on semiconductor heat sinks, should be removed according to the manufacturer's instructions, if provided; otherwise, the manufacturer should be consulted. Care must be taken to avoid damaging any delicate components and to avoid displacing dust, dirt, or debris in a way that permits it to enter or settle into parts of the control equipment.

7. Enclosures should be inspected for evidence of deterioration. Accumulated dust and dirt should be removed from the top of the enclosures before opening doors or removing covers.

8. Certain hazardous materials removed as part of maintenance or repair procedure (e.g., polychlorinated biphenyls (PCB) found in some liquid filled capacitors) must be disposed of as described in Federal regulations.

Preventive Maintenance [Explanatory Information (Supplementary Comments - Not part of NEMA Standards Publication No. ICS 1.1)]

Lithium batteries are frequently used for memory backup in solid state equipment due to their excellent shelf life and high energy-to-weight ratio. Lithium is a highly reactive metal that can cause burns if there is contact with skin. The batteries are sealed so there is seldom a problem of contact with lithium as long as reasonable care is exercised when handling them. They should only be used in their intended application and not subjected to rough handling. When batteries are replaced in equipment, the batteries removed should be disposed of in accordance with the battery supplier's instructions.

The Department of Transportation has certain regulations that prohibit shipment of equipment with batteries installed if the batteries contain 0.5 grams or greater of lithium. The batteries must be removed from equipment and shipped separately in a container approved by the Department of Transportation. Additional Department of Transportation restrictions apply to the shipment of lithium batteries.

NEMA Standards Publication No. ICS 1.3-1986, Preventive Maintenance of Industrial Control and System Equipment, is recommended for personnel responsible for maintenance of equipment.

5.3 Repair

If equipment condition indicates repair or replacement, the manufacturer's instruction manual should be followed carefully. Diagnostic information within such a manual should be used to identify the probable source of the problem, and to formulate a repair plan. The level of field repair recommended by the manufacturer should be followed.

When solid state equipment is repaired, it is important that any replacement part be in accordance with the recommendations of the equipment manufacturer. Care should be taken to avoid the use of parts which are no longer compatible with other changes in the equipment. Also, replacement parts should be inspected for deterioration due to "shelf life" and for signs of rework or wear, which may involve factors critical to safety.

After repair, proper start-up procedures should be followed. Special precautions should be taken to protect personnel from hazards during start-up.

C.5.3 Repair [Explanatory Information (Supplementary Comments - Not part of NEMA Standards Publication No. ICS 1.1)]

Follow manufacturer's instructions exactly when replacing power semiconductors mounted on heatsinks since improper installation may become the source of further difficulties. Torque semiconductors or bolts retaining semiconductors to the value specified with a torque wrench. Too much pressure against a heatsink can damage a semiconductor, while too little can restrict the amount of heat transferred from the semiconductor to the heatsink, resulting in operation at higher temperature with decreased reliability.

Exercise care when removing modules from a system during maintenance. Failed modules are frequently returned to the manufacturer for repair. Any physical damage sustained during removal may result in more expensive repair or render the module unrepairable if damage is too great.

Modules with electrostatic sensitive components should be handled by the edges without touching components or printed circuit conductors. Use packaging material supplied with the replacement module when shipping the module to the manufacturer for repair.

When the scope of repairs exceeds the manufacturer's recommendations for field repair, the module(s) should be returned to the manufacturer for repair. Doing so will help to ensure that only properly selected components are used and that all necessary hardware and firmware revisions are incorporated into the repair. Failure to make necessary updates may result in safety, compatibility, or performance problems, which may not become apparent for some time after the repaired module has been placed back in service. When firmware is protected by copyright law, updates can be provided legally only by the manufacturer or licensee.

5.4 Safety Recommendations for Maintenance Personnel

All maintenance work should be done by qualified personnel familiar with the construction, operation, and hazards involved with the equipment. The appropriate work practices of NFPA 70E should be followed.

Product Compliance

Product Compliance Information

For your quick reference, product certification information can be found at www.ab.com/certification. Actual product certification is indicated by the label(s) on the product and not by a listing on this website or in product literature.

UL Certification

Generally, Rockwell Automation pursues applicable UL certification for its products. The following are relevant types of certifications granted by Underwriters Laboratories (UL):

- UL Recognized (UR), or UL Recognized to Canadian (cUR), or UL Recognized to US and Canadian (cURus) safety requirements under the Component Recognition Program of Underwriters Laboratories, Inc. UL Recognition may be for use in general as well as Hazardous Locations. The UL Recognition mark for products recognized for use in Hazardous Locations will be accompanied by the phrase "Industrial Control Equipment for use in Hazardous Locations" and information which indicates the nature of the Hazardous Locations. This is typically "Class I, Division 2 Groups A,B,C,D".
- UL Listed (UL), UL Listed to Canadian (cUL), or UL Listed to US and Canadian safety standards (cULus). UL Listing may be for use in general as well as hazardous Locations. The UL Listed mark for products certified for use in Hazardous Locations will be accompanied by the phrase "Industrial Control Equipment for use in Hazardous Locations" and information which indicates the nature of the Hazardous Locations. This is typically "Class I, Division 2 Groups A,B,C,D".

Although Rockwell Automation is only using the Class I Division 2 Group A, B, C, D designation on its products, it should be noted that this hazardous location classification is equivalent to the internationally defined Class I Zone 2 Group IIC area classification (see IEC publication 60079-10). Therefore, products labeled Class I Division 2 Group A, B, C, D may be used in Class I Zone 2 Group IIC environments.

Actual UL listing is indicated by the marking on the product, and not by statements in this catalog or any product literature.

Important Safety and Product Information

CSA Certification

In many cases Rockwell Automation pursues applicable CSA certifications for its products. CSA certifies products for general use as well as for use in hazardous locations. Products in this catalog might be certified in one of these two ways:

- CSA Certification (CSA): The product is certified by the Canadian Standards Association for use in Non-hazardous Locations.
- CSA Class I, Division 2 Hazardous Location Certification: The product is listed by the Canadian Standards Association as certified for use in Class I, Division 2, Group A, B, C, D, or non-hazardous locations.

Although Rockwell Automation is only using the Class I Division 2 Group A, B, C, D designation on its products, it should be noted that this hazardous location classification is equivalent to the internationally defined Class I Zone 2 Group IIC area classification (see IEC publication 60079-10). Therefore, products labeled Class I Division 2 Group A, B, C, D may be used in Class I Zone 2 Group IIC environments.

Actual CSA certification is indicated by the marking on the product, and not by statements in this catalog or any product literature.

FM Approval

A limited number of Allen-Bradley branded products have Factory Mutual Approval. FM approves products for use in general as well as hazardous locations.

- FM Class I Division 2 Hazardous Location Approval: The product is approved by Factory Mutual Research Corporation for use in Class I, Division 2, Group A, B, C, and D, or non-hazardous locations only.

Although Rockwell Automation is only using the Class I Division 2 Group A, B, C, D designation on its products, it should be noted that this hazardous location classification is equivalent to the internationally defined Class I Zone 2 Group IIC area classification (see IEC publication 60079-10). Therefore, products labeled Class I Division 2 Group A, B, C, D may be used in Class I Zone 2 Group IIC environments.

Actual FM Approval is indicated by the marking on the product, and not by statements in this catalog or any product literature.

Certification for Marine and Off-Shore Applications

If a product or its packaging has a certification for marine and off-shore applications, it is listed in the Marine Certification Applications publication CIG-2.2. Also see www.ab.com/certification.

Many Allen-Bradley branded products, such as selected PLC-5 programmable controllers, 1771 I/O, and Dataliner Message Displays, have been certified for use in marine and offshore applications around the world by:

- Lloyd's Register
- Registoro Italiano Navale
- Germanischer Lloyd
- Korean Register of Shipping
- American Bureau of Shipping
- Bureau Veritas
- Det Norske Veritas

Compliance with European Union Directives

Allen-Bradley branded products covered by European Union Directives are intended for sale and use within the European market and conform to the essential requirements of these directives:

- Products specifically required to do so bear the CE marking per the relevant European Union Directives and CE marking regulations.
- Declarations of Conformity for Allen-Bradley branded products are available as required at www.ab.com/certification.
- The necessary technical documentation is on file within Rockwell Automation.

Actual European Union conformity is indicated by the CE Marking on the product or its packaging, and not by statements in this catalog or any product literature.

EU Hazardous Location Certification

In addition to the "CE" mark, a limited number of Allen-Bradley branded products have also been issued Type Examination Certificates (Ex) indicating that the products have been found to comply with the Essential Health and Safety Requirements related to their design and construction as Category 1, 2, or 3 equipment intended for use in potentially explosive atmospheres as given in Annex II of EU Directive 94/9/EC. The related hazardous location protection methods and installation restrictions are documented in the product user documentation. See www.ab.com/certification.

Actual approval of product for use in EU Hazardous (classified) locations is indicated by the marking on the product, and not by statements in this catalog or any product literature.

DEMKO Certification

In addition to the "CE" mark, a limited number of Allen-Bradley branded products have DEMKO certification (D). DEMKO certifies products for general use as well as hazardous locations. As a Notified Body for the European Hazardous Location Directives, DEMKO verifies that products comply with the applicable European directives and standards for use in hazardous locations. Refer to the specific product nameplate for the actual hazardous location rating.

Actual DEMKO approval of product is indicated by the marking on the product, and not by statements in this catalog or any product literature.

Australian C-Tick Compliance

Allen-Bradley branded products covered by Australian acts are intended for sale and use within the Australian market and conform with the essential requirements of these acts. Declarations of Conformity for Allen-Bradley branded products are available as required.

Actual C-Tick conformity is indicated by the label on the product, and not by statements in this catalog or any product literature.

ISO 9001 Registration

Rockwell Automation has registered facilities encompassing more than 45 separate sites around the world to the ISO 9001 standard. This registration means that its quality system governing the design, development, manufacture, and delivery of its products has been verified by third-party audits.

Contacting Standards Organizations

For contact information of organizations regarding standards that may impact the installation, application and/or interoperability of Allen-Bradley branded products, refer to the following on-line address:

http://www.ab.com/en/epub/catalogs/12768/229240/229242/2841186/tab12.html.

ControlNet Conformance

Products which have been determined by ControlNet International to have passed conformance testing receive a Declaration of Conformity from ControlNet International for the product. Vendors who have received a Declaration of Conformity for a product have the right to be use the ControlNet CONFORMANCE TESTED certification logo mark and certification word mark on the product and in materials about the product.

DeviceNet Conformance

The Conformance Tested Service Mark is an ODVA-controlled logo protected by law, the authorized use of which indicates that a product has passed conformance testing at an official ODVA Test Service Provider (TSP). The DeviceNet conformance-tested service mark may be placed on a product, its literature, and/or advertising, only after it has successfully passed conformance testing at an official independent test lab of the Open DeviceNet Vendor Association.

EtherNet/IP Conformance

The Conformance Tested Service Mark is an ODVA-controlled logo protected by law, the authorized use of which indicates that a product has passed conformance testing at an official ODVA Test Service Provider (TSP). The EtherNet/IP conformance-tested service mark may be placed on a product, its literature, and/or advertising, only after it has successfully passed conformance testing at an official independent test lab of the Open DeviceNet Vendor Association.

Specifying Enclosures

Specify the Correct Enclosure for your Motor Controls

Enclosure Selection Criteria

Enclosures for Non-Hazardous Locations

For a Degree of Protection Against:	Designed to Meet Tests No. ✶	Type							
		For Indoor Use			Outdoor Use		Indoor or Outdoor		
		1	12	13	3R	3	4	4X	6P
Incidental contact with enclosed equipment	6.2	✓	✓	✓	✓	✓	✓	✓	✓
Falling dirt	6.2	✓	✓	✓	✓	✓	✓	✓	✓
Rust	6.8	✓	✓	✓	✓	✓	✓	✓	✓
Circulating dust, lint, fibers and flyings ❄	6.5.1.2 (2)		✓	✓		✓	✓	✓	✓
Windblown dust	6.5.1.1 (2)					✓	✓	✓	✓
Falling liquids and light splashing	6.3.2.2		✓	✓		✓	✓	✓	✓
Rain (Test evaluated per 6.4.2.1)	6.4.2.1				✓	✓	✓	✓	✓
Rain (Test evaluated per 6.4.2.2)	6.4.2.2					✓	✓	✓	✓
Snow and sleet	6.6.2.2				✓	✓	✓	✓	✓
Hosedown and splashing water	6.7						✓	✓	✓
Occasional prolonged submersion	6.11 (2)								✓
Oil and coolant seepage	6.3.2.2		✓	✓					
Oil or coolant spraying and splashing	6.12			✓					
Corrosive agents	6.9				✓	✓	✓	✓	✓

✶ See below for abridged description of NEMA enclosure test requirements. Refer to NEMA Standards Publication No. 250 for complete test specifications.
❄ Non-hazardous materials, not Class III ignitable or combustible.

Abridged Description of NEMA Enclosure Test Requirements

6.2 Rod Entry Test — A 1/8 in (3.18 mm) diameter rod must not be able to enter enclosure except at locations where nearest live part is more than 4 in (102 mm) from an opening — such opening shall not permit a 1/2 in (13 mm) diameter rod to enter.

6.3 Drip Test — Water is dripped onto enclosure for 30 minutes from an overhead pan having uniformly spaced spouts, one every 20 sq in (12900 mm^2) of pan area, each spout having a drip rate of 20 drops per minute. Evaluation 6.3.2.2: No water shall have entered enclosure.

6.4 Rain Test — Entire top and all exposed sides are sprayed with water at a pressure of 5 psi (0.35 kg/cm^2) from nozzles for one hour at a rate to cause water to rise 18 in (457 mm) in a straight-sided pan beneath the enclosure. Evaluation 6.4.2.1: No water shall have reached live parts, insulation or mechanisms.

Evaluation 6.4.2.2: No water shall have entered enclosure.

6.5.1.1 (2) Outdoor Dust Test (Alternate Method) — Enclosure and external mechanisms are subjected to a stream of water at 45 gallons (170.5 liters) per minute from a 1 in (25.4 mm) diameter nozzle, directed at all joints from all angles from a distance of 10 to 12 feet (3 to 3.7 meters). Test time is 48 seconds times the test length (height + width + depth of enclosure in feet), or a minimum of 5 minutes. No water shall enter enclosure.

6.5.1.2 (2) Indoor Dust Test (Alternate Method) — Atomized water at a pressure of 30 psi (2.11 kg/cm^2) is sprayed on all seams, joints and external operating mechanisms from a distance of 12 to 15 in (305 to 381mm) at a rate of 3 gallons (11 liters) per hour. No less than 5 ozs (142 gms) of water per linear foot of test length (height + length + depth of enclosure) is applied. No water shall enter enclosure.

6.6 **External Icing Test** — Water is sprayed on enclosure for one hour in a cold room 35.6 °F (+2 °C); then room temperature is lowered to approximately –23 °F (–5 °C) and water spray is controlled so as to cause ice to build up at a rate of 1/4 in (6.4 mm) per hour until 3/4 in (19 mm) thick ice has formed on top surface of a 1 in (25.4 mm) diameter metal test bar, then temperature is maintained at –23 °F (–5 °C) for 3 hours.

Evaluation 6.6.2.2: Equipment shall be undamaged after ice has melted (external mechanisms not required to be operable while ice-laden).

6.7 **Hosedown Test** — Enclosure and external mechanisms are subjected to a stream of water at 65 gallons (246 liters) per minute from a 1 in (25.4 mm) diameter nozzle, directed at all joints from all angles from a distance of 10 to 12 ft (3 to 3.7 meters). Test time is 48 seconds times the test length (height + width + depth of enclosure in ft) (meters), or a minimum of 5 seconds. No water shall enter enclosure.

6.8 **Rust Resistance Test (Applicable Only to Enclosures Incorporating External Ferrous Parts)** — Enclosure is subjected to a salt spray (fog) for 24 hours, using water with five parts by weight of salt (NaCI), at 95 °F (35 °C), then rinsed and dried. There shall be no rust except where protection is impractical (e.g., machined mating surfaces, sliding surfaces of hinges, shafts, etc.).

6.9 **Corrosion Protection** — Sheet steel enclosures are evaluated per Underwriter's Laboratories (UL) 50, Part 13 (test for equivalent protection as G-90 commercial zinc coated sheet steel). Other materials per Underwriter's Laboratories (UL) 508, 6.9 or 6.10.

6.11 (2) **Air Pressure Test (Alternate Method)** — Enclosure is submerged in water at a pressure equal to water depth of 6 ft (2 meters), for 24 hours. No water shall enter enclosure.

6.12 **Oil Exclusion Test** — Enclosure is subjected to a stream of test liquid for 30 minutes from a 3/8 in (9.5 mm) diameter nozzle at 2 gallons (7.57 liters) a minute. Water with 0.1% wetting agent is directed from all angles from a distance of 12 to 18 in (305 to 457 mm), while any externally operated device is operated at 30 operations per minute. No test liquid shall enter the enclosure.

Enclosure Selection Criteria, Continued

For a Degree of Protection Against Atmospheres Typically Containing: ‡	Designed to Meet Tests ❄	Class (National Electrical Code)	Type						
			7, Class I Group				9, Class II Group		
			A	B	C	D	E	F	G
Acetylene	Explosion, Hydrostatic and Temperature Test	I	✓						
Hydrogen, Manufactured Gas		I	✓	✓					
Diethyl Ether, Ethylene, Hydrogen Sulfide		I			✓				
Acetone, Butane, Gasoline, Propane, Toluene		I			✓	✓			
Metal dusts and other combustible dusts with resistivity of less than 10^5 ohm-cm.	Dust Penetration Test Temperature Test with Dust Blanket	II					✓		
Carbon black, charcoal, coal or coke dusts with resistivity between 10^2…10^8 ohm-cm		II						✓	
Combustible dusts with resistivity of 10^5 ohm-cm or greater		II							✓
Fibers, flyings	§	III							✓

∗ For indoor locations only unless cataloged with additional NEMA Type enclosure number(s) suitable for outdoor use as shown in table on page Important-9. Some control devices (if so listed in the catalog) are suitable for Division 2 hazardous location use in enclosures for non-hazardous locations. For explanation of CLASSES, DIVISIONS and GROUPS, refer to the National Electrical Code.
Note: Classifications of hazardous locations are subject to the approval of the authority having jurisdiction. Refer to the National Electrical Code.

❄ See abridged description of test requirements below. For complete requirements, refer to UL Standard 698, compliance with which is required by NEMA enclosure standards.

‡ For listing of additional materials and information noting the properties of liquids, gases and solids, refer to NFPA 497M-1991, Classification of Gases, Vapors, and Dusts for Electrical Equipment in Hazardous (Classified) Locations.

§ UL 698 does not include test requirements for Class III. Products that meet Class II, Group G requirements are acceptable for Class III.

Abridged Description of UL Standard 698 Test Requirements

Explosion Test — During a series of tests in which gas-air mixtures of the specific gas, over its range of explosive concentrations, are ignited inside the enclosure, the enclosure shall prevent the passage of flame and sparks capable of igniting a similar gas-air mixture surrounding the enclosure. In addition, there shall be no mechanical damage to enclosed electrical mechanisms or the enclosure.

Hydrostatic Test — The enclosure shall withstand for 1 minute a hydrostatic test based on the maximum internal explosion pressure developed during the explosion tests, as follows: cast metal, four times the explosion pressure without rupture or permanent deformation; fabricated steel, twice the explosion pressure without permanent deformation and three times the explosion pressure without rupture. Exception: Hydrostatic tests may be omitted if calculations show safety factor of 5:1 for cast metal and 4:1 for fabricated steel.

Temperature Test — The enclosed device is subjected to a temperature test to determine maximum temperature at any point on the external surface. The device must be marked with a temperature code based on the result only if the temperature exceeds (+212 °F) +100 °C.

Dust Penetration Test — The device is operated at full rated load until equilibrium temperatures are attained, then allowed to cool to ambient (room) temperature, through six heating and cooling cycles covering at least 30 hours, while continuously exposed to circulating dust of specified properties in a test chamber. No dust shall enter the enclosure.

Temperature Test with Dust Blanket
This test is conducted as described for the Dust Penetration test except that the recirculating dust nozzles are positioned so that the dust is not blown directly on the device under test. The device is operated at full rated load (and under abnormal conditions for equipment subject to overloading) until equilibrium temperatures are attained. Dust in contact with the enclosure shall not ignite or discolor from heat, and the exterior temperatures based on (+104 °F) +40 °C ambient shall not exceed:

Group	Normal Operation	Abnormal Operation
E	(+392 °F) +200 °C	(+392 °F) +200 °C
F	(+302 °F) +150 °C	(+392 °F) +200 °C
G	(+248 °F) +120 °C	(+329 °F) +165 °C

Degree of Protection

IEC Publication 529 describes standard Degrees of Protection that enclosures of a product are designed to provide when properly installed.

Summary

The publication defines degrees of protection with respect to:
- Persons
- Equipment within the enclosure
- Ingress of water

It does **not** define:
- Protection against risk of explosion
- Environmental protection (e.g. against humidity, corrosive atmospheres or fluids, fungus or the ingress of vermin)

Note: The IEC test requirements for Degrees of Protection against liquid ingress refer only to water. Those products in this catalog, which have a high degree of protection against ingress of liquid, in most cases include Nitrile seals. These have good resistance to a wide range of oils, coolants and cutting fluids. However, some of the available lubricants, hydraulic fluids and solvents can cause severe deterioration of Nitrile and other polymers. Some of the products listed are available with seals of Viton or other materials for improved resistance to such liquids. For specific advice on this subject refer to your local Allen-Bradley Sales Office.

IEC Enclosure Classification

The degree of protection is indicated by two letters (IP) and two numerals. International Standard IEC 529 contains descriptions and associated test requirements that define the degree of protection each numeral specifies. The following table indicates the *general* degree of protection — refer to Abridged Descriptions of IEC Enclosure Test Requirements below and on page Important-11. **For complete test requirements refer to IEC 529.**

First Numeral*	Second Numeral*
Protection of persons against access to hazardous parts and protection against penetration of solid foreign objects.	Protection against ingress of water under test conditions specified in IEC 529.
Non-protected	Non-protected
Back of hand; objects greater than 50 mm in diameter	Vertically falling drops of water
Finger; objects greater than 12.5 mm in diameter	Vertically falling drops of water with enclosure tilted 15 degrees
Tools or objects greater than 2.5 mm in diameter	Spraying water
Tools or objects greater than 1.0 mm in diameter	Splashing water
Dust-protected (dust may enter during specified test but must not interfere with operation of the equipment or impair safety)	Water jets
Dusttight (no dust observable inside enclosure at end of test)	Powerful water jets
	Temporary submersion
	Continuous submersion
Example: IP41 describes an enclosure that is designed to protect against the entry of tools or objects greater than 1 mm in diameter and to protect against vertically dripping water under specified test conditions.	
Note: All first numerals and second numerals up to and including characteristic numeral 6, imply compliance also with the requirements for all lower characteristic numerals in their respective series (first or second). Second numerals 7 and 8 do not imply suitability for exposure to water jets (second characteristic numeral 5 or 6) unless dual coded; e.g., IP_5/IP_7.	

* The IEC standard permits use of certain supplementary letters with the characteristic numerals. If such letters are used, refer to IEC 529 for the explanation.

Abridged Descriptions of IEC Enclosure Test Requirements

(Refer to IEC 529 for complete test specifications — e.g., test apparatus configuration; tolerances; etc. For Metric Conversion factors — see page Important-2.)

Tests for Protection Against Access to Hazardous Parts (first characteristic numeral)

The first characteristic numeral of the IP number indicates compliance with the following tests for the degree of protection against access to hazardous parts. It also indicates compliance with tests as shown in the next section for the degree of protection against solid foreign objects.

The protection against access to hazardous parts is satisfactory if adequate clearance is kept between the specified access probe and hazardous parts. For voltages less than 1000V AC and 1500V DC, the access probe must not touch the hazardous live parts. For voltages exceeding 1000V AC and 1500V DC, the equipment must be capable of withstanding specified dielectric tests with the access probe in the most unfavorable position.

IP0_ — No test required.

IP1_ — A rigid sphere 50 mm in diameter shall not completely pass through any opening. Force = 50 N.

IP2_ — A jointed test finger 80 mm long and 12 mm in diameter may penetrate to its 80 mm length, but shall have adequate clearance as specified above, from hazardous live parts, in every possible position of the test finger as both joints are bent through an angle up to 90°. Force = 10 N.

IP3_ — A test rod 2.5 mm in diameter shall not penetrate and adequate clearance shall be kept from hazardous live parts (as specified above). Force = 3 N.

IP4_ — A test wire 1 mm in diameter shall not penetrate and adequate clearance shall be kept from hazardous live parts (as specified above). Force = 1 N.

IP5_ — A test wire 1 mm in diameter shall not penetrate and adequate clearance shall be kept from hazardous live parts (as specified on page Important-11). Force = 1 N.

IP6_ — A test wire 1 mm in diameter shall not penetrate and adequate clearance shall be kept from hazardous live parts (as specified on page Important-11). Force = 1 N.

Tests for Protection Against Solid Foreign Objects (first characteristic numeral)

For first numerals **1**, **2**, **3**, and **4** the protection against solid foreign objects is satisfactory if the full diameter of the specified probe does not pass through any opening. Note that for first numerals **3** and **4** the probes are intended to simulate foreign objects which may be spherical. Where shape of the entry path leaves any doubt about ingress or a spherical object capable of motion, it may be necessary to examine drawings or to provide special access for the object probe. For first numerals **5** and **6** see test descriptions below for acceptance criteria.

IP0_ — No test required.

IP1_ — The full diameter of a rigid sphere 50 mm in diameter must not pass through any opening at a test force of 50 N.

IP2_ — The full diameter of a rigid sphere 12.5 mm in diameter must not pass through any opening at a test force of 30 N.

IP3_ — A rigid steel rod 2.5 mm in diameter must not pass through any opening at a test force of 3 N.

IP4_ — A rigid steel wire 1 mm in diameter must not pass through any opening at a test force of 1 N.

IP5_ — The test specimen is supported inside a specified dust chamber where talcum powder, able to pass through a square-meshed sieve with wire diameter 50 mm and width between wires 75 mm, is kept in suspension.

Enclosures for equipment subject to thermal cycling effects (category 1) are vacuum pumped to a reduced internal pressure relative to the surrounding atmosphere: maximum depression = 2 kPa; maximum extraction rate = 60 volumes per hour. If extraction rate of 40 to 60 volumes/h is obtained, test is continued until 80 volumes have been drawn through or 8 h has elapsed. If extraction rate is less than 40 volumes/h at 20 kPa depression, test time = 8 h.

Enclosures for equipment not subject to thermal cycling effects **and** designated category 2 in the relevant product standard are tested for 8 h without vacuum pumping.

Protection is satisfactory if talcum powder has not accumulated in a quantity or location such that, as with any other kind of dust, it could interfere with the correct operation of the equipment or impair safety; and no dust has been deposited where it could lead to tracking along creepage distances.

IP6_ — All enclosures are tested as category 1, as specified above for IP5_. The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test.

Tests for Protection Against Water (second characteristic numeral)

The second characteristic numeral of the IP number indicates compliance with the following tests for the degree of protection against water. For numerals **1** through **7**, the protection is satisfactory if any water that has entered does not interfere with satisfactory operation, does not reach live parts not designed to operate when wet, and does not accumulate near a cable entry or enter the cable. For second numeral **8** the protection is satisfactory if no water has entered the enclosure.

IP_0 — No test required.

IP_1 — Water is dripped onto the enclosure from a “drip box” having spouts spaced on a 20 mm square pattern, at a “rainfall” rate of 1 mm/min. The enclosure is placed in its normal operating position under the drip box. Test time = 10 min.

IP_2 — Water is dripped onto the enclosure from a “drip box” having spouts spaced on a 20 mm square pattern, at a “rainfall” rate of 3 mm/min. The enclosure is placed in 4 fixed positions tilted 15° from its normal operating position, under the drip box. Test time = 2.5 min. for each position of tilt.

Tests for Protection Against Access to Hazardous Parts (second characteristic numeral)

IP_3 — Water is sprayed onto all sides of the enclosure over an arc of 60° from vertical, using an oscillating tube device with spray holes 50 mm apart (or a hand-held nozzle for larger enclosures). Flow rate, oscillating tube device = 0.07 l/min. per hole x number of holes; for hand-held nozzle = 10 l/min. Test time, oscillating tube = 10 min.; for hand-held nozzle = 1 min./m^2 of enclosure surface area, 5 min. minimum.

IP_4 — Same as test for **IP_3** except spray covers an arc of 180° from vertical.

IP_5 — Enclosure is sprayed from all practicable directions with a stream of water at 12.5 l/min. from a 6.3 mm nozzle from a distance of 2.5 to 3 m. Test time = 1min./m^2 of enclosure surface area to be sprayed, 3 min. minimum.

IP_6 — Enclosure is sprayed from all practicable directions with a stream of water at 100 l/min. from a 12.5 mm nozzle from a distance of 2.5 to 3 m. Test time = 1min./m^2 of enclosure surface area to be sprayed, 3 min. minimum.

IP_7 — Enclosure is immersed in water in its service position for 30 min. Lowest point of enclosures less than 850 mm tall = 1000 mm below surface of water. Highest point of enclosures more than 850 mm tall = 150 mm below surface of water.

IP_8 — Test conditions are subject to agreement between manufacturer and user, but shall be at least as severe as those for **IP_7**.

Notes

For more information on Allen-Bradley drives, please visit our website at:

http://www.ab.com/drives

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