LISTEN.
THINK.
SOLVE.®

PowerFlex® 700

TECHNICAL DATA

ADJUSTABLE FREQUENCY AC DRIVES

ALLEN-BRADLEY • ROCKWELL SOFTWARE

Rockwell Automation

Outstanding Control and Performance

Multiple motor control algorithms allow performance matched to the application need:

- **Volts/Hertz** for simple Fan and Pump applications.
- **Sensorless Vector** for high torque production over a wide speed range.
- **Vector** for outstanding torque regulation and excellent low speed/zero speed performance (w/Vector Control cassette).

The PowerFlex 700 drive's Vector Control uses Allen-Bradley's patented Force™ Technology which provides excellent low-speed performance - whether it is operated with or without feedback. While this industry-leading control provides the highest level of drive performance, it is as easy to use as any general purpose drive available.
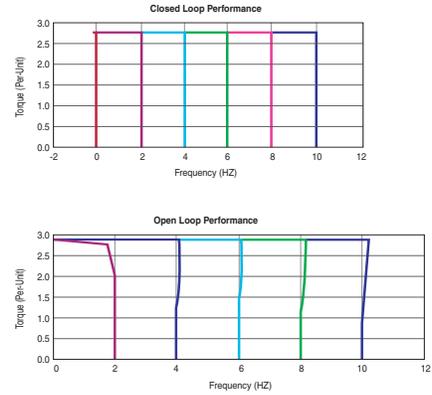
Drives Features

- Fast-acting **Current Limit** and **Bus Voltage Regulation** result in maximum accel/decel without tripping.
- **High speed analog inputs** improve drive response to torque or speed commands.
- **Programming flexibility** allows parameters to be linked within the drive.
- **Flying Start** delivers smooth and instantaneous connection into rotating loads, regardless of commanded direction, without the need for any speed feedback.
- **Integral Process PI Control** can eliminate the need for a separate process loop controller.
- **Inertia Ride-Through** offers tripless operation during a prolonged power outage by using the rotating energy stored in high inertia, low-friction loads.
- **Position Indexer/Speed Profiler** uses a 16 step indexer to provide point-to-point positioning or velocity profiling based on encoder counts, digital inputs, parameter levels or time.
- **TorqProve**™ assures control of the load when transferring control between the drive and a mechanical brake.
- **Speed Regulation** - Open Loop or Closed Loop
  - **Slip Compensation** delivers a minimum 0.5% speed regulation without feedback hardware.
  - **Droop** allows drives to load share without fighting each other.
  - **Encoder Feedback** provides up to 0.001% speed regulation for the tightest application requirements.
- **Torque Regulation** - Open Loop or Closed Loop
  - **Open Loop** torque regulation provides ±5% regulation.
  - **Encoder Feedback** provides ±2% regulation and the ability to hold full load at zero speed.

Unsurpassed Capability in Network Communications

PowerFlex drives are fully compatible with the wide variety of Allen-Bradley DPI™ communication adapters, offering the following benefits:

BACnet®	Bluetooth®	ControlNet™	DeviceNet™	EtherNet/IP™	Interbus™	LonWorks™	Modbus RTU	PROFIBUS™	Remote I/O	RS485 DF1	USB	Description
		✔	✔	✔								**(Unconnected Messaging)** permits other network devices (e.g. PanelView™) to communicate directly to a drive without routing the communication through the network scanner.
✔	✔	✔	✔	✔						✔	✔	**Adapter Routing** - Plug PC into one drive and talk to all other Allen-Bradley drives on same network, without being routed through network scanner.
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	Access to 100% of all parameters over the network.
✔			✔	✔			✔					**AutoBaud** capability makes initial connections less problematic.
			✔									**Change of State** significantly reduces network traffic by configuring control messages to be sent only upon customer defined states. Very flexible configuration for each node (Example: "reference must change by more than 5%").
		✔	✔									**Peer Control** provides master-slave type control between drives, where one or more slave drives (consumers) can run based on the status of a master drive (producer), which can also significantly reduce network traffic.
			✔									**ADR (Automatic Device Replacement)** saves significant time and effort when replacing a drive, by allowing the scanner to be configured to automatically detect a new drive and download the required parameter settings.
✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	**Flexible Fault Configuration** - Adapters can be programmed to take fault based actions as ramp to stop, coast-to-stop and hold last state, as well as send user configurable logic control and speed reference values. In addition, different actions can be taken based on whether the network experienced a serious problem (broken cable etc.) versus network idle condition (PLC set to "Program").

4

						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*

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	IP20, NEMA/UL Type 1
F ⌘	Flange Mount
N §	Front: IP00, NEMA/UL Type Open Back/Heatsink: IP54, NEMA/UL Type 12
G ⌘	Stand-Alone/Wall Mount IP54, NEMA/UL Type 12
M ❖	IP20, NEMA/UL Type 1 with Conformal Coat

⌘ Only available for Frame 5 & Frame 6 drives, 400…690V.

§ Only available for Frames 7…10.

❖ Only available with Vector Control option.

e

HIM

Code	Operator Interface
0	Blank Cover
3	Full Numeric LCD
5	Prog. Only LCD
J ➣	Remote (Panel Mount), IP66, NEMA/UL Type 12 Full Numeric LCD HIM
K ➣	Remote (Panel Mount), IP66, NEMA/UL Type 12 Prog. Only LCD HIM

➣ Available with Frames 5…6 Stand-Alone IP54 drives (Enclosure Code "G") and Frames 8…10 IP20 drives (Enclosure Code "A").

f

Documentation

Code	Type
A	User Manual
N	No Manual
C	Chinese Documentation

g

Brake

Code	w/Brake IGBT ❋
Y	Yes
N	No

❋ Brake IGBT is standard on Frames 0-3, optional on Frames 4-6 and not available on Frames 7…10.

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

‡ Note: 600V class drives below 77 Amps (Frames 0-4) are declared to meet the Low Voltage Directive. It is the responsibility of the user to determine compliance to the EMC directive. CE Certification testing has not been performed on Frame 7…10 drives (all voltages).

✦ Refer to *Internal EMC Filter* for details on selecting this option for each frame size.

j

Comm Slot

Code	Version
B	BACnet MS/TP
C	ControlNet (Coax)
D	DeviceNet
E	EtherNet/IP
R	Remote I/O
S	RS485 DF1
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. Frame 7…10 drives only accept Vector Control.

l

Feedback

Code	Type
0	None
1	Encoder, 12V/5V

m

Future Use

n

Special Firmware

Code	Type
AD ➣	60 Hz Maximum
AE ➣	Cascading Fan/Pump Control

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

Feedback Options (Vector Control Only)

Description	Cat. Code (Position l)
No Encoder	0
12V/5V Encoder ➤	1

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

Special Firmware

Description	Cat. Code (Position m…n)
60 Hz Maximum	NNAD⌘
Cascading Fan/Pump Control	NNAE⌘

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

User Installed Options

Human Interface and Wireless Interface Modules

No HIM (Blank Plate)
20-HIM-A0

LCD Display, Full Numeric Keypad
20-HIM-A3

LCD Display, Programmer Only
20-HIM-A5

Wireless Interface Module
20-WIM-N1

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

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

Remote (Panel Mount) Wireless Interface Module
20-WIM-N4S

Description	Handheld/Local (Drive Mount) Cat. No.	Remote (Panel Mount) IP66, NEMA/UL Type 4x/12 ✳ Cat. No.
No HIM (Blank Plate)	20-HIM-A0	–
LCD Display, Full Numeric Keypad	20-HIM-A3	20-HIM-C3S ‡
LCD Display, Programmer Only	20-HIM-A5	20-HIM-C5S ‡
Wireless Interface Module	20-WIM-N1	20-WIM-N4S

✳ For indoor use only.
‡ 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/UL Type 1 ‡	20-HIM-B1
PowerFlex HIM Interface Cable, 1 m (39 in) ♣	20-HIM-H10
Cable Kit (Male-Female) ➤	
0.33 Meters (1.1 Feet)	1202-H03
1 Meter (3.3 Feet)	1202-H10
3 Meter (9.8 Feet)	1202-H30
9 Meter (29.5 Feet)	1202-H90
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 (Open Loop) - No I/O	20B-STD-N
Standard Control (Open Loop) - 24V dc/ac	20B-STD-A0
Standard Control (Open Loop) - 115V ac	20B-STD-B0
Vector Control (Series B) - 24V dc ✛	20B-VECTB-C0
Vector Control (Series B) - 24V dc, Conformal Coat ✛	20B-VECTB-C0-MX3
Vector Control (Series B) - 115V ac ✛	20B-VECTB-D0
Vector Control (Series B) - 115V ac, Conformal Coat ✛	20B-VECTB-D0-MX3

✛ Vector Control option utilizes DPI Only.

I/O Option Kit (Standard Control Only)

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

Encoder Option Kit (Vector Control Only)

Description	Cat. No.
12V/5V Encoder	20B-ENC-1
12V/5V Encoder with Conformal Coat	20B-ENC-1-MX3

Communication Option Kits

Description	Cat. No.
BACnet® MS/TP RS485 Communication Adapter	20-COMM-B
ControlNet™ Communication Adapter (Coax)	20-COMM-C
ControlNet™ Communication Adapter (Coax) Conformal Coat	20-COMM-C-MX3
DeviceNet™ Communication Adapter	20-COMM-D
DeviceNet™ Communication Adapter Conformal Coat	20-COMM-D-MX3
EtherNet/IP™ Communication Adapter	20-COMM-E
EtherNet/IP™ Communication Adapter Conformal Coat	20-COMM-E-MX3
HVAC Communication Adapter❖	20-COMM-H
Interbus™ Communication Adapter	20-COMM-I
CANopen® Communication Adapter	20-COMM-K
LonWorks® Communication Adapter⧫	20-COMM-L
Modbus/TCP Communication Adapter	20-COMM-M
PROFIBUS™ DP Communication Adapter	20-COMM-P
ControlNet™ Communication Adapter (Fiber)	20-COMM-Q
Remote I/O Communication Adapter	20-COMM-R
Remote I/O Communication Adapter Conformal Coat	20-COMM-R-MX3
RS485 DF1 Communication Adapter	20-COMM-S
RS485 DF1 Communication Adapter Conformal Coat	20-COMM-S-MX3
External Communications Kit Power Supply	20-XCOMM-AC-PS1
DPI External 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 (RS232) includes 1203-SFC and 1202-C10 Cables	1203-SSS
Universal Serial Bus™ (USB) Converter includes 2m USB, 20-HIM-H10 & 22-HIM-H10 Cables	1203-USB

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

Dynamic Brake, Chopper Only Kits

Description	Rating	Cat. No.
200…240V ac	18A	1336-WA018
	70A	1336-WA070
	115A	1336-WA115
380…480V ac	9A	1336-WB009
	35A	1336-WB035
	110A	1336-WB110
500…600V ac	9A	1336-WC009
	35A	1336-WC035
	85A	1336-WC085

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…600V ac	115	0	20BD-DB1-0
	115	1	20BD-DB1-1
380…480V ac	68	2	20BD-DB1-2

Reflected Wave Reduction Modules

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

✦ Refer to Appendix A of publication *DRIVES-IN001* for selection information.

Reflected Wave Reduction Devices

Voltage	Drive Cat. No.	ND Hp	Cat. No.
480V ac	20BD8P0	5.0	1321-RWR8-DP
	20BD011	7.5	1321-RWR12-DP
	20BD014	10.0	1321-RWR18-DP
	20BD022	15.0	1321-RWR25-DP
	20BD027	20.0	1321-RWR35-DP
	20BD034	25.0	1321-RWR35-DP
	20BD040	30.0	1321-RWR45-DP
	20BD052	40.0	1321-RWR55-DP
	20BD065	50.0	1321-RWR80-DP
	20BD077	60.0	1321-RWR80-DP
	20BD096	75.0	1321-RWR100-DP
	20BD125	100.0	1321-RWR130-DP
	20BD156	125.0	1321-RWR160-DP
	20BD180	150.0	1321-RWR200-DP
	20BD248	200.0	1321-RWR250-DP
	20BD292	250.0	1321-RWR320-DP
600V ac	20BE6P1	5.0	1321-RWR8-EP
	20BE9P0	7.5	1321-RWR12-EP
	20BE011	10.0	1321-RWR12-EP
	20BE017	15.0	1321-RWR18-EP
	20BE022	20.0	1321-RWR25-EP
	20BE027	25.0	1321-RWR35-EP
	20BE032	30.0	1321-RWR35-EP
	20BE041	40.0	1321-RWR45-EP
	20BE052	50.0	1321-RWR55-EP
	20BE062	60.0	1321-RWR80-EP
	20BE077	75.0	1321-RWR80-EP
	20BE099	100.0	1321-RWR100-EP
	20BE125	125.0	1321-RWR130-EP
	20BE144	150.0	1321-RWR160-EP