Specifications

Drive Ratings

Catalog Number[1]	Output Ratings		Input Ratings			Branch Circuit Protection			
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses	140M/140MT Motor Protectors[3][4]	Contactors	Min. Enclosure Volume[5] (in.^{3})
100...120V AC (±10%) – 1-phase Input, 0...230V 3-phase Output									
22B-V2P3x104	0.4 (0.5)	2.3	90...132	1.15	9.0	15	140M-C2E-C16 140MT-C3E-C16	100-C12	1655
22B-V5P0x104	0.75 (1.0)	5.0	90...132	2.45	20.3	35	140M-D8E-C20 140MT-D9E-C20	100-C23	1655
22B-V6P0x104	1.1 (1.5)	6.0	90...132	3.0	24.0	40	140M-F8E-C32	100-C37	1655
200...240V AC (±10%) – 1-phase[2] Input, 0...230V 3-phase Output									
22B-A2P3x104	0.4 (0.5)	2.3	180...264	1.15	6.0	10	140M-C2E-B63 140MT-C3E-B63	100-C09	1655
22B-A5P0x104	0.75 (1.0)	5.0	180...264	2.45	12.0	20	140M-C2E-C16 140MT-C3E-C16	100-C12	1655
22B-A8P0x104	1.5 (2.0)	8.0	180...264	4.0	18.0	30	140M-D8E-C20 140MT-D9E-C20	100-C23	1655
22B-A012x104	2.2 (3.0)	12.0	180-264	5.5	25.0	40	140M-F8E-C32	100-C37	2069
200...240V AC (±10%) – 3-phase Input, 0...230V 3-phase Output									
22B-B2P3x104	0.4 (0.5)	2.3	180...264	1.15	2.5	6	140M-C2E-B40 140MT-C3E-B40	100-C07	1655
22B-B5P0x104	0.75 (1.0)	5.0	180...264	2.45	5.7	10	140M-C2E-B63 140MT-C3E-C10	100-C09	1655
22B-B8P0x104	1.5 (2.0)	8.0	180...264	4.0	9.5	15	140M-C2E-C16 140MT-C3E-C16	100-C12	1655
22B-B012x104	2.2 (3.0)	12.0	180...264	5.5	15.5	25	140M-C2E-C16 140MT-C3E-C16	100-C23	1655
22B-B017x104	3.7 (5.0)	17.5	180...264	8.6	21.0	30	140M-F8E-C25	100-C23	1655
22B-B024x104	5.5 (7.5)	24.0	180...264	11.8	26.1	40	140M-F8E-C32	100-C37	2069
22B-B033x104	7.5 (10.0)	33.0	180...264	16.3	34.6	60	140M-F8E-C45	100-C60	2069
380...480V AC (±10%) – 3-phase Input, 0...460V 3-phase Output									
22B-D1P4x104	0.4 (0.5)	1.4	342...528	1.4	1.8	3	140M-C2E-B25 140MT-C3E-B25	100-C07	1655
22B-D2P3x104	0.75 (1.0)	2.3	342...528	2.3	3.2	6	140M-C2E-B40 140MT-C3E-B40	100-C07	1655
22B-D4P0x104	1.5 (2.0)	4.0	342...528	4.0	5.7	10	140M-C2E-B63 140MT-C3E-B63	100-C09	1655
22B-D6P0x104	2.2 (3.0)	6.0	342...528	5.9	7.5	15	140M-C2E-C10 140MT-C3E-C10	100-C09	1655
22B-D010x104	4.0 (5.0)	10.5	342...528	10.3	13.0	20	140M-C2E-C16 140MT-C3E-C16	100-C23	1655
22B-D012x104	5.5 (7.5)	12.0	342...528	11.8	14.2	25	140M-D8E-C20 140MT-D9E-C20	100-C23	2069
22B-D017x104	7.5 (10.0)	17.0	342...528	16.8	18.4	30	140M-D8E-C20 140MT-D9E-C20	100-C23	2069
22B-D024x104	11.0 (15.0)	24.0	342...528	23.4	26.0	50	140M-F8E-C32	100-C43	2069
460...600V AC (±10%) – 3-phase Input, 0...575V 3-phase Output									
22B-E1P7x104	0.75 (1.0)	1.7	414...660	2.1	2.3	6	140M-C2E-B25	100-C09	1655
22B-E3P0x104	1.5 (2.0)	3.0	414...660	3.65	3.8	6	140M-C2E-B40	100-C09	1655
22B-E4P2x104	2.2 (3.0)	4.2	414...660	5.2	5.3	10	140M-D8E-B63	100-C09	1655
22B-E6P6x104	4.0 (5.0)	6.6	414...660	8.1	8.3	15	140M-D8E-C10	100-C09	1655

Drive Ratings (Continued)

Catalog Number(1)	Output Ratings		Input Ratings			Branch Circuit Protection			
	kW (HP)	Amps	Voltage Range	kVA	Amps	Fuses	140M/140MT Motor Protectors(3)(4)	Contactors	Min. Enclosure Volume(5) (in.3)
22B-E9P9x104	5.5 (7.5)	9.9	414…660	12.1	11.2	20	140M-D8E-C16	100-C16	2069
22B-E012x104	7.5 (10.0)	12.2	414…660	14.9	13.7	25	140M-D8E-C16	100-C23	2069
22B-E019x104	11.0 (15.0)	19.0	414…660	23.1	24.1	40	140M-F8E-C25	100-C30	2069

(1) In the Catalog Numbers listed "x" represents enclosure type. Specifications are valid for all enclosure types. IP66, NEMA/UL Type 4X drive ratings are only available as Frame B drives. See Table 2.

(2) 200…240V AC - 1-phase drives are also available with an integral EMC filter. Catalog suffix changes from N104 to N114. Filter option is not available for IP66, NEMA/UL Type 4X rated drives.

(3) The AIC ratings of the Bulletin 140M/140MT devices can vary. See See Motor Protection Circuit Breaker and Motor Circuit Protector Specifications Technical Data, publication 140-TD005 or 140M-TD002.

(4) Manual Self-Protected (Type E) Combination Motor Controller, UL listed for 208 Wye or Delta, 240 Wye or Delta, 480Y/277 or 600Y/347. Not UL listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.

(5) When using a Manual Self-Protected (Type E) Combination Motor Controller, the drive must be installed in a ventilated or non-ventilated enclosure with the minimum volume specified in this column. Application specific thermal considerations may require a larger enclosure.

Approvals

UL508C CSA 22.2 Radiocommunications Act, compliant with: EN 61800-3

EMC Directive: 2014/30/EU: EN 61800-3 NSF certified to LV Directive: 2014/35/EU: EN 61800-5-1 NSF/ANSI 169 KCC-REM-RAA-22B

EMC Regulations: 2016 No. 1091: EN 61800-3
LV Regulations: 2016 No. 1101: EN 61800-5-1

Input/Output Ratings

Output Frequency: 0…400 Hz (Programmable)
Efficiency: 97.5% (Typical)

Digital Control Inputs (Input Current = 6mA)		Analog Control Inputs
SRC (Source) Mode: 18...24V = ON 0...6V = OFF	SNK (Sink) Mode: 0...6V = ON 18...24V = OFF	4…20 mA Analog: 250 Ω input impedance 0…10V DC Analog: 100 kΩ input impedance External Pot: 1...10 kΩ, 2 Watt minimum

Control Output

Programmable Output (form C relay)	Opto Outputs	Analog Outputs (10 bit)
Resistive Rating: 3.0 A at 30V DC, 3.0 A at 125V AC, 3.0 A at 240V AC Inductive Rating: 0.5 A at 30V DC, 0.5 A at 125V AC, 0.5 A at 240V AC	30V DC, 50 mA Non-inductive	0...10V, 1k Ω min 4…20 mA, 525 Ω max

Fuses and Circuit Breakers

Recommended Fuse Type:	UL Class J, CC, T or Type BS88; 600V (550V) or equivalent
Recommended Circuit Breakers:	HMCP circuit breakers or equivalent

Protective Features

Motor Protection:	I^2t overload protection - 150% for 60 Secs, 200% for 3 Secs (Provides Class 10 protection)
Overcurrent:	200% hardware limit, 300% instantaneous fault

Over Voltage:100-120V AC Input – Trip occurs at 405V DC bus voltage (equivalent to 150V AC incoming line)
200…240V AC Input – Trip occurs at 405V DC bus voltage (equivalent to 290V AC incoming line)
380…460V AC Input – Trip occurs at 810V DC bus voltage (equivalent to 575V AC incoming line)
460…600V AC Input – Trip occurs at 1005V DC bus voltage (equivalent to 711V AC incoming line)

Under Voltage:100-120V AC Input – Trip occurs at 210V DC bus voltage (equivalent to 75V AC incoming line)
200…240V AC Input – Trip occurs at 210V DC bus voltage (equivalent to 150V AC incoming line)
380…480V AC Input – Trip occurs at 390V DC bus voltage (equivalent to 275V AC incoming line)
460…600V AC Input – If P042 = 3 "High Voltage" trip occurs at 487V DC bus voltage (344V AC incoming line);
If P042 = 2 "Low Voltage" trip occurs at 390V DC bus voltage (275V AC incoming line)

Control Ride Through: Minimum ride through is 0.5 Secs - typical value 2 Secs

Faultless Power Ride Through: 100 milliseconds

Dynamic Braking

Internal brake IGBT included with all ratings except when no brake is specified.
See Appendix B for DB resistor ordering information.

Appendix A Supplemental Drive Information

Category	Specification	
Environment	Altitude:	1000 m (3300 ft) max. without derating
	Maximum Surrounding Air Temperature without derating: IP20, NEMA/UL Type Open: IP30, NEMA/UL Type 1 Flange Mount: IP66, NEMA/UL Type 4X	 -10…+50° C (14…122° F) -10…+40° C (14…104° F) Heatsink: -10…+40° C (14…104° F) Drive: -10…+50° C (14…122° F) -10…+40° C (14…104° F)
	Cooling Method Convection: Fan:	 0.4 kW (0.5 HP) drives All other drive ratings and 0.4 kW (0.5 HP) 1-phase drives with Integral “S Type” EMC Filter
	Storage Temperature:	-40…+85 °C (-40…+185 °F)
	Atmosphere:	**Important:** Drive must not be installed in an area where the ambient atmosphere contains volatile or corrosive gas, vapors or dust. If the drive is not going to be installed for a period of time, it must be stored in an area where it will not be exposed to a corrosive atmosphere.
	Relative Humidity:	0…95% non-condensing
	Shock (operating):	15 g peak for 11 ms duration (±1.0 ms)
	Vibration (operating):	1 g peak, 5…2000 Hz
Control	Carrier Frequency	2…16 kHz. Drive rating based on 4 kHz
	Frequency Accuracy Digital Input: Analog Input: Analog Output:	 Within ±0.05% of set output frequency. Within 0.5% of maximum output frequency, 10-bit resolution ±2% of full scale, 10-bit resolution
	Speed Regulation - Open Loop with Slip Compensation:	±1% of base speed across a 60:1 speed range.
	Stop Modes:	Multiple programmable stop modes including - Ramp, Coast, DC-Brake, Ramp-to-Hold and S Curve.
	Accel/Decel:	Two independently programmable accel and decel times. Each time may be programmed from 0…600 seconds in 0.1 second increments.
	Intermittent Overload:	150% overload capability for up to 1 minute 200% overload capability for up to 3 seconds
	Electronic Motor Overload Protection:	Provides class 10 motor overload protection according to NEC article 430 and motor over-temperature protection according to NEC article 430.126 (A) (2). UL 508C File 29572.
Electrical	Voltage Tolerance:	100…120V ±10% 200…240V ±10% 380…480V ±10% 460…600V ±10%
	Frequency Tolerance:	48…63 Hz
	Input Phases:	Three-phase input provides full rating. Single-phase operation provides 35% rated current.
	Displacement Power Factor:	0.98 across entire speed range
	Maximum Short Circuit Rating:	100,000 Amps Symmetrical
	Actual Short Circuit Rating:	Determined by AIC Rating of installed fuse/circuit breaker
	Transistor Type:	Insulated Gate Bipolar Transistor (IGBT)

PowerFlex 40 Estimated Watts Loss (Rated Load, Speed & PWM)

Voltage	kW (HP)	External Watts	Internal Watts	Total Watts Loss
100…120V	0.4 (0.5)	22	18	40
	0.75 (1.0)	40	20	60
	1.1 (1.5)	58	22	80
200…240V	0.4 (0.5)	22	18	40
	0.75 (1.0)	40	20	60
	1.1 (2.0)	63	22	85
	2.2 (3.0)	100	25	125
	3.7 (5.0)	150	30	180
	5.5 (7.5)	200	35	235
	7.5 (10)	265	40	305
380…480V	0.4 (0.5)	17	18	35
	0.75 (1.0)	30	20	50
	1.1 (2.0)	48	22	70
	2.2 (3.0)	75	25	100
	3.7 (5.0)	135	25	160
	5.5 (7.5)	140	35	175
	7.5 (10)	175	35	210
	11 (15)	260	40	300
460…600V	0.75 (1.0)	30	20	50
	1.5 (2.0)	48	22	70
	2.2 (3.0)	75	25	100
	4.0 (5.0)	135	25	160
	5.5 (7.5)	140	35	175
	7.5 (10)	175	35	210
	11 (15)	260	40	300

Apter Power

Appendix B

Accessories and Dimensions

Product Selection

Table 1 – Catalog Number Description

22B	-	A	1P5	N	1	1	4
Drive		Voltage Rating	Rating	Enclosure	HIM	Emission Class	Type

Table 2 – PowerFlex 40 Drives

Drive Ratings				IP20, NEMA/UL Type Open		IP20 Flange Mount[1]	IP66, NEMA/UL Type 4X
Input Voltage	kW	HP	Output Current	Catalog Number	Frame Size	Catalog Number	Catalog Number
120V 50/60 Hz 1-phase No Filter	0.4	0.5	2.3A	22B-V2P3N104	B	22B-V2P3F104	22B-V2P3C104
	0.75	1.0	5.0A	22B-V5P0N104	B	22B-V5P0F104	22B-V5P0C104
	1.1	1.5	6.0A	22B-V6P0N104	B	22B-V6P0F104	22B-V6P0C104
240V 50/60 Hz 1-phase With Integral "S Type" EMC Filter	0.4	0.5	2.3A	22B-A2P3N114	B	–	–
	0.75	1.0	5.0A	22B-A5P0N114	B	–	–
	1.5	2.0	8.0A	22B-A8P0N114	B	–	–
	2.2	3.0	12.0A	22B-A012N114	C	–	–
240V 50/60 Hz 1-phase No Filter	0.4	0.5	2.3A	22B-A2P3N104	B	22B-A2P3F104	22B-A2P3C104
	0.75	1.0	5.0A	22B-A5P0N104	B	22B-A5P0F104	22B-A5P0C104
	1.5	2.0	8.0A	22B-A8P0N104	B	22B-A8P0F104	22B-A8P0C104
	2.2	3.0	12.0A	22B-A012N104	C	22B-A012F104	–
240V 50/60 Hz 3-phase No Filter	0.4	0.5	2.3A	22B-B2P3N104	B	22B-B2P3F104	22B-B2P3C104
	0.75	1.0	5.0A	22B-B5P0N104	B	22B-B5P0F104	22B-B5P0C104
	1.5	2.0	8.0A	22B-B8P0N104	B	22B-B8P0F104	22B-B8P0C104
	2.2	3.0	12.0A	22B-B012N104	B	22B-B012F104	22B-B012C104
	3.7	5.0	17.5A	22B-B017N104	B	22B-B017F104	22B-B017C104
	5.5	7.5	24.0A	22B-B024N104	C	22B-B024F104	–
	7.5	10.0	33.0A	22B-B033N104	C	22B-B033F104	–
480V 50/60 Hz 3-phase No Filter	0.4	0.5	1.4A	22B-D1P4N104	B	22B-D1P4F104	22B-D1P4C104
	0.75	1.0	2.3A	22B-D2P3N104	B	22B-D2P3F104	22B-D2P3C104
	1.5	2.0	4.0A	22B-D4P0N104	B	22B-D4P0F104	22B-D4P0C104
	2.2	3.0	6.0A	22B-D6P0N104	B	22B-D6P0F104	22B-D6P0C104
	4.0	5.0	10.5A	22B-D010N104	B	22B-D010F104	22B-D010C104
	5.5	7.5	12.0A	22B-D012N104	C	22B-D012F104	–
	7.5	10.0	17.0A	22B-D017N104	C	22B-D017F104	–
	11.0	15.0	24.0A	22B-D024N104	C	22B-D024F104 [2]	–

Table 10 – Programming Software

Item	Description
Connected Components Workbench Software	Windows-based software packages for programming and configuring Allen-Bradley drives and other Rockwell Automation products. Compatibility: Microsoft Windows® Server 2012(1), Windows Server 2012 R2, Windows Server 2016(1), Windows Server 2019, Windows 10 IoT Enterprise 2016 LTSB 64-bit, Windows 10 IoT Enterprise 2019 LTSC, Windows 10, and Windows 11(2) All supported operating systems require .NET Framework 3.5 SP1 to be installed. You can download Connected Components Workbench Standard Edition software for free at rok.auto/pcdc. To purchase Connected Components Workbench Developer Edition software, visit rok.auto/ccw.
DriveExecutive Software (Download as part of the DriveTools SP software package)	Windows-based software package that provides an intuitive means for monitoring or configuring Allen-Bradley drives and communications adapters online and offline. Compatibility: Microsoft Windows 7, Windows 10, and Windows Server 2019 You can download DriveTool SP software package at rok.auto/pcdc.

(1) Requires Connected Components Workbench software version 20.01.00 or earlier.
(2) Requires Connected Components Workbench software version 20.01.00 or later.

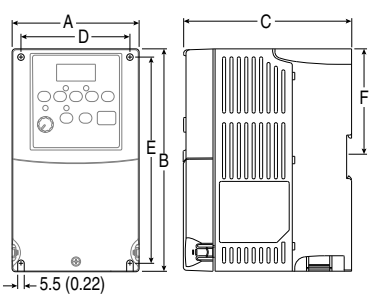
Product Dimensions

Table 11 – PowerFlex 40 Frames – Ratings are in kW and (HP)

Frame	120V AC – 1-phase	240V AC – 1-phase	240V AC – 3-phase		480V AC – 3-phase		600V AC – 3-phase	
B	0.4 (0.5) 0.75 (1.0) 1.1 (1.5)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0)	2.2 (3.0) 3.7 (5.0)	0.4 (0.5) 0.75 (1.0) 1.5 (2.0)	2.2 (3.0) 4.0 (5.0)	0.75 (1.0) 1.5 (2.0)	2.2 (3.0) 4.0 (5.0)
C(1)		2.2 (3.0)	5.5 (7.5) 7.5 (10.0)		5.5 (7.5) 7.5 (10.0)	11.0 (15.0)	5.5 (7.5) 7.5 (10.0)	11.0 (15.0)

(1) IP66, NEMA/UL Type 4X rated drives are not available in Frame C drive ratings.

Figure 1 IP20, NEMA/UL Type Open

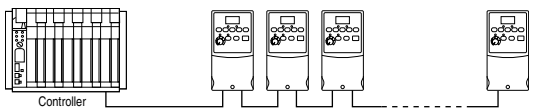


Dimensions are in millimeters and (inches).
Weights are in kilograms and (pounds).

Frame	A	B	C	D	E	F	Ship Weight
B	100 (3.94)	180 (7.09)	136 (5.35)	87 (3.43)	168 (6.61)	87.4 (3.44)	2.2 (4.9)
C	130 (5.1)	260 (10.2)	180 (7.1)	116 (4.57)	246 (9.7)	–	4.3 (9.5)

RS-485 (DSI) Protocol

PowerFlex 40 drives support the RS-485 (DSI) protocol to allow efficient operation with Rockwell Automation peripherals. In addition, some Modbus functions are supported to allow simple networking. PowerFlex 40 drives can be multi-dropped on an RS-485 network using Modbus protocol in RTU mode.

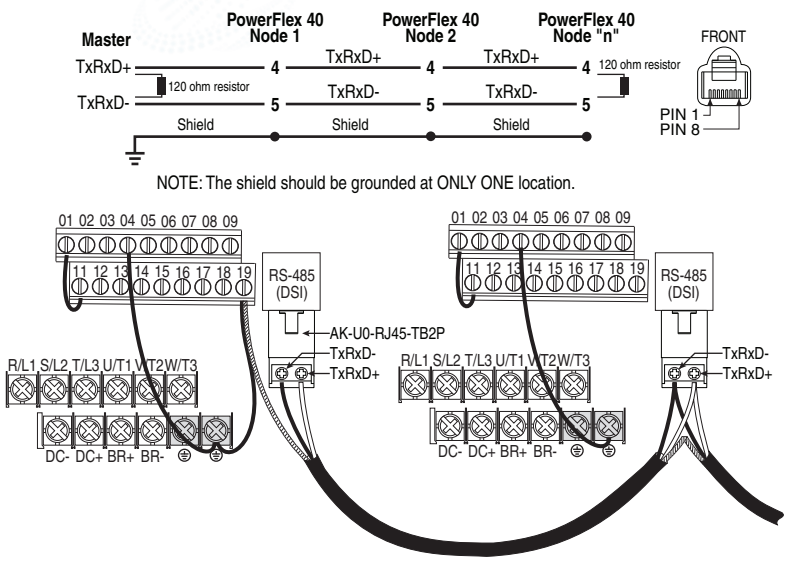


For information regarding DeviceNet or other communication protocols, see the appropriate user manual.

Network Wiring

Network wiring consists of a shielded 2-conductor cable that is daisy-chained from node to node.

Figure 15 Network Wiring Diagram



Only pins 4 and 5 on the RJ45 plug should be wired. The other pins on the PowerFlex 40 RJ45 socket must not be connected because they contain power, and so on for other Rockwell Automation peripheral devices.

Wiring terminations on the master controller will vary depending on the master controller used and “TxRxD+” and “TxRxD-” are shown for illustration purposes only. See the master controller’s user manual for network terminations. Note that there is no standard for the “+” and “-” wires, and consequently Modbus device manufacturers interpret them differently. If you have problems with initially establishing communications, try swapping the two network wires at the master controller.

Standard RS-485 wiring practices apply.

- Termination resistors need to be applied at each end of the network cable.
- RS-485 repeaters may need to be used for long cable runs, or if greater than 32 nodes are needed on the network.
- Network wiring should be separated from power wires by at least 0.3 meters (1 foot).
- Network wiring should only cross power wires at a right angle.

I/O Terminal 19 on the PowerFlex 40 drive is connected to the metal shield around the RJ45 connector. It is recommended to ground this terminal (there are two PE terminals on the drive). See Table 8 for more information.

Network Common is internally tied to I/O Terminal 04 (Digital Common). Tying I/O Terminal 04 to PE ground may improve noise immunity in some applications.