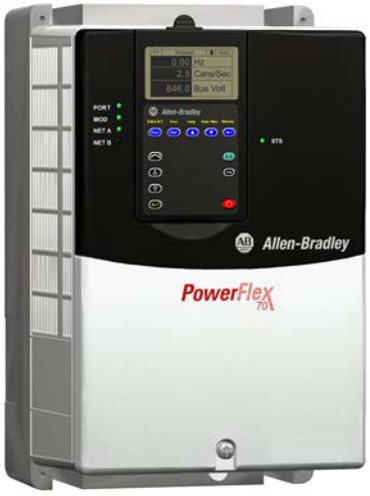
**Technical Data**

Original Instructions

# PowerFlex 70 Adjustable Frequency AC Drive

Catalog Number 20A





# Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

| Topic | Page |
|---|---|
| Added Efficiency Class of Ecodesign regulation (EU) 2019/1781 to Certification table. | 40 |
| Updated certification information | 40 |

# Product Overview

PowerFlex® 70 drives are designed to worldwide standards providing out-of-the-box performance around the globe. Available ratings include these options:

- 0.5...25 Hp output at 240V AC input
- 0.5...50 Hp output at 480V AC input
- 0.5...50 Hp output at 600V AC input

The PowerFlex 70 drive can be used with a full featured LCD human interface module (HIM) that provides multilingual text for startup, metering, programming, and troubleshooting.

The PowerFlex 70 can be programmed for either 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: Connected Components Workbench™ software, DeviceNetManager™, EtherNet/IP®, ControlNet®, serial communications, and other open control and communication networks. Computer tools such as DriveExplorer™ and DriveTools™ SP assist with programming, monitoring, and troubleshooting the PowerFlex 70.

DriveTools SP Software has been upgraded to Connected Components Workbench software. DriveTools support can be found at the Product Compatibility and Download Center rok.auto/pcdc, but is no longer available for sale.

## Flexible Packaging and Mounting

- **IP20, NEMA / UL Type 1** – For conventional mounting inside or outside a control cabinet. Conduit plate is vertically removable for easy installation and replacement without disturbing conduit.
- **IP66, NEMA / UL Type 4X/12** (indoor use) – For mounting directly in the production environment. Listed by UL to resist dust, dirt, other contaminants, and to survive high-pressure water spray. Also certified by NSF International to verify conformity with international food equipment standards.
- **Flange Type** – For mounting heatsink through back of an enclosure, thus removing a large portion of the heat inside a cabinet. The backside is rated IP66, NEMA / UL Type 4X/12 for both indoor and outdoor use.
- **Zero-Stacking™ Drive** - Drives can be mounted directly next to one another with no reduction of ambient temperature rating (50 °C [122 °F] for IP20, NEMA / UL Type 1, and Flange Mount; 40 °C [104 °F] for IP66, NEMA / UL Type 4X/12).
- **Conformal Coating** - The drive is coated in an insulator, or non-conducting substance, that helps protect it from moisture, fungus, dust, corrosion, abrasion, and other environmental stresses caused by highly polluted atmospheres. The coating improves product lifetime expectancy when exposure to corrosive environment is present. It helps maintain long-term surface insulation resistance, ensuring operational integrity of the assembly.

## Space Saving Hardware Features

- Integral electromagnetic compatibility (EMC) filtering provides a compact, all-in-one package solution for meeting EMC requirements, including CE in Europe.
- Integral dynamic brake transistor delivers a cost-effective means of switching regenerative energy without costly external chopper circuits.
- Internal dynamic brake resistor requires no extra panel space, and supplies a large amount of braking torque for short periods.
- Internal Communications allow you to integrate the drive into the manufacturing process. Status indicators for all internal communication options are visible on the cover for easy setup and monitoring of drive communications. You can easily manage information from shop floor to top floor and seamlessly integrate their complete system as they control, configure, and collect data.

## Easy to Use Human Interface Tools

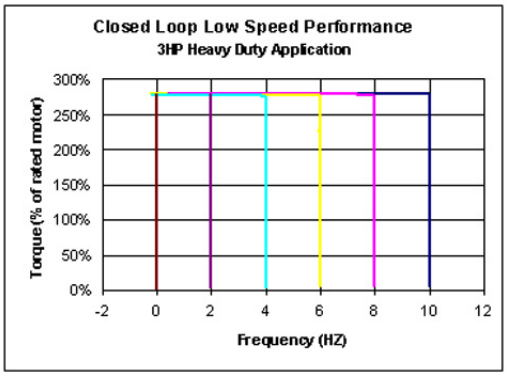
The PowerFlex 7-Class AC drives provide common human interface tools that are familiar and easy to use. These tools include the LCD human interface modules and computer-based configuration tools.

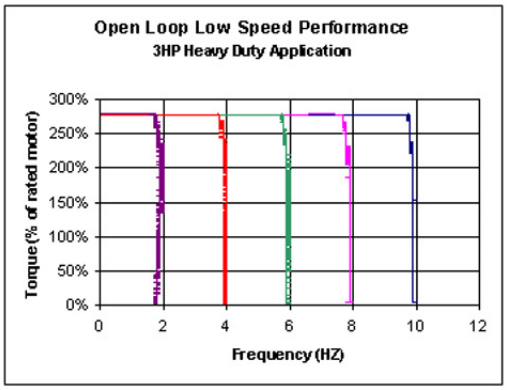
The LCD HIMs provide these features and functions:

- Large and easy to read 7-line x 21-character backlit display
- Variety of languages (English, French, German, Italian, Spanish, Portuguese, Dutch)
- Alternate function keys for shortcuts to common tasks
- 'Calculator-like' number pad for fast and easy data entry (full numeric version only)
- Control keys for local start, stop, speed, and direction
- Remote versions for panel mount application

## Outstanding Control and Performance

- Volt/Hertz Control for simple Fan and Pump applications
- Vector Control with FORCE Technology provides outstanding torque and speed regulation, with or without encoder feedback.
- **Sensorless Vector Control** develops high torque over a wide speed range, and adapts to individual motor characteristics.




## Drives Features

- Fast acting **Current Limit** and **Bus Voltage Regulation** result in maximum acceleration and deceleration without tripping.
- **Flying Start** delivers smooth connection into rotating loads, regardless of commanded direction, without the need for any speed feedback device.
- **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 that is stored in high-inertia, low-friction loads.
- **User Sets**, allowing up to three complete sets of parameter data, can be individually loaded for different batch processes.
- **Slip compensation** delivers minimum of 0.5% open-loop speed regulation across a wide speed range, eliminating the need for speed feedback devices in some applications.
- **Safe Torque Off**, the first offering available within the DriveGuard® series of safety solutions, helps prevent a drive from delivering rotational energy to motors by integrating a safety circuit with the power switching signals of the drive. This solution meets EN ISO 13849-1, Category 3.
- **Droop Control** for load sharing applications.
- **Sleep/Wake Control** for analog control of start and stop.

# Unsurpassed Capability in Network Communications

PowerFlex drives are fully compatible with the wide variety of Allen-Bradley® DPI™ (drive peripheral interface) communication adapters, offering the following benefits.

| Benefits and Description | Availability By Communication Adapter | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BACnet | DeviceNet | ControlNet | EtherNet/IP | Dual-Port EtherNet/IP | RS-485 DF1 | PROFIBUS DP | LonWorks | Modbus RTU | Modbus TCP | Metasys N2 | Siemens P1 FLN |
| **Unconnected Messaging:** permits other network devices (for example, PanelView™) to communicate directly to a drive without routing the communication through the network scanner. | | X | X | X | X | | | | | | | |
| **Adapter Routing:** plug personal computer into one drive and talk to other Allen-Bradley drives on same network, without being routed through network scanner. | X | X | X | X | X | X | | | X | | | |
| **Access all parameters:** provides access to 100% of parameters over the network. | X | X | X | X | X | X | X | X | X | X | X | X |
| **Autobaud:** makes initial connections less problematic. | X | X | | X | X | | X | | | | | |
| **Change of state:** significantly reduces network traffic by configuring control messages to be sent only upon customer defined states. Flexible configuration for each node (for example, reference must change by more than 5%). | | X | | | | | | | | | | |
| **Peer Control:** provides leader/follower type control between drives, where one or more follower drives (consumers) can run based on the status of a leader drive (producer). The leader drive can also significantly reduce network traffic. | | X | | X | X | | | | | | | |
| **Automatic Device Replacement (ADR):** 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. | | X | | | | | | | | | | |
| **Flexible Fault Configuration:** adapters can be programmed to take fault-based actions such as ramp to stop, cost to stop, and hold last state, and 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) versus a network idle condition (PLC set to 'Program.') | X | X | X | X | X | X | X | X | X | X | X | X |

# Catalog Number Explanation

| 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 |
| 20 A | PowerFlex 70 |

*b*

| Voltage Rating | | |
|---|---|---|
| Code | Voltage | Ph. |
| B | 240V AC | 3 (6 pulse) |
| C | 400V AC | 3 (6 pulse) |
| D | 480V AC | 3 (6 pulse) |
| E | 600V AC | 3 (6 pulse) |

*c1*

| PowerFlex 70 ND Rating<br>208V, 60 Hz Input | | | | |
|---|---|---|---|---|
| Code | 208V amps | kW | Hp | Frame |
| 2P2 | 2.5 | 0.37 | 0.5 | A |
| 4P2 | 4.8 | 0.75 | 1.0 | |
| 6P8 | 7.8 | 1.5 | 2.0 | B |
| 9P6 | 11 | 2.2 | 3.0 | |
| 015 | 17.5 | 4.0 | 5.0 | C |
| 022 | 25.3 | 5.5 | 7.5 | D |
| 028 | 32.2 | 7.5 | 10 | |
| 042 | 43 | 11 | 15 | |
| 054 | 56 | 15 | 20 | E |
| 070 | 78.2 | 18.5 | 25 | |

*c2*

| PowerFlex 70 ND Rating<br>240V, 60 Hz Input | | | | |
|---|---|---|---|---|
| Code | Amps | kW | Hp | Frame |
| 2P2 | 2.2 | 0.37 | 0.5 | A |
| 4P2 | 4.2 | 0.75 | 1.0 | |
| 6P8 | 6.8 | 1.5 | 2.0 | B |
| 9P6 | 9.6 | 2.2 | 3.0 | |
| 015 | 15.3 | 4.0 | 5.0 | C |
| 022 | 22 | 5.5 | 7.5 | D |
| 028 | 28 | 7.5 | 10 | |
| 042 | 42 | 11 | 15 | |
| 054 | 54 | 15 | 20 | E |
| 070 | 70 | 18.5 | 25 | |

*c3*

| PowerFlex 70 ND Rating<br>400V, 50 Hz Input | | | | |
|---|---|---|---|---|
| Code | Amps | kW | Hp | Frame |
| 1P3 | 1.3 | 0.37 | 0.5 | A |
| 2P1 | 2.1 | 0.75 | 1.0 | |
| 3P5 | 3.5 | 1.5 | 2.0 | |
| 5P0 | 5.0 | 2.2 | 3.0 | B |
| 8P7 | 8.7 | 4.0 | 5.0 | |
| 011 | 11.5 | 5.5 | 7.5 | C |
| 015 | 15.4 | 7.5 | 10 | |
| 022 | 22 | 11 | 15 | D |
| 030 | 30 | 15 | 20 | |
| 037 | 37 | 18.5 | 25 | |
| 043 | 42 | 22 | 30 | |
| 060 | 60 | 30 | 40 | E |
| 072 | 72 | 37 | 50 | |

*c4*

| PowerFlex 70 ND Rating<br>480V, 60 Hz Input | | | | |
|---|---|---|---|---|
| Code | Amps | kW | Hp | Frame |
| 1P1 | 1.1 | 0.37 | 0.5 | A |
| 2P1 | 2.1 | 0.75 | 1.0 | |
| 3P4 | 3.4 | 1.5 | 2.0 | |
| 5P0 | 5.0 | 2.2 | 3.0 | B |
| 8P0 | 8.0 | 3.7 | 5.0 | |
| 011 | 11 | 5.5 | 7.5 | C |
| 014 | 14 | 7.5 | 10 | |
| 022 | 22 | 11 | 15 | D |
| 027 | 27 | 15 | 20 | |
| 034 | 34 | 18.5 | 25 | |
| 040 | 40 | 22 | 30 | |
| 052 | 52 | 30 | 40 | E |
| 065 | 65 | 37 | 50 | |

*c5*

| PowerFlex 70 ND Rating<br>600V, 60 Hz Input[1] | | | | |
|---|---|---|---|---|
| Code | Amps | kW | Hp | Frame |
| 0P9 | 0.9 | 0.37 | 0.5 | A |
| 1P7 | 1.7 | 0.75 | 1.0 | |
| 2P7 | 2.7 | 1.5 | 2.0 | |
| 3P9 | 3.9 | 2.2 | 3.0 | B |
| 6P1 | 6.1 | 4.0 | 5.0 | |
| 9P0 | 9.0 | 5.5 | 7.5 | C |
| 011 | 11 | 7.5 | 10 | |
| 017 | 17 | 11 | 15 | D |
| 022 | 22 | 15 | 20 | |
| 027 | 27 | 18.5 | 25 | |
| 032 | 32 | 22 | 30 | |
| 041 | 41 | 30 | 40 | E |
| 052 | 52 | 37 | 50 | |

(1) 600V class drives are declared to meet the Low Voltage Directive. It is the responsibility of the user to determine compliance to the EMC Directive.

*d*

| Enclosure | |
|---|---|
| Code | Enclosure[1] |
| A[2] | Panel Mount - IP 20, NEMA/UL Type 1 |
| C[2] | Wall/Machine Mount = IP66, NEMA/UL Type 4X/12 for indoor use only |
| F | Flange Mount - Front Chassis = IP 20, NEMA/UL Type 1; Rear Heatsink = IP66, NEMA/UL Type 4X/12 for indoor use only |
| G | Wall/Machine Mount - IP54, NEMA/UL Type 12[3] |

(1) All enclosures come with conformal coating standard.
(2) IP20 and IP66 frame E drives are manufactured with a flange-like heat heatsink with mounting holes.
(3) Only available on Frame E.

*e*

| HIM | |
|---|---|
| Code | Interface Module |
| 0 | Blank Cover |
| 3 | Full Numeric LCD |
| 5 | Prog. Only LCD[1] |

(1) Only available with NEMA 4X, enclosure C.

*f*

| Documentation | |
|---|---|
| Code | Type |
| A | Manual |
| N | No manual |

*g*

| Brake IGBT | |
|---|---|
| Code | w/Brake |
| Y | Yes |

*h*

| Internal Brake Resistor | |
|---|---|
| Code | w/ Resistor |
| Y | Yes |
| N | No |

*i*

| Emission Class[1] | |
|---|---|
| Code | Rating |
| A | Filtered |
| N | Not Filtered |

(1) For additional information, see the following table.

| Emission Class by Frame Current Rating (A…E) and Voltage | | | | | |
|---|---|---|---|---|---|
| | A[1][2] | B[2] | C | D | E |
| 240V | A or N | A or N | A | A | A |
| 400V | A or N | A or N | A | A | A |
| 480V | A or N | A or N | A | A | A |
| 600V | N | N | N | N | A |

(1) If a filter is used with a Frame A current rating, the drive with internal filter is supplied in the B Frame to accommodate the additional size.
(2) "A or N" indicates that filtering is optional.

*j*

| Comm Slot | |
|---|---|
| Code | Network Type |
| C | ControlNet (Coax) |
| D | DeviceNet |
| E | EtherNet/IP |
| N | None |

*k*

| Control and I/O | | |
|---|---|---|
| Code | Control | Safe Torque Off [1] [2] |
| N[3] | Standard | – |
| C | Enhanced | No |
| G | Enhanced | Yes |

(1) Safe Torque Off is not available user-installed for 600V drives.
(2) Drive is not CE EMC/TUV certified when the encoder interface option is installed.
(3) No longer available for sale.

*l*

| Feedback[1] | |
|---|---|
| Code | Feedback |
| 0 | No Feedback - Enhanced Control |
| 1 | 5V/12V Encoder w/Enhanced Control |

(1) Drive is not CE EMC certified when the encoder interface option is installed or functionally safety certified when safe torque off option is installed.

# Product Selection

## Panel Mount - IP20, NEMA/UL Type 1, No HIM

### 200...240V AC, Three-phase Drives

| 240V AC Input | | | | | | 208V AC Input[1] | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 2.2 | 2.4 | 3.3 | 0.5 | 0.33 | 20AB2P2A0AYNNNC0 | 2.5 | 2.7 | 3.7 | 0.37 | 0.25 | 20AB2P2A0AYNNNC0 | No | A |
| | | | | | 20AB2P2A0AYNANC0 | | | | | | 20AB2P2A0AYNANC0 | Yes | B |
| 4.2 | 4.8 | 6.4 | 1 | 0.75 | 20AB4P2A0AYNNNC0 | 4.8 | 5.5 | 7.4 | 0.75 | 0.55 | 20AB4P2A0AYNNNC0 | No | A |
| | | | | | 20AB4P2A0AYNANC0 | | | | | | 20AB4P2A0AYNANC0 | Yes | B |
| 6.8 | 9 | 12 | 2 | 1.5 | 20AB6P8A0AYNNNC0 | 7.8 | 10.3 | 13.8 | 1.5 | 1.1 | 20AB6P8A0AYNNNC0 | No | |
| | | | | | 20AB6P8A0AYNANC0 | | | | | | 20AB6P8A0AYNANC0 | Yes | |
| 9.6 | 10.6 | 14.4 | 3 | 2 | 20AB9P6A0AYNNNC0 | 11 | 12.1 | 16.5 | 2.2 | 1.5 | 20AB9P6A0AYNNNC0 | No | |
| | | | | | 20AB9P6A0AYNANC0 | | | | | | 20AB9P6A0AYNANC0 | Yes | |
| 15.3 | 17.4 | 23.2 | 5 | 3 | 20AB015A0AYNANC0 | 17.5 | 19.2 | 26.2 | 4 | 3 | 20AB015A0AYNANC0 | | C |
| 22 | 24.2 | 33 | 7.5 | 5 | 20AB022A0AYNANC0 | 25.3 | 27.8 | 37.9 | 5.5 | 4 | 20AB022A0AYNANC0 | | D |
| 28 | 33 | 44 | 10 | 7.5 | 20AB028A0AYNANC0 | 32.2 | 37.9 | 50.6 | 7.5 | 5.5 | 20AB028A0AYNANC0 | | |
| 42 | 46.2 | 63 | 15 | 10 | 20AB042A0AYNANC0 | 43 | 55.5 | 74 | 11 | 7.5 | 20AB042A0AYNANC0 | | |
| 54 | 63 | 84 | 20 | 15 | 20AB054A0AYNANC0 | 62.1 | 72.4 | 96.6 | 15 | 11 | 20AB054A0AYNANC0 | | E |
| 70 | 81 | 108 | 25 | 20 | 20AB070A0AYNANC0 | 78.2 | 93.1 | 124 | 18.5 | 15 | 20AB070A0AYNANC0 | | |

(1) Drive must be programmed to lower voltage to obtain the currents shown.

## 380...480V AC, Three-phase Drives

| 480V AC Input | | | | | | 400V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 1.1 | 1.2 | 1.6 | 0.5 | 0.33 | 20AD1P1A0AYNNNC0 | 1.3 | 1.4 | 1.9 | 0.37 | 0.25 | 20AC1P3A0AYNNNC0 | No | A |
| | | | | | 20AD1P1A0AYNANC0 | | | | | | 20AC1P3A0AYNANC0 | Yes | B |
| 2.1 | 2.4 | 3.2 | 1 | 0.75 | 20AD2P1A0AYNNNC0 | 2.1 | 2.4 | 3.2 | 0.75 | 0.55 | 20AC2P1A0AYNNNC0 | No | A |
| | | | | | 20AD2P1A0AYNANC0 | | | | | | 20AC2P1A0AYNANC0 | Yes | B |
| 3.4 | 4.5 | 6 | 2 | 1.5 | 20AD3P4A0AYNNNC0 | 3.5 | 4.5 | 6 | 1.5 | 1.1 | 20AC3P5A0AYNNNC0 | No | A |
| | | | | | 20AD3P4A0AYNANC0 | | | | | | 20AC3P5A0AYNANC0 | Yes | B |
| 5 | 5.5 | 7.5 | 3 | 2 | 20AD5P0A0AYNNNC0 | 5 | 5.5 | 7.5 | 2.2 | 1.5 | 20AC5P0A0AYNNNC0 | No | B |
| | | | | | 20AD5P0A0AYNANC0 | | | | | | 20AC5P0A0AYNANC0 | Yes | |
| 8 | 8.8 | 12 | 5 | 3 | 20AD8P0A0AYNNNC0 | 8.7 | 9.9 | 13.2 | 4 | 3 | 20AC8P7A0AYNNNC0 | No | B |
| | | | | | 20AD8P0A0AYNANC0 | | | | | | 20AC8P7A0AYNANC0 | Yes | |
| 11 | 12.1 | 16.5 | 7.5 | 5 | 20AD011A0AYNANC0 | 11.5 | 13 | 17.4 | 5.5 | 4 | 20AC011A0AYNANC0 | | C |
| 14 | 16.5 | 22 | 10 | 7.5 | 20AD014A0AYNANC0 | 15 | 17.2 | 23.1 | 7.5 | 5.5 | 20AC015A0AYNANC0 | | C |
| 22 | 24.2 | 33 | 15 | 10 | 20AD022A0AYNANC0 | 22 | 24.2 | 33 | 11 | 7.5 | 20AC022A0AYNANC0 | | D |
| 27 | 33 | 44 | 20 | 15 | 20AD027A0AYNANC0 | 30 | 33 | 45 | 15 | 11 | 20AC030A0AYNANC0 | | D |
| 34 | 40.5 | 54 | 25 | 20 | 20AD034A0AYNANC0 | 37 | 45 | 60 | 18.5 | 15 | 20AC037A0AYNANC0 | | D |
| 40 | 51 | 68 | 30 | 25 | 20AD040A0AYNANC0 | 43 | 56 | 74 | 22 | 18.5 | 20AC043A0AYNANC0 | | D |
| 52 | 60 | 80 | 40 | 30 | 20AD052A0AYNANC0 | 60 | 66 | 90 | 30 | 22 | 20AC060A0AYNANC0 | | E |
| 65 | 78 | 104 | 50 | 40 | 20AD065A0AYNANC0 | 72 | 90 | 120 | 37 | 30 | 20AC072A0AYNANC0 | | E |

## 500...600V AC, Three-phase Drives

| 600V AC Input | | | | | | | |
|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | With Filter | Frame Size |
| Cont. | 60 s | 3 s | | | | | |
| 0.9 | 1 | 1.4 | 0.5 | 0.33 | 20AE0P9A0AYNNNC0 | No | A |
| 1.7 | 1.9 | 2.6 | 1 | 0.75 | 20AE1P7A0AYNNNC0 | | |
| 2.7 | 3.6 | 4.8 | 2 | 1 | 20AE2P7A0AYNNNC0 | | |
| 3.9 | 4.3 | 5.8 | 3 | 1.5 | 20AE3P9A0AYNNNC0 | | B |
| 6.1 | 6.7 | 9.1 | 5 | 3 | 20AE6P1A0AYNNNC0 | | |
| 9 | 9.9 | 13.5 | 7.5 | 5 | 20AE9P0A0AYNNNC0 | | C |
| 11 | 13.5 | 18 | 10 | 7.5 | 20AE011A0AYNNNC0 | | |
| 17 | 18.7 | 25.5 | 15 | 10 | 20AE017A0AYNNNC0 | | D |
| 22 | 25.5 | 34 | 20 | 15 | 20AE022A0AYNNNC0 | | |
| 27 | 33 | 44 | 25 | 20 | 20AE027A0AYNNNC0 | | |
| 32 | 40.5 | 54 | 30 | 25 | 20AE032A0AYNNNC0 | | |
| 41 | 48 | 64 | 40 | 30 | 20AE041A0AYNANC0 | | E |
| 52 | 61.5 | 82 | 50 | 40 | 20AE052A0AYNANC0 | | |

# Wall/Machine Mount - IP66, NEMA/UL Type 4X/12 for Indoor Use with HIM

## 200...240V AC, Three-phase Drives

| 240V AC Input | | | | | | 208V AC Input[1] | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 2.2 | 2.4 | 3.3 | 0.5 | 0.33 | 20AB2P2C3AYNNNC0 | 2.5 | 2.7 | 3.7 | 0.37 | 0.25 | 20AB2P2C3AYNNNC0 | No | B |
| | | | | | 20AB2P2C3AYNANC0 | | | | | | 20AB2P2C3AYNANC0 | Yes | |
| 4.2 | 4.8 | 6.4 | 1 | 0.75 | 20AB4P2C3AYNNNC0 | 4.8 | 5.5 | 7.4 | 0.75 | 0.55 | 20AB4P2C3AYNNNC0 | No | |
| | | | | | 20AB4P2C3AYNANC0 | | | | | | 20AB4P2C3AYNANC0 | Yes | |
| 6.8 | 9 | 12 | 2 | 1.5 | 20AB6P8C3AYNNNC0 | 7.8 | 10.3 | 13.8 | 1.5 | 1.1 | 20AB6P8C3AYNNNC0 | No | |
| | | | | | 20AB6P8C3AYNANC0 | | | | | | 20AB6P8C3AYNANC0 | Yes | |
| 9.6 | 10.6 | 14.4 | 3 | 2 | 20AB9P6C3AYNNNC0 | 11 | 12.1 | 16.5 | 2.2 | 1.5 | 20AB9P6C3AYNNNC0 | No | |
| | | | | | 20AB9P6C3AYNANC0 | | | | | | 20AB9P6C3AYNANC0 | Yes | |
| 15.3 | 17.4 | 23.2 | 5 | 3 | 20AB015C3AYNANC0 | 17.5 | 19.2 | 26.2 | 4 | 3 | 20AB015C3AYNANC0 | | D |
| 22 | 24.2 | 33 | 7.5 | 5 | 20AB022C3AYNANC0 | 25.3 | 27.8 | 37.9 | 5.5 | 4 | 20AB022C3AYNANC0 | | |
| 28 | 33 | 44 | 10 | 7.5 | 20AB028C3AYNANC0 | 32.2 | 37.9 | 50.6 | 7.5 | 5.5 | 20AB028C3AYNANC0 | | |
| 42 | 46.2 | 63 | 15 | 10 | 20AB042C3AYNANC0 | 43 | 55.5 | 74 | 11 | 7.5 | 20AB042C3AYNANC0 | | |
| 54 | 63 | 84 | 20 | 15 | 20AB054C3AYNANC0 | 62.1 | 72.4 | 96.6 | 15 | 11 | 20AB054C3AYNANC0 | | E |
| 70 | 81 | 108 | 25 | 20 | 20AB070C3AYNANC0 | 78.2 | 93.1 | 124 | 18.5 | 15 | 20AB070C3AYNANC0 | | |

(1) The drive must be programmed to lower voltage to obtain the currents shown.

## 380...480V AC, Three-phase Drives

| 480V AC Input | | | | | | 400V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 1.1 | 1.2 | 1.6 | 0.5 | 0.33 | 20AD1P1C3AYNNNC0 | 1.3 | 1.4 | 1.9 | 0.37 | 0.25 | 20AC1P3C3AYNNNC0 | No | B |
| | | | | | 20AD1P1C3AYNANC0 | | | | | | 20AC1P3C3AYNANC0 | Yes | |
| 2.1 | 2.4 | 3.2 | 1 | 0.75 | 20AD2P1C3AYNNNC0 | 2.1 | 2.4 | 3.2 | 0.75 | 0.55 | 20AC2P1C3AYNNNC0 | No | |
| | | | | | 20AD2P1C3AYNANC0 | | | | | | 20AC2P1C3AYNANC0 | Yes | |
| 3.4 | 4.5 | 6 | 2 | 1.5 | 20AD3P4C3AYNNNC0 | 3.5 | 4.5 | 6 | 1.5 | 1.1 | 20AC3P5C3AYNNNC0 | No | |
| | | | | | 20AD3P4C3AYNANC0 | | | | | | 20AC3P5C3AYNANC0 | Yes | |
| 5 | 5.5 | 7.5 | 3 | 2 | 20AD5P0C3AYNNNC0 | 5 | 5.5 | 7.5 | 2.2 | 1.5 | 20AC5P0C3AYNNNC0 | No | |
| | | | | | 20AD5P0C3AYNANC0 | | | | | | 20AC5P0C3AYNANC0 | Yes | |
| 8 | 8.8 | 12 | 5 | 3 | 20AD8P0C3AYNNNC0 | 8.7 | 9.9 | 13.2 | 4 | 3 | 20AC8P7C3AYNNNC0 | No | |
| | | | | | 20AD8P0C3AYNANC0 | | | | | | 20AC8P7C3AYNANC0 | Yes | |
| 11 | 12.1 | 16.5 | 7.5 | 5 | 20AD011C3AYNANC0 | 11.5 | 13 | 17.4 | 5.5 | 4 | 20AC011C3AYNANC0 | | D |
| 14 | 16.5 | 22 | 10 | 7.5 | 20AD014C3AYNANC0 | 15 | 17.2 | 23.1 | 7.5 | 5.5 | 20AC015C3AYNANC0 | | |
| 22 | 24.2 | 33 | 15 | 10 | 20AD022C3AYNANC0 | 22 | 24.2 | 33 | 11 | 7.5 | 20AC022C3AYNANC0 | | |
| 27 | 33 | 44 | 20 | 15 | 20AD027C3AYNANC0 | 30 | 33 | 45 | 15 | 11 | 20AC030C3AYNANC0 | Yes | |
| 34 | 40.5 | 54 | 25 | 20 | 20AD034C3AYNANC0 | 37 | 45 | 60 | 18.5 | 15 | 20AC037C3AYNANC0 | | |
| 40 | 51 | 68 | 30 | 25 | 20AD040C3AYNANC0 | 43 | 56 | 74 | 22 | 18.5 | 20AC043C3AYNANC0 | | |
| 52 | 60 | 80 | 40 | 30 | 20AD052C3AYNANC0 | 60 | 66 | 90 | 30 | 22 | 20AC060C3AYNANC0 | | E |
| 65 | 78 | 104 | 50 | 40 | 20AD065C3AYNANC0 | 72 | 90 | 120 | 37 | 30 | 20AC072C3AYNANC0 | | |

### 500...600V AC, Three-phase Drives

| 600V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | | |
| 0.9 | 1 | 1.4 | 0.5 | 0.33 | 20AE0P9C3AYNNNC0 | No | B |
| 1.7 | 1.9 | 2.6 | 1 | 0.75 | 20AE1P7C3AYNNNC0 | | |
| 2.7 | 3.6 | 4.8 | 2 | 1 | 20AE2P7C3AYNNNC0 | | |
| 3.9 | 4.3 | 5.8 | 3 | 1.5 | 20AE3P9C3AYNNNC0 | | |
| 6.1 | 6.7 | 9.1 | 5 | 3 | 20AE6P1C3AYNNNC0 | | |
| 9 | 9.9 | 13.5 | 7.5 | 5 | 20AE9P0C3AYNNNC0 | | D |
| 11 | 13.5 | 18 | 10 | 7.5 | 20AE011C3AYNNNC0 | | |
| 17 | 18.7 | 25.5 | 15 | 10 | 20AE017C3AYNNNC0 | | |
| 22 | 25.5 | 34 | 20 | 15 | 20AE022C3AYNNNC0 | | |
| 27 | 33 | 44 | 25 | 20 | 20AE027C3AYNNNC0 | | |
| 32 | 40.5 | 54 | 30 | 25 | 20AE032C3AYNNNC0 | | |
| 41 | 48 | 64 | 40 | 30 | 20AE041C3AYNANC0 | | E |
| 52 | 61.5 | 82 | 50 | 40 | 20AE052C3AYNANC0 | | |

## Wall/Machine Mount - IP54, NEMA/UL Type 12, with HIM

### 200...240V AC, Three-phase Drives

| 240V AC Input | | | | | 208V AC Input(1) | | | | | Cat. No. | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | | | |
| Cont. | 60 s | 3 s | | | Cont. | 60 s | 3 s | | | | | |
| 54 | 63 | 84 | 20 | 15 | 62.1 | 72.4 | 96.6 | 15 | 11 | 20AB054G3AYNANC0 | Yes | E |
| 70 | 81 | 108 | 25 | 20 | 78.2 | 93.1 | 124 | 18.5 | 15 | 20AB070G3AYNANC0 | | |

(1) Drive must be programmed to lower voltage to obtain the currents shown.

### 380...480V AC, Three-phase Drives

| 480V AC Input | | | | | | 400V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 52 | 60 | 80 | 40 | 30 | 20AD052G3AYNANC0 | 60 | 66 | 90 | 30 | 22 | 20AC060G3AYNANC0 | Yes | E |
| 65 | 78 | 104 | 50 | 40 | 20AD065G3AYNANC0 | 72 | 90 | 120 | 37 | 30 | 20AC072G3AYNANC0 | | |

### 500...600V AC, Three-phase Drives

| 600V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | | |
| 41 | 48 | 64 | 40 | 30 | 20AE041G3AYNANC0 | Yes | E |
| 52 | 61.5 | 82 | 50 | 40 | 20AE052G3AYNANC0 | | |

# Flange Mount, Front Chassis = IP20, NEMA/UL Type 1, Heatsink = IP66, NEMA/UL Type 4X/12, No HIM

## 200...240V AC, Three-phase Drives

| 240V AC Input | | | | | | 208V AC Input[1] | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 2.2 | 2.4 | 3.3 | 0.5 | 0.33 | 20AB2P2F0AYNNNC0 | 2.5 | 2.7 | 3.7 | 0.37 | 0.25 | 20AB2P2F0AYNNNC0 | No | A |
| | | | | | 20AB2P2F0AYNANC0 | | | | | | 20AB2P2F0AYNANC0 | Yes | B |
| 4.2 | 4.8 | 6.4 | 1 | 0.75 | 20AB4P2F0AYNNNC0 | 4.8 | 5.5 | 7.4 | 0.75 | 0.55 | 20AB4P2F0AYNNNC0 | No | A |
| | | | | | 20AB4P2F0AYNANC0 | | | | | | 20AB4P2F0AYNANC0 | Yes | B |
| 6.8 | 9 | 12 | 2 | 1.5 | 20AB6P8F0AYNNNC0 | 7.8 | 10.3 | 13.8 | 1.5 | 1.1 | 20AB6P8F0AYNNNC0 | No | |
| | | | | | 20AB6P8F0AYNANC0 | | | | | | 20AB6P8F0AYNANC0 | Yes | |
| 9.6 | 10.6 | 14.4 | 3 | 2 | 20AB9P6F0AYNNNC0 | 11 | 12.1 | 16.5 | 2.2 | 1.5 | 20AB9P6F0AYNNNC0 | No | |
| | | | | | 20AB9P6F0AYNANC0 | | | | | | 20AB9P6F0AYNANC0 | Yes | |
| 15.3 | 17.4 | 23.2 | 5 | 3 | 20AB015F0AYNANC0 | 17.5 | 19.2 | 26.2 | 4 | 3 | 20AB015F0AYNANC0 | | C |
| 22 | 24.2 | 33 | 7.5 | 5 | 20AB022F0AYNANC0 | 25.3 | 27.8 | 37.9 | 5.5 | 4 | 20AB022F0AYNANC0 | | D |
| 28 | 33 | 44 | 10 | 7.5 | 20AB028F0AYNANC0 | 32.2 | 37.9 | 50.6 | 7.5 | 5.5 | 20AB028F0AYNANC0 | | |
| 42 | 46.2 | 63 | 15 | 10 | 20AB042F0AYNANC0 | 43 | 55.5 | 74 | 11 | 7.5 | 20AB042F0AYNANC0 | | |
| 54 | 63 | 84 | 20 | 15 | 20AB054F0AYNANC0 | 62.1 | 72.4 | 96.6 | 15 | 11 | 20AB054F0AYNANC0 | | E |
| 70 | 81 | 108 | 25 | 20 | 20AB070F0AYNANC0 | 78.2 | 93.1 | 124 | 18.5 | 15 | 20AB070F0AYNANC0 | | |

(1) Drive must be programmed to lower voltage to obtain the currents shown.

## 380...480V AC, Three-phase Drives

| 480V AC Input | | | | | | 400V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | Output Amps | | | Normal-Duty kW | Heavy-Duty kW | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | Cont. | 60 s | 3 s | | | | | |
| 1.1 | 1.2 | 1.6 | 0.5 | 0.33 | 20AD1P1F0AYNNNC0 | 1.3 | 1.4 | 1.9 | 0.37 | 0.25 | 20AC1P3F0AYNNNC0 | No | A |
| | | | | | 20AD1P1F0AYNANC0 | | | | | | 20AC1P3F0AYNANC0 | Yes | B |
| 2.1 | 2.4 | 3.2 | 1 | 0.75 | 20AD2P1F0AYNNNC0 | 2.1 | 2.4 | 3.2 | 0.75 | 0.55 | 20AC2P1F0AYNNNC0 | No | A |
| | | | | | 20AD2P1F0AYNANC0 | | | | | | 20AC2P1F0AYNANC0 | Yes | B |
| 3.4 | 4.5 | 6 | 2 | 1.5 | 20AD3P4F0AYNNNC0 | 3.5 | 4.5 | 6 | 1.5 | 1.1 | 20AC3P5F0AYNNNC0 | No | A |
| | | | | | 20AD3P4F0AYNANC0 | | | | | | 20AC3P5F0AYNANC0 | Yes | |
| 5 | 5.5 | 7.5 | 3 | 2 | 20AD5P0F0AYNNNC0 | 5 | 5.5 | 7.5 | 2.2 | 1.5 | 20AC5P0F0AYNNNC0 | No | |
| | | | | | 20AD5P0F0AYNANC0 | | | | | | 20AC5P0F0AYNANC0 | Yes | B |
| 8 | 8.8 | 12 | 5 | 3 | 20AD8P0F0AYNNNC0 | 8.7 | 9.9 | 13.2 | 4 | 3 | 20AC8P7F0AYNNNC0 | No | |
| | | | | | 20AD8P0F0AYNANC0 | | | | | | 20AC8P7F0AYNANC0 | | |
| 11 | 12.1 | 16.5 | 7.5 | 5 | 20AD011F0AYNANC0 | 11.5 | 13 | 17.4 | 5.5 | 4 | 20AC011F0AYNANC0 | | C |
| 14 | 16.5 | 22 | 10 | 7.5 | 20AD014F0AYNANC0 | 15 | 17.2 | 23.1 | 7.5 | 5.5 | 20AC015F0AYNANC0 | | |
| 22 | 24.2 | 33 | 15 | 10 | 20AD022F0AYNANC0 | 22 | 24.2 | 33 | 11 | 7.5 | 20AC022F0AYNANC0 | | D |
| 27 | 33 | 44 | 20 | 15 | 20AD027F0AYNANC0 | 30 | 33 | 45 | 15 | 11 | 20AC030F0AYNANC0 | Yes | |
| 34 | 40.5 | 54 | 25 | 20 | 20AD034F0AYNANC0 | 37 | 45 | 60 | 18.5 | 15 | 20AC037F0AYNANC0 | | |
| 40 | 51 | 68 | 30 | 25 | 20AD040F0AYNANC0 | 43 | 56 | 74 | 22 | 18.5 | 20AC043F0AYNANC0 | | |
| 52 | 60 | 80 | 40 | 30 | 20AD052F0AYNANC0 | 60 | 66 | 90 | 30 | 22 | 20AC060F0AYNANC0 | | E |
| 65 | 78 | 104 | 50 | 40 | 20AD065F0AYNANC0 | 72 | 90 | 120 | 37 | 30 | 20AC072F0AYNANC0 | | |

## 500...600V AC, Three-phase Drives

| 600V AC Input | | | | | | With Filter | Frame Size |
|---|---|---|---|---|---|---|---|
| Output Amps | | | Normal-Duty Hp | Heavy-Duty Hp | Cat. No. | | |
| Cont. | 60 s | 3 s | | | | | |
| 0.9 | 1 | 1.4 | 0.5 | 0.33 | 20AE0P9F0AYNNNC0 | No | A |
| 1.7 | 1.9 | 2.6 | 1 | 0.75 | 20AE1P7F0AYNNNC0 | | |
| 2.7 | 3.6 | 4.8 | 2 | 1 | 20AE2P7F0AYNNNC0 | | |
| 3.9 | 4.3 | 5.8 | 3 | 1.5 | 20AE3P9F0AYNNNC0 | | B |
| 6.1 | 6.7 | 9.1 | 5 | 3 | 20AE6P1F0AYNNNC0 | | |
| 9 | 9.9 | 13.5 | 7.5 | 5 | 20AE9P0F0AYNNNC0 | | C |
| 11 | 13.5 | 18 | 10 | 7.5 | 20AE011F0AYNNNC0 | | |
| 17 | 18.7 | 25.5 | 15 | 10 | 20AE017F0AYNNNC0 | | D |
| 22 | 25.5 | 34 | 20 | 15 | 20AE022F0AYNNNC0 | | |
| 27 | 33 | 44 | 25 | 20 | 20AE027F0AYNNNC0 | | |
| 32 | 40.5 | 54 | 30 | 25 | 20AE032F0AYNNNC0 | | |
| 41 | 48 | 64 | 40 | 30 | 20AE041F0AYNANC0 | | E |
| 52 | 61.5 | 82 | 50 | 40 | 20AE052F0AYNANC0 | | |

# Factory-installed Options

This section provides information about optional components that are installed at the factory.

## Human Interface and Wireless Interface Modules *(Position)*

**IP20, NEMA/UL Type 1 and Flange Type Drives**

Cat. Code: 0
No HIM (Blank Plate)

Cat. Code: 3
LCD Display, Full Numeric Keypad

**IP66, NEMA/UL Type 4X/12 Drives**

Cat. Code: 5
LCD Display, Programmer Only

Cat. Code: 0
No HIM (Blank)

Cat. Code: 3
LCD Display, Full Numeric Keypad

### Internal Dynamic Brake Resistors

| Internal Dynamic Brake Resistors | | | |
|---|---|---|---|
| **Drive Input Voltage** | **Brake Resistance W** | **Frame** | **Cat. Code** *(Position h)* |
| 200...240V AC | 62 | A | Y |
| | | B | Y |
| | | C | Y |
| | 22 | D | Y |
| | | E | Not Available |
| 380...480V AC | 115 | A | Y |
| | | B | Y |
| | | C | Y |
| | 62 | D | Y |
| | | E | Not Available |
| 600V AC | 115 | A | Y |
| | | B | Y |
| | | C | Y |
| | – | D and E | Not Available |

These resistors have a limited duty cycle. See the PowerFlex Dynamic Braking Selection Guide to determine if an internal resistor is sufficient. An external resistor may be required.

### Internal EMC Filter

| Internal EMC Filter | | | |
|---|---|---|---|
| **Drive Voltage** | **CE Filter** | **Frame(1)** | **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 | |
| 600V AC (2) | Standard | E | – |

(1) Internal CE filters are not available inside of the compact A Frame size. If an A Frame current rating is ordered with an internal filter option, the drive with internal CE filter is supplied in the B Frame to accommodate the additional size.
(2) 600V AC Frames A...D available only without filter.

### Internal Communication Adapters

| Internal Communication Adapters | Cat. Code *(Position j)* |
|---|---|
| ControlNet Communication Adapter (Coax) | C |
| DeviceNet Communication Adapter | D |
| EtherNet/IP Communication Adapter | E |
| None | N |

### Control Options

| Control Options(1) | Cat. Code *(Position k)* |
|---|---|
| Enhanced Control without DriveGuard Safe Torque Off | C |
| Enhanced Control with DriveGuard Safe Torque Off | G |

(1) Drive is not CE EMC/TUV certified when the Safe Torque Off encoder interface option is installed.

### Feedback Options

| Feedback Options | Cat. Code *(Position k)* |
|---|---|
| None | 0 |
| 5V/12V Encoder(1) | 1 |

(1) Drive is not CE EMC certified when the encoder interface option is installed.

### Documentation

| Documentation | Cat. Code *(Position f)* |
|---|---|
| Manual | A |
| No manual | N |

# User-installed Options

This section provides information about optional components that you can install.

## 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

Enhanced LCD Display, Full Numeric Keypad
20-HIM-A6

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

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

Enhanced LCD Display, Full Numeric Keypad
20-HIM-C6S

| 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 ‡ |
| Enhanced LCD Display, Full Numeric Keypad | 20-HIM-A6 | 20-HIM-C6S |

∗ For indoor use only.
‡ Includes a 1202-C30 interface cable, 3 m (9.8 ft), 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 |
| 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 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).

# 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% | — | — |
| 5.5 (7.5) | 4.0 (5.0) | 21 | 20AB-DB1-D | 22 | 0.036 | 0.9 | 117% | 100% | 1.3% | 117% | 1.1% |
| 7.5 (10) | 5.5 (7.5) | 21 | 20AB-DB1-D | 22 | 0.036 | 0.9 | 86% | 86% | 1.1% | — | — |
| 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% | — | — |
| 7.5 (10) | 5.5 (7.5) | 74 | 20AD-DB1-C | 115 | 0.04 | 0.9 | 69% | 69% | 1.5% | — | — |
| 11 (15) | 7.5 (10) | 44 | 20AD-DB1-D | 62 | 0.036 | 0.8 | 87% | 87% | 0.8% | — | — |
| 15 (20) | 11 (15) | 31 | 20AD-DB1-D | 62 | 0.036 | 0.8 | 64% | 64% | 0.8% | — | — |
| 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 | — | — | — | — | — | — | — | — | — |
| 15 (20) | 11 (15) | 48 | — | — | — | — | — | — | — | — | — |

∗ 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.

## *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 |
| | | E | — |
| 380…480V AC | 115 | A | 20AD-DB1-A |
| | | B | 20AD-DB1-B |
| | | C | 20AD-DB1-C |
| | 62 | D | 20AD-DB1-D |
| | | E | — |
| 600V AC | 115 | A | 20AD-DB1-A |
| | | B | 20AD-DB1-B |
| | | C | 20AD-DB1-C |
| | | D and E | — |

These resistors have a limited duty cycle. See the PowerFlex Dynamic Braking Resistor Calculator Application Technique, publication PFLEX-AT001, to determine if an internal resistor is sufficient. An external resistor may be required.

## *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 | Continuous 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 |

# Communication Options

The sections that follow describe the communication options that are available.

### Communication Option Kits

| Description | Cat. No. |
|---|---|
| BACnet® MS/TP RS-485 Communication Adapter | 20-COMM-B |
| ControlNet Communication Adapter (Coax) | 20-COMM-C |
| DeviceNet Communication Adapter | 20-COMM-D |
| EtherNet/IP Communication Adapter | 20-COMM-E |
| Dual-port EtherNet/IP Communication Adapter | 20-COMM-ER |
| HVAC Communication Adapter | 20-COMM-H |
| 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 | 20-COMM-Q |
| RS-485 DF1 Communication Adapter | 20-COMM-S |
| External Communications Kit Power Supply | 20-XCOMM-AC-PS1 |
| DPI External Communications Kit | 20-XCOMM-DC-BASE |
| External DPI I/O Option Board(1) | 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 |
| Universal Serial Bus (USB) Converter includes 2 m (6.5 ft) USB, 20-HIM-H10, and 22-HIM-H10 cables | 1203-USB |

(1) For use only with DPI External Communications Kits 20-XCOMM-DC-BASE.

### Other Options

| Description | Cat. No. |
|---|---|
| DriveGuard Safe Torque Off Board | 20A-DG01 |
| 5V/12V Encoder(1) | 20A-ENC-1 |
| 115V AC Interface | AK-M9-115VAC-1 |
| Frame E Flange Gasket | AK-M9-GASKET1-E4 |
| Service Connection Board(2) | SK-M9-SCB1 |

(1) Drive is not CE EMC certified when the encoder interface option is installed.
(2) Provides temporary DPI/HIM connection for NEMA/UL Type 1 and Flange drives with cover removed.

### Terminators

| Description(1) | Cat. No. |
|---|---|
| for use with 3.7 kW (5 HP) and below drives | 1204-TFA1 |
| for use with 1.5 kW (2 Hp) and up drives | 1204-TFB2 |

(1) For selection information, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001, Appendix A.

### Reflected Wave Reduction Modules

| Description(1) | Cat. No. |
|---|---|
| 17 A with Common Mode Choke | 1204-RWC-17-A |
| 9 A without Choke, Book Mount(2) | 1204-RWR2-09-B |
| 9 A without Choke, Stack Mount(2) | 1204-RWR2-09-C |

(1) For selection information, see Wiring and Grounding Guidelines for Pulse-width Modulated (PWM) AC Drives, publication DRIVES-IN001, Appendix A.
(2) 1321-RWR products replace existing 1204-RWR products, 1204-RWRC modules (RWR and Common Mode Choke assembly) are still available.

### Reflective Wave Reduction Devices

| 480V, 60 Hz, Three-phase (1) | | |
|---|---|---|
| **Drive Cat. No.** | **kW (Hp)** | **RWR Filter Cat. No.** |
| 20AD1P1-ND | 0.37 (0.5) | – |
| 20AD2P1-ND | 0.75 (1.0) | – |
| 20AD3P4-ND | 1.5 (2.0) | – |
| 20AD5P0-ND | 2.2 (3.0) | – |
| 20AD8P0-ND | 4.0 (5.0) | 1321-RWR8-DP |
| 20AD011-ND | 5.5 (7.5) | 1321-RWR12-DP |
| 20AD014-ND | 7.5 (10) | 1321-RWR18-DP |
| 20AD022-ND | 11 (15) | 1321-RWR25-DP |
| 20AD027-ND | 15 (20) | 1321-RWR35-DP |
| 20AD034-ND | 18.5 (25) | 1321-RWR35-DP |
| 20AD040-ND | 22 (30) | 1321-RWR45-DP |
| 20AD052-ND | 30 (40) | 1321-RWR55-DP |
| 20AD065-ND | 37 (50) | 1321-RWR80-DP |

| 600V, 60 Hz, Three-phase (1) | | |
|---|---|---|
| **Drive Cat. No.** | **kW (Hp)** | **RWR Filter Cat. No.** |
| 20AE0P9-ND | 0.37 (0.5) | – |
| 20AE1P7-ND | 0.75 (1.0) | – |
| 20AE2P7-ND | 1.5 (2.0) | – |
| 20AE3P9-ND | 2.2 (3.0) | – |
| 20AE6P1-ND | 4.0 (5.0) | 1321-RWR8-EP |
| 20AE9P0-ND | 5.5 (7.5) | 1321-RWR12-EP |
| 20AE011-ND | 7.5 (10) | 1321-RWR18-EP |
| 20AE017-ND | 11 (15) | 1321-RWR25-EP |
| 20AE022-ND | 15 (20) | 1321-RWR35-EP |
| 20AE027-ND | 18.5 (25) | 1321-RWR45-EP |
| 20AE032-ND | 22 (30) | 1321-RWR55-EP |
| 20AE041-ND | 30 (40) | 1321-RWR80-EP |
| 20AE052-ND | 37 (50) | 1321-RWR100-EP |

(1) 1321-RWR devices are used at the output of the drive to reduce dv/dt and motor terminal peak voltages

## Isolation Transformers

For installations that have specific types of AC supply configurations or require drive protection due to AC line disturbances, isolation transformers are available. The isolation transformers are IP32, NEMA/UL Type 3R Standalone, 4...6% Nominal Impedance.

| Motor Rating | | 240V, 60 Hz, Three-phase, 240V Primary, and 240V Secondary | 460V, 60 Hz, Three-phase, 460V Primary, and 460V Secondary | 575V, 60 Hz, Three-phase, 575V Primary, and 575V Secondary |
|---|---|---|---|---|
| **kW** | **Hp** | **Cat. No.** | **Cat. No.** | **Cat. No.** |
| 0.25 | 0.33 | – | 1321-3TW005-BB | – |
| 0.37 | 0.5 | – | 1321-3TW005-BB | 1321-3TW005-CC |
| 0.55 | 0.75 | – | 1321-3TW005-BB | – |
| 0.75 | 1.0 | – | 1321-3TW005-BB | 1321-3TW005-CC |
| 1.1 | 1.5 | – | 1321-3TW005-BB | – |
| 1.5 | 2.0 | – | 1321-3TW005-BB | 1321-3TW005-CC |
| 2.2 | 3.0 | – | 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 |

# Input Line Reactors and Output Line Reactors

For impedance matching, protection from AC line disturbances or motor protection, reactors are available for both the input and output sides of the drive.

## 240V, 60 Hz, Three-phase, 3% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor (1) | | Output Line Reactor (1) | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL 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 | 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 | 1321-3R8-A | 1321-3RA8-A | 1321-3R8-A | 1321-3RA8-A |
| 20AB9P6 | Heavy-Duty | 2 | 1321-3R8-A | 1321-3RA8-A | 1321-3R12-A | 1321-3RA12-A |
| 20AB9P6 | Normal-Duty | 3 | 1321-3R12-A | 1321-3RA12-A | 1321-3R12-A | 1321-3RA12-A |
| 20AB015 | Heavy-Duty | 3 | 1321-3R12-A | 1321-3RA12-A | 1321-3R18-A | 1321-3RA18-A |
| 20AB015 | Normal-Duty | 5 | 1321-3R18-A | 1321-3RA18-A | 1321-3R18-A | 1321-3RA18-A |
| 20AB022 | Heavy-Duty | 5 | 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 |

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

## 240V, 60 Hz, Three-phase, 5% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor (1) | | Output Line Reactor (1) | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL 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 | 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 | 1321-3R8-B | 1321-3RA8-B | 1321-3R8-B | 1321-3RA8-B |
| 20AB9P6 | Heavy-Duty | 2 | 1321-3R8-B | 1321-3RA8-B | 1321-3R12-B | 1321-3RA12-B |
| 20AB9P6 | Normal-Duty | 3 | 1321-3R12-B | 1321-3RA12-B | 1321-3R12-B | 1321-3RA12-B |
| 20AB015 | Heavy-Duty | 3 | 1321-3R12-B | 1321-3RA12-B | 1321-3R18-B | 1321-3RA18-B |
| 20AB015 | Normal-Duty | 5 | 1321-3R18-B | 1321-3RA18-B | 1321-3R18-B | 1321-3RA18-B |
| 20AB022 | Heavy-Duty | 5 | 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 |

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

## 480V, 60 Hz, Three-phase, 3% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor [1] | | Output Line Reactor [1] | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) |
| | | | 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 | 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 | 1321-3R4-B | 1321-3RA4-B | 1321-3R4-B | 1321-3RA4-B |
| 20AD5P0 | Heavy Duty | 2 | 1321-3R4-B | 1321-3RA4-B | 1321-3R8-C | 1321-3RA8-C |
| 20AD5P0 | Normal Duty | 3 | 1321-3R8-C | 1321-3RA8-C | 1321-3R8-C | 1321-3RA8-C |
| 20AD8P0 | Heavy Duty | 3 | 1321-3R8-C | 1321-3RA8-C | 1321-3R8-B | 1321-3RA8-B |
| 20AD8P0 | Normal Duty | 5 | 1321-3R8-B | 1321-3RA8-B | 1321-3R8-B | 1321-3RA8-B |
| 20AD011 | Heavy Duty | 5 | 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 |

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

## 480V, 60 Hz, Three-phase, 5% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor [1] | | Output Line Reactor [1] | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL 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 | 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 | 1321-3R4-D | 1321-3RA4-D | 1321-3R4-D | 1321-3RA4-D |
| 20AD5P0 | Heavy Duty | 2 | 1321-3R4-D | 1321-3RA4-D | 1321-3R8-D | 1321-3RA8-D |
| 20AD5P0 | Normal Duty | 3 | 1321-3R8-D | 1321-3RA8-D | 1321-3R8-D | 1321-3RA8-D |
| 20AD8P0 | Heavy Duty | 3 | 1321-3R8-D | 1321-3RA8-D | 1321-3R8-C | 1321-3RA8-C |
| 20AD8P0 | Normal Duty | 5 | 1321-3R8-C | 1321-3RA8-C | 1321-3R8-C | 1321-3RA8-C |
| 20AD011 | Heavy Duty | 5 | 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[2] | 1321-3RA35-C[2] | 1321-3R25-C | 1321-3RA25-C |
| 20AD034 | Heavy Duty | 20 | 1321-3R35-C[2] | 1321-3RA35-C[2] | 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 |

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.
(2) 4% impedance.

## 600V, 60 Hz, Three-phase, 3% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor (1) | | Output Line Reactor (1) | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) |
| | | | 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 | 0.5 | 1321-3R2-B | 1321-3RA2-B | 1321-3R2-B | 1321-3RA2-B |
| 20AE1P7 | Normal Duty | 1 | 1321-3R2-B | 1321-3RA2-B | 1321-3R2-B | 1321-3RA2-B |
| 20AE2P7 | Heavy Duty | 1 | 1321-3R2-A | 1321-3RA2-A | 1321-3R4-D | 1321-3RA4-D |
| 20AE2P7 | Normal Duty | 2 | 1321-3R4-C | 1321-3RA4-C | 1321-3R4-D | 1321-3RA4-D |
| 20AE3P9 | Heavy Duty | 2 | 1321-3R4-C | 1321-3RA4-C | 1321-3R4-C | 1321-3RA4-C |
| 20AE3P9 | Normal Duty | 3 | 1321-3R4-C | 1321-3RA4-C | 1321-3R4-C | 1321-3RA4-C |
| 20AE6P1 | Heavy Duty | 3 | 1321-3R4-C | 1321-3RA4-C | 1321-3R8-C | 1321-3RA8-C |
| 20AE6P1 | Normal Duty | 5 | 1321-3R8-C | 1321-3RA8-C | 1321-3R8-C | 1321-3RA8-C |
| 20AE9P0 | Heavy Duty | 5 | 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-B | 1321-3RA18-B |
| 20AE017 | Normal Duty | 15 | 1321-3R18-B | 1321-3RA18-B | 1321-3R18-B | 1321-3RA18-B |
| 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 |

(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.

## 600V, 60 Hz, Three-phase, 5% Impedance

| Drive Cat. No. | Duty | Hp | Input Line Reactor (1) | | Output Line Reactor (1) | |
|---|---|---|---|---|---|---|
| | | | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL Type 1) | IP00 (NEMA / UL Type Open) | IP11 (NEMA / UL 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 | 0.5 | 1321-3R1-B | 1321-3RA1-B | 1321-3R2-C | 1321-3RA2-C |
| 20AE1P7 | Normal Duty | 1 | 1321-3R2-C | 1321-3RA2-C | 1321-3R2-C | 1321-3RA2-C |
| 20AE2P7 | Heavy Duty | 1 | 1321-3R2-C | 1321-3RA2-C | 1321-3R4-D(2) | 1321-3RA4-D(2) |
| 20AE2P7 | Normal Duty | 2 | 1321-3R4-D(2) | 1321-3RA4-D(2) | 1321-3R4-D(2) | 1321-3RA4-D(2) |
| 20AE3P9 | Heavy Duty | 2 | 1321-3R4-D(2) | 1321-3RA4-D(2) | 1321-3R4-D | 1321-3RA4-D |
| 20AE3P9 | Normal Duty | 3 | 1321-3R4-D | 1321-3RA4-D | 1321-3R4-D | 1321-3RA4-D |
| 20AE6P1 | Heavy Duty | 3 | 1321-3R4-D | 1321-3RA4-D | 1321-3R8-D | 1321-3RA8-D |
| 20AE6P1 | Normal Duty | 5 | 1321-3R8-D | 1321-3RA8-D | 1321-3R8-D | 1321-3RA8-D |
| 20AE9P0 | Heavy Duty | 5 | 1321-3R8-D | 1321-3RA8-D | 1321-3R12-C(2) | 1321-3RA12-C(2) |
| 20AE9P0 | Normal Duty | 7.5 | 1321-3R12-C(2) | 1321-3RA12-C(2) | 1321-3R12-C(2) | 1321-3RA12-C(2) |
| 20AE011 | Heavy Duty | 7.5 | 1321-3R12-C(2) | 1321-3RA12-C(2) | 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(2) | 1321-3RA25-C(2) |
| 20AE022 | Normal Duty | 20 | 1321-3R25-C(2) | 1321-3RA25-C(2) | 1321-3R25-C(2) | 1321-3RA25-C(2) |
| 20AE027 | Heavy Duty | 20 | 1321-3R25-C(2) | 1321-3RA25-C(2) | 1321-3R35-C(2) | 1321-3RA35-C(2) |
| 20AE027 | Normal Duty | 25 | 1321-3R35-C(2) | 1321-3RA35-C(2) | 1321-3R35-C(2) | 1321-3RA35-C(2) |
| 20AE032 | Heavy Duty | 25 | 1321-3R35-C(2) | 1321-3RA35-C(2) | 1321-3R35-C(2) | 1321-3RA35-C(2) |
| 20AE032 | Normal Duty | 30 | 1321-3R35-C(2) | 1321-3RA35-C(2) | 1321-3R35-C(2) | 1321-3RA35-C(2) |
| 20AE041 | Heavy Duty | 30 | 1321-3R35-C(2) | 1321-3RA35-C(2) | 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 |

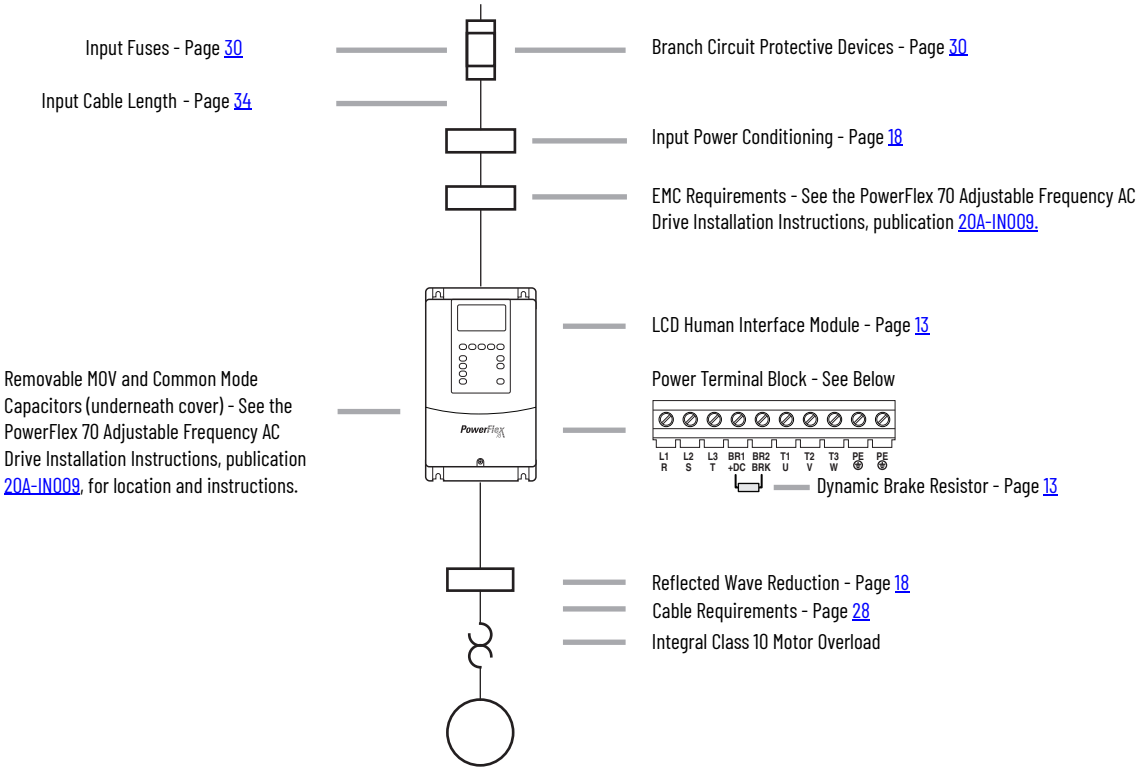
(1) Input line reactors were sized based on the NEC Fundamental Motor Amps. Output line reactors were sized based on the VFD rated output currents.
(2) 4% impedance.

# Installation Power Wiring

The PowerFlex 70 has the following built in protective features to help simplify installation:

- Ground fault protection during startup and running helps verify reliability
- Electronic motor overload protection increases motor life
- Removable MOV to ground and common mode capacitors to ground verify compatibility with ungrounded systems. These devices must be disconnected if the drive is installed on an ungrounded, high-resistance, or B phase grounded distribution system. These devices must also be disconnected if a regenerative unit is used as a bus supply or brake.
- 6 kV transient protection increased robustness for 380...480V system voltages

There are many other factors that must be considered for optimal performance in any given application. The following block diagram highlights the primary installation considerations. Consult Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001, for detailed recommendations on input power conditioning, dynamic braking, reflected wave protection, and motor cables types.



# Terminal Blocks

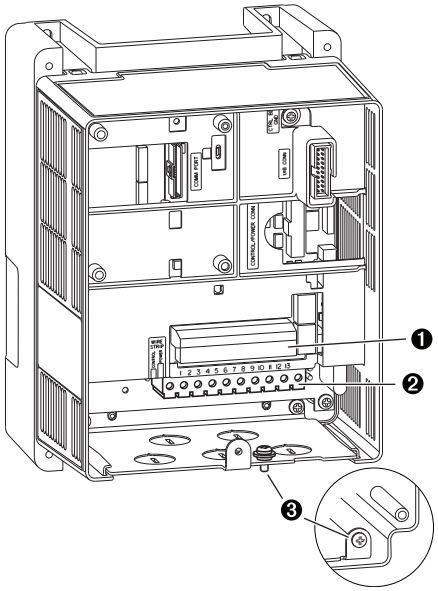
## Terminal Block Specifications

| No. | Name | Description | Frame | Wire Size Range[1] | | Torque | |
|---|---|---|---|---|---|---|---|
| | | | | Max, $mm^2$ (AWG) | Min, $mm^2$ (AWG) | Max, N•m (lb•in) | Recommended, N•m (lb•in) |
| ❶ | I/O terminal block | Signal and control connections | All | 1.5 (16) | 0.05 (30) | 0.55 (4.9) | 0.5 (4.4) |
| ❷ | Power terminal block | Input power and motor connections | A, B, and C | 3.5 (12) | 0.3 (22) | 0.66 (5.5) | 0.6 (5) |
| | | | D | 8.4 (8) | 0.8 (18) | 1.7 (15) | 1.4 (12) |
| | | | E | 25.0 (3) | 2.5 (14) | 2.71 (24) | 2.71 (24) |
| ❸ | SHLD terminal | Terminating point for wiring shields | All | — | — | 1.6 (14) | 1.6 (14) |

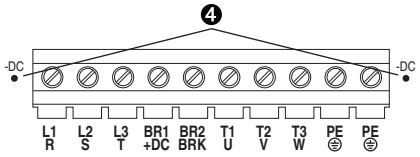
(1) These are the maximum/minimum sizes that the terminal block accepts, not recommendations.

| Terminal | Description | Notes |
|---|---|---|
| BR1<br>BR2 | DC brake (+)<br>DC brake (–) | dB resistor connection - **Important:** Do not connect both an internal and external dB resistor simultaneously. This can violate the minimum allowed dB resistance and cause drive damage. |
| +DC<br>–DC | DC bus (+)<br>DC bus (–) | ❹ Test point on Frames A...D on the left or right of the power terminal block. Frame E has a dedicated terminal. |
| PE | PE ground | — |
| U, V, W | U (T1), V (T2), W (T3) | To the motor |
| R, S, T | R (L1), S (L2), T (L3) | AC line input power |

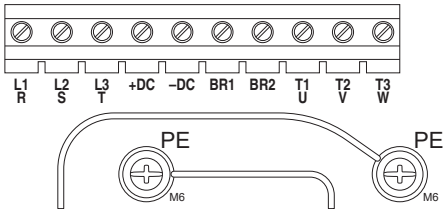
### Typical Terminal Block Location




Power Terminals

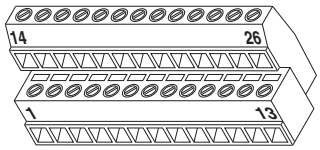



Frames A...D




Frame E

## Control Terminals

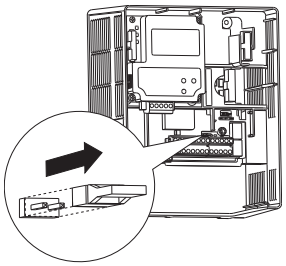



| No. | Signal | Factory Default | Description | Related Parameters |
|---|---|---|---|---|
| 1 | Digital In 1 | Stop – CF<br>(CF = clear fault) | 11.2 mA at 24V DC<br>19.2V min on state<br>3.2V max off state<br>Important: Use only 24V DC, not suitable for 115V AC circuitry.(3)<br>Inputs can be wired as sink or source. | 361...366 |
| 2 | Digital In 2 | Start | | |
| 3 | Digital In 3 | Auto/Man | | |
| 4 | Digital In 4 | Speed Sel 1 | | |
| 5 | Digital In 5 | Speed Sel 2 | | |
| 6 | Digital In 6 | Speed Sel 3 | | |
| 7 | 24V Common | – | Drive supplied power for digital In1...6 inputs only.<br>Not intended for use on circuits outside of the drive.<br>See examples beginning on page 27.<br>150 mA max load. | |
| 8 | Digital In Common | – | | |
| 9 | +24V DC | – | | |
| 10 | +10V Pot Reference | – | 2 kΩ min load. | |
| 11 | Digital Out 1 – N.O.(1) | NOT Fault | Max Resistive Load<br>250V AC / 30V DC<br>50VA / 60 Watts<br>Min DC Load<br>10 µA, 10 mV DC<br>Max Inductive Load<br>250V AC / 30V DC<br>25VA / 30 Watts | 380...387 |
| 12 | Digital Out 1 Common | | | |
| 13 | Digital Out 1 – N.C.(1) | Fault | | |
| 14 | Analog In 1 (– Volts) | (2)<br>Voltage – Reads value at 14 & 15 | Non-isolated, 0...10V, 10 bit, 100 kΩ input impedance.(4) | 320...327 |
| 15 | Analog In 1 (+ Volts) | | | |
| 16 | Analog In 1 (– Current) | | Non-isolated, 4...20 mA, 10 bit, 100 Ω input impedance.(4) | |
| 17 | Analog In 1 (+ Current) | | | |
| 18 | Analog In 2 (– Volts) | (2)<br>Voltage – Reads value at 18 & 19 | Isolated, bipolar, differential, 0...10V unipolar (10 bit) or ±10V bipolar (10 bit and sign), 100 kΩ input impedance.(5) | |
| 19 | Analog In 2 (+ Volts) | | | |
| 20 | Analog In 2 (– Current) | | Isolated, 4...20mA, 10 bit and sign, 100 Ω input impedance.(5) | |
| 21 | Analog In 2 (+ Current) | | | |
| 22 | 10V Pot Common<br>Analog Out (– Volts)<br>Analog Out (– Current) | (2)<br>Output Freq | 0...10V, 10 bit, 10 kΩ (2 kΩ min) load.<br>0...20 mA, 10 bit, 400 Ω max load.(6)<br>Referenced to chassis ground.<br>Common if internal 10V supply (terminal 10) is used. | 340...344 |
| 23 | Analog Out (+ Volts)<br>Analog Out (+ Current) | | | |
| 24 | Digital Out 2 – N.O.(1) | Run | See description at Numbers 11...13. | 380...387 |
| 25 | Digital Out 2 Common | | | |
| 26 | Digital Out 2 – N.C.(1) | NOT Run | | |

(1) Contacts shown in unpowered state. Any relay that is programmed as Fault or Alarm is energized (pick up) when power is applied to the drive and de-energize (drop out) when a fault or alarm exists. Relays selected for other functions are energized only when that condition exists and are de-energize when that condition is removed.
(2) These inputs/outputs are dependent on a number of parameters. For information on related parameters, see publication, 20A-UM001.
(3) For use with 115V AC circuitry. A 115V AC interface option (AK-M9-115VAC-1) must be used
(4) Differential isolation - external source must be less than 10V with respect to PE.
(5) Differential isolation - external source must be maintained at less than 160V with respect to PE. Input provides high common mode immunity.
(6) Analog output current is only available with enhanced control drives.

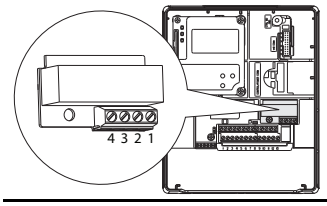
## Hardware Enable Circuitry

By default, you can program a digital input as an enable input. Drive software interprets the status of this input. If the application requires the drive to be disabled without software interpretation, a hardware enable configuration can be used. To set up a hardware enable configuration, use the following procedure:



1. Remove the drive cover.
2. On the main control board, locate and remove the enable jumper (ENBL JMP).
3. Wire the enable input to Digital In 6.
4. Verify that 366 [Digital In6 Sel] is set to option 1 Enable.

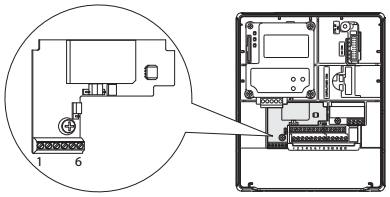
## Safe Torque Off Board Terminal Block

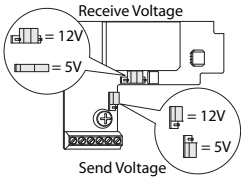



| No. | Signal | Description |
|---|---|---|
| 1 | Monitor - N.C. | Normally closed contacts for monitoring relay status.<br>Max resistive load: 250V AC / 30V DC / 50V AC / 60 W<br>Max inductive load: 250V AC / 30V DC / 25V AC/ 30 W |
| 2 | Common - N.C. | |
| 3 | +24V DC | Connections for user-supplied power to energize coil. |
| 4 | 24V common | |

For detailed connection examples, refer to the DriveGuard Safe Torque Off Option (Series B) for PowerFlex 40P and PowerFlex 70 Enhanced Control AC Drives User Manual, publication PFLEX-UM003.

## Encoder Interface Terminal Block

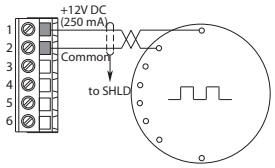
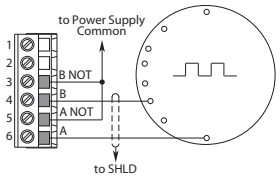


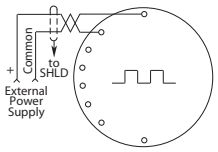
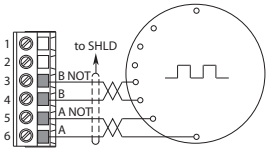

| No. | Signal | Description | Jumper Settings |
|---|---|---|---|
| 1 | 5...12V power(1) | Internal power source 250 mA (isolated) |  |
| 2 | Power return | | |
| 3 | Encoder B (NOT) | Single channel or quadrature B input. | |
| 4 | Encoder B | | |
| 5 | Encoder A (NOT) | Single channel or quadrature A input. | |
| 6 | Encoder A | | |



(1) Jumper selectable +5...12V is available on 20A-ENC-1 encoder boards.

## Sample Encoder Wiring

| I/O | Connection Example |
|---|---|
| **Encoder Power – Internal Drive Power** Internal (drive) 12V DC, 250 mA |  |
| **Encoder Signal – Single-Ended, Dual Channel** |  |

| I/O | Connection Example |
|---|---|
| **Encoder Power – External Power Source** |  |
| **Encoder Signal – Differential, Dual Channel** |  |

## EMC Filters

| Description | Factory-installed (Position 13) |
|---|---|
| Internal 3-phase 200...480 filter | A |

The following two tables provide the catalog number codes for EMC filters, and the current ratings and voltages where filters are used. These tables are also provided in the Catalog Number Explanation on page 6.

| Emission Class | |
|---|---|
| **Code** | **Rating** |
| A | Filtered |
| N | Not Filtered |

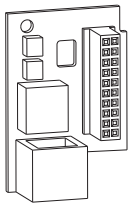
| Emission Class by Frame Current Rating (A...E) and Voltage | | | | | |
|---|---|---|---|---|---|
| | **A(1)(2)** | **B(2)** | **C** | **D** | **E** |
| 240V | A or N | A or N | A | A | A |
| 400V | A or N | A or N | A | A | A |
| 480V | A or N | A or N | A | A | A |
| 600V | N | N | N | N | A |

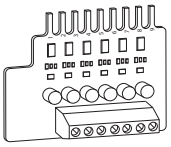
(1) If a filter is used with a Frame A current rating, the drive with internal filter is supplied in the B Frame to accommodate the additional size.
(2) "A or N" indicates that filtering is optional.

## Other Options

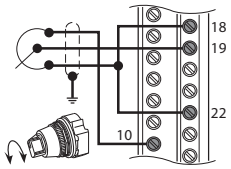
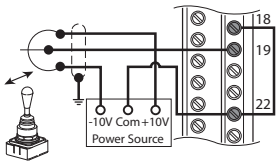
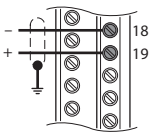
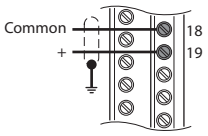
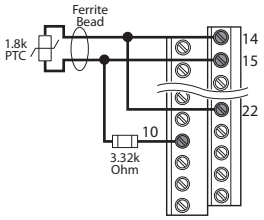
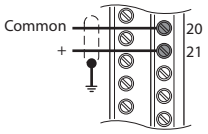
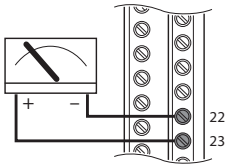
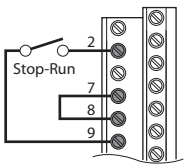
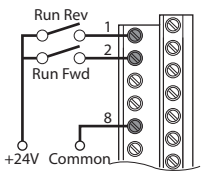
| Description | Catalog No. |
|---|---|
| | **User-installed** |
| Service connection board(1) | SK-M9-SCB1 |
| 115V AC interface card | AK-M9-115VAC-1 |
| Frame E flange gasket | AK-M9-GASKET1-E4 |

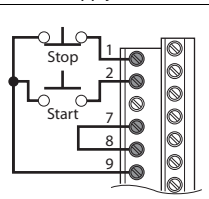
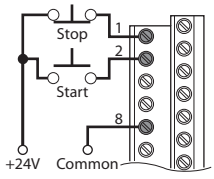
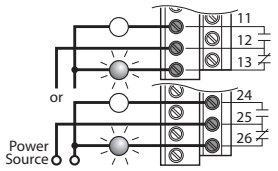
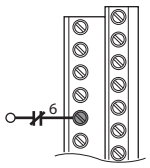
(1) Provides temporary DPI/HIM connection for NEMA 1 and flange drives with cover removed.


Service Connection Board
SK-M9-SCB1


115V Interface Card
AK-M9-115VAC-1

# I/O Wiring Examples

| Input/Output | Connection Example | Required Parameter Settings |
|---|---|---|
| Potentiometer Unipolar Speed Reference<br>10 kΩ Pot. Recommended<br>(2 kΩ min) |  | Select Speed Reference source:<br>Param. 090 = 1 "Analog In 2"<br>Adjust Scaling:<br>Param. 091, 092, 322, 323<br>Check Results:<br>Param. 016 |
| Joystick Bipolar Speed Reference<br>±10V Input |  | Set Direction Mode:<br>Param. 190 = 1 "Bipolar"<br>Adjust Scaling:<br>Param. 091, 092, 325, 326<br>Check Results:<br>Param. 017 |
| Analog Input Bipolar Speed Reference<br>±10V Input |  | Adjust Scaling:<br>Param. 091, 092, 325, 326<br>Check Results:<br>Param. 017 |
| Analog Input Unipolar Speed Reference<br>0V...+10V Input |  | Adjust Scaling:<br>Param. 091, 092, 325, 326<br>Check Results:<br>Param. 017 |
| Analog Input, PTC<br>PTC OT set > 5V<br>PTC OT cleared < 4V<br>PTC Short < 0.2V |  | Set Fault Config 1:<br>Param. 238, Bit #7 = 1 "Enabled"<br><br>Set Alarm Config 1:<br>Param. 259, Bit #11 = 1 "Enabled" |
| Analog Input Unipolar Speed Reference<br>4...20 mA Input |  | Configure Input for Current:<br>Param. 320, Bit #1 = 1 "Current"<br>Adjust Scaling:<br>Param. 091, 092, 325, 326<br>Check Results:<br>Param. 017 |
| Analog Output Unipolar<br>0V ...+10V Output. Can Drive a 2 kΩ load (25 mA short circuit limit) |  | Select Source Value:<br>Param. 342<br>Adjust Scaling:<br>Param. 343, 344 |
| 2-Wire Control Nonreversing | Internal Supply<br>  | Disable Digital Input 1:<br>Param. 361 = 0 "Not Used"<br>Set Digital Input 2:<br>Param. 362 = 7 "Run" |
| 2-Wire Control Reversing | External Supply<br>  | Set Digital Input 1:<br>Param. 361 = 8 "Run Forward"<br>Set Digital Input 2:<br>Param. 362 = 9 "Run Reverse" |

| Input/Output | Connection Example | Required Parameter Settings |
|---|---|---|
| 3-Wire Control | Internal Supply<br>  | Use factory default parameter settings. |
| 3-Wire Control | External Supply<br>  | Use factory default parameter settings. |
| Digital Output<br>Form C Relays Energized in Normal State. |  | Select Source:<br>Param. 380, 384 |
| Enable Input<br>Shown in enabled state. |  | Configure with parameter 366<br>For dedicated hardware Enable: Remove Enable Jumper (ENBL JMP) on the Main Control Board. |

# Cable Recommendations

## Cable Types Acceptable for 200...600V Installations

Various cable types are acceptable for drive installations. For many installations, unshielded cable is adequate, provided it can be separated from sensitive circuits. As an approximate guide, allow a spacing of 0.3 m (1 ft) for every 10 m (32.8 ft) of length. In all cases, long parallel runs must be avoided. Do not use cable with an insulation thickness less than or equal to 15 mils (0.4 mm/0.015 in.). Use copper wire only. Wire gauge requirements and recommendations are based on 75 °C (167 °F). Do not reduce wire gauge when using higher temperature wire. See 208/240V AC Three-phase Input Drive Ratings and Input Protection Devices on page 30.

*Unshielded*

The following wire types are acceptable for drive installation in dry environments, as long as adequate free air space and/or conduit fill rate limits are provided: Thermoplastic High Heat-resistant Nylon-coated (THHN), Thermoplastic Heat and Water-resistant Nylon-coated (THWN), or similar wire. The wire must have a minimum insulation thickness of 15 mils (0.4 mm/0.015 in.) and cannot have large variations in insulation concentricity.

**IMPORTANT** Do not use THHN or similarly coated wire in wet areas.

*Shielded/Armored Cable*

Shielded cable has the general benefits of multi-conductor cable. It also has the benefit of a copper braided shield that can contain much of the noise that a typical AC Drive generates. Use shielded cable for installations with sensitive equipment such as weigh scales, capacitive proximity switches, and other devices that can be affected by electrical noise in the distribution system. Applications with large numbers of drives in a similar location, imposed EMC regulations, or a high degree of communications/networking are also good candidates for shielded cable.

Shielded cable can also help reduce shaft voltage and induced bearing currents for some applications. In addition, the increased impedance of shielded cable can help extend the distance that the motor can be from the drive without the addition of motor protective devices, such as terminator networks. See Reflected Wave in Wiring and Grounding Guidelines for PWM AC Drives, publication DRIVES-IN001.

Consider the general specifications of the environment of the installation, including temperature, flexibility, moisture characteristics, and chemical resistance. A braided shield can be included. If included, the braided shield is to be specified by the cable manufacturer as having coverage of at least 75%. An additional foil shield can greatly improve noise containment.

A good example of recommended cable is Belden 295*xx* (*xx* determines gauge). This cable has four Cross-linked Polyethylene (XLPE) insulated conductors with a 100% coverage foil and an 85% coverage copper braided shield (with drain wire) surrounded by a Polyvinyl Chloride (PVC) jacket.

Other types of shielded cable are available, but the use of these types can limit the allowable cable length. For example, some of the newer cables bundle four conductors of THHN wire and wrap them tightly with a foil shield. This type of construction can greatly increase the cable charging current that is required and reduce the overall drive performance. Unless specified in the individual distance tables as tested with the drive, these cables are not recommended and their performance against the lead length limits is not known.

## Recommended Shielded Wire

| Location | Rating/Type | Description |
|---|---|---|
| Standard (option 2) | Tray rated 600V, 90 °C (194 °F)<br>RHH/RHW-2<br>Anixter OLF-7*xxxxx* or equivalent | Three tinned copper conductors with XLPE insulation.<br>5 mil single helical copper tape (25% overlap min) with three bare copper grounds in contact with the shield.<br>PVC jacket. |
| Class I and II;<br>Division I and II | Tray rated 600V, 90 °C (194 °F)<br>RHH/RHW-2<br>Anixter 7V-7*xxxx*-3G or equivalent | Three bare copper conductors with XLPE insulation and impervious corrugated continuously welded aluminum armor.<br>Black sunlight resistant PVC jacket overall.<br>Three copper grounds on #10 AWG and smaller. |

**ATTENTION:** To avoid a possible shock hazard that is caused by induced voltages, unused wires in the conduit must be grounded at both ends. Also, if a drive sharing a conduit is being serviced or installed, disable all of the drives that are using that conduit. Disabling all of the drives that are using that conduit helps minimize the possible shock hazard from cross coupled motor leads.

## Maximum Motor Cable Lengths

For information on maximum motor cable lengths, see the Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001.

# Power Ratings and Branch Circuit Protection

See the tables in this section for power ratings and branch circuit protection information.

## Single-phase Input Power

The PowerFlex 70 drive is typically used with a three-phase input supply. Single-phase operation of the drive is rated under the UL 508C listing. Rockwell Automation has verified that single-phase operation can be performed with output current that is derated by 50% of the three-phase ratings that are identified in the tables in this section.

### 208/240V AC Three-phase Input Drive Ratings and Input Protection Devices

| Cat.No. | Frame(1) | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range(4)(5) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min(6) | Max(7) | Min(6) | Max(7) | Max(8) | Max(8) | Available Catalog Numbers(9) | | | Minimum Enclosure Volume (in.3)(10) |
| **208V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AB2P2 | A | 0.5 | 0.33 | 2.9 | 1.1 | 2.5 | 2.7 | 3.7 | 6 | 6 | 6 | 10 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | 3441 |
| 20AB4P2 | A | 1 | 0.75 | 5.6 | 2 | 4.8 | 5.5 | 7.4 | 10 | 10 | 10 | 17.5 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AB6P8 | B | 2 | 1.5 | 10 | 3.6 | 7.8 | 10.3 | 13.8 | 15 | 15 | 15 | 30 | 30 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AB9P6 | B | 3 | 2 | 14 | 5.1 | 11 | 12.1 | 16.5 | 20 | 25 | 20 | 40 | 40 | 30 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB015 | C | 5 | 3 | 16 | 5.8 | 17.5 | 19.2 | 26.6 | 20 | 35 | 20 | 70 | 70 | 30 | 140M-C2E-C20 | 140M-D8E-C20 | 140M-F8E-C20 | 3441 |
| 20AB022 | D | 7.5 | 5 | 23.3 | 8.3 | 25.3 | 27.8 | 37.9 | 30 | 50 | 30 | 100 | 100 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AB028 | D | 10 | 7.5 | 29.8 | 10.7 | 32.2 | 37.9 | 50.6 | 40 | 70 | 40 | 125 | 125 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AB042 | D | 15 | 10 | 39.8 | 14.3 | 43 | 55.5 | 74 | 60 | 100 | 60 | 175 | 175 | 70 | – | – | 140M-F8E-C45 | 5098 |
| 20AB054 | E | 20 | 15 | 57.5 | 20.7 | 62.1 | 72.4 | 96.6 | 80 | 125 | 80 | 200 | 200 | 100 | – | – | – | – |
| 20AB070 | E | 25 | 20 | 72.3 | 26.0 | 78.2 | 93.1 | 124 | 90 | 175 | 90 | 300 | 300 | 100 | – | – | – | – |
| **240V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AB2P2 | A | 0.5 | 0.33 | 2.5 | 1.1 | 2.2 | 2.4 | 3.3 | 3 | 4.5 | 3 | 8 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AB4P2 | A | 1 | 0.75 | 4.8 | 2 | 4.2 | 4.8 | 6.4 | 6 | 9 | 6 | 15 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AB6P8 | B | 2 | 1.5 | 8.7 | 3.6 | 6.8 | 9 | 12 | 15 | 15 | 15 | 25 | 25 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AB9P6 | B | 3 | 2 | 12.2 | 5.1 | 9.6 | 10.6 | 14.4 | 20 | 20 | 20 | 35 | 35 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB015 | C | 5 | 3 | 13.9 | 5.8 | 15.3 | 17.4 | 23.2 | 20 | 30 | 20 | 60 | 60 | 30 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB022 | D | 7.5 | 5 | 19.9 | 8.3 | 22 | 24.4 | 33 | 25 | 45 | 25 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AB028 | D | 10 | 7.5 | 25.7 | 10.7 | 28 | 33 | 44 | 35 | 60 | 35 | 110 | 110 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AB042 | D | 15 | 10 | 38.7 | 16.1 | 42 | 46.2 | 63 | 50 | 90 | 50 | 150 | 150 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AB054 | E | 20 | 15 | 49.8 | 20.7 | 54 | 63 | 84 | 60 | 100 | 60 | 200 | 200 | 100 | – | – | – | – |
| 20AB070 | E | 25 | 20 | 64.5 | 26.8 | 70 | 81 | 108 | 90 | 150 | 90 | 275 | 275 | 100 | – | – | – | – |

See page 33 for notes.

### 400/480V AC Three-phase Input Drive Ratings and Input Protection Devices

| Cat.No. | Frame(1) | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range(4)(5) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min(6) | Max(7) | Min(6) | Max(7) | Max(8) | Max(8) | Available Catalog Numbers(9) | | | Minimum Enclosure Volume (in.3)(10) |
| **400V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AC1P3 | A | 0.37 | 0.25 | 1.6 | 1.1 | 1.3 | 1.4 | 1.9 | 3 | 3 | 3 | 5 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AC2P1 | A | 0.75 | 0.55 | 2.5 | 1.8 | 2.1 | 2.4 | 3.2 | 4 | 6 | 4 | 8 | 15 | 7 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AC3P5 | A | 1.5 | 1.1 | 4.3 | 3 | 3.5 | 4.5 | 6 | 6 | 6 | 6 | 12 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AC5P0 | B | 2.2 | 1.5 | 6.5 | 4.5 | 5 | 5.5 | 7.5 | 10 | 10 | 10 | 20 | 20 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AC8P7 | B | 4 | 3 | 11.3 | 7.8 | 8.7 | 9.9 | 13.2 | 15 | 17.5 | 15 | 30 | 30 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |

## 400/480V AC Three-phase Input Drive Ratings and Input Protection Devices (Continued)

| Cat.No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| 20AC011 | C | 5.5 | 4 | 10.5 | 7.6 | 11.5 | 13 | 17.4 | 15 | 25 | 15 | 45 | 40 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AC015 | C | 7.5 | 5.5 | 15.1 | 10.4 | 15.4 | 17.2 | 23.1 | 20 | 30 | 20 | 60 | 60 | 20 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AC022 | D | 11 | 7.5 | 21.9 | 15.2 | 22 | 24.2 | 33 | 30 | 45 | 30 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AC030 | D | 15 | 11 | 30.3 | 21 | 30 | 33 | 45 | 40 | 60 | 40 | 120 | 120 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AC037 | D | 18.5 | 15 | 35 | 24.3 | 37 | 45 | 60 | 50 | 80 | 50 | 125 | 140 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AC043 | D | 22 | 18.5 | 40.7 | 28.2 | 43 | 56 | 74 | 60 | 90 | 60 | 150 | 160 | 70 | – | – | – | – |
| 20AC060 | E | 30 | 22 | 56.8 | 39.3 | 60 | 66 | 90 | 80 | 125 | 80 | 225 | 240 | 80 | – | – | – | – |
| 20AC072 | E | 37 | 30 | 68.9 | 47.8 | 72 | 90 | 120 | 90 | 150 | 90 | 250 | 280 | 100 | – | – | – | – |
| **480V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AD1P1 | A | 0.5 | 0.33 | 1.3 | 1.1 | 1.1 | 1.2 | 1.6 | 3 | 3 | 3 | 4 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AD2P1 | A | 1 | 0.75 | 2.4 | 2 | 2.1 | 2.4 | 3.2 | 3 | 6 | 3 | 8 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AD3P4 | A | 2 | 1.5 | 3.8 | 3.2 | 3.4 | 4.5 | 6 | 6 | 6 | 6 | 12 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | 3441 |
| 20AD5P0 | B | 3 | 2 | 5.6 | 4.7 | 5 | 5.5 | 7.5 | 10 | 10 | 10 | 20 | 20 | 15 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AD8P0 | B | 5 | 3 | 9.8 | 8.4 | 8 | 8.8 | 12 | 15 | 15 | 15 | 30 | 30 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AD011 | C | 7.5 | 5 | 9.4 | 7.9 | 11 | 12.1 | 16.5 | 15 | 20 | 15 | 40 | 40 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AD014 | C | 10 | 7.5 | 12.4 | 10.4 | 14 | 16.5 | 22 | 20 | 30 | 20 | 50 | 50 | 20 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AD022 | D | 15 | 10 | 19.9 | 16.6 | 22 | 24.2 | 33 | 25 | 45 | 25 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AD027 | D | 20 | 15 | 24.8 | 20.6 | 27 | 33 | 44 | 35 | 60 | 35 | 100 | 100 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AD034 | D | 25 | 20 | 31.2 | 25.9 | 34 | 40.5 | 54 | 40 | 70 | 40 | 125 | 125 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AD040 | D | 30 | 25 | 36.7 | 30.5 | 40 | 51 | 68 | 50 | 90 | 50 | 150 | 150 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AD052 | E | 40 | 30 | 47.7 | 39.7 | 52 | 60 | 80 | 60 | 110 | 60 | 200 | 200 | 70 | – | – | – | – |
| 20AD065 | E | 50 | 40 | 59.6 | 49.6 | 65 | 78 | 104 | 80 | 125 | 80 | 250 | 250 | 100 | – | – | – | – |

See page 33 for notes.

## 600V AC Three-phase Input Drive Ratings and Input Protection Devices

| Cat.No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| **600V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AE0P9 | A | 0.5 | 0.33 | 1.3 | 1.3 | 0.9 | 1.1 | 1.4 | 3 | 3 | 3 | 3.5 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AE1P7 | A | 1 | 0.75 | 1.9 | 2 | 1.7 | 2 | 2.6 | 3 | 6 | 3 | 6 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AE2P7 | A | 2 | 1.5 | 3 | 3.1 | 2.7 | 3.6 | 4.8 | 4 | 6 | 4 | 10 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | - | 3441 |
| 20AE3P9 | B | 3 | 2 | 4.4 | 4.5 | 3.9 | 4.3 | 5.9 | 6 | 8 | 6 | 15 | 15 | 7 | - | 140M-D8E-B63 | - | 3441 |
| 20AE6P1 | B | 5 | 3 | 7.5 | 7.8 | 6.1 | 6.7 | 9.2 | 10 | 12 | 10 | 20 | 20 | 15 | - | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AE9P0 | C | 7.5 | 5 | 7.7 | 8 | 9 | 9.9 | 13.5 | 10 | 20 | 10 | 35 | 35 | 15 | - | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AE011 | C | 10 | 7.5 | 9.8 | 10.1 | 11 | 13.5 | 18 | 15 | 20 | 15 | 40 | 40 | 15 | - | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AE017 | D | 15 | 10 | 15.3 | 15.9 | 17 | 18.7 | 25.5 | 20 | 35 | 20 | 60 | 60 | 30 | - | - | 140M-F8E-C20 | 5098 |
| 20AE022 | D | 20 | 15 | 20 | 20.8 | 22 | 25.5 | 34 | 25 | 45 | 25 | 80 | 80 | 30 | - | - | 140M-F8E-C25 | 5098 |
| 20AE027 | D | 25 | 20 | 24.8 | 25.7 | 27 | 33 | 44 | 35 | 60 | 35 | 100 | 100 | 50 | - | - | 140M-F8E-C25 | 5098 |
| 20AE032 | D | 30 | 25 | 29.4 | 30.5 | 32 | 40.5 | 54 | 40 | 70 | 40 | 125 | 125 | 50 | - | - | 140M-F8E-C32 | 5098 |
| 20AE041 | E | 40 | 30 | 37.6 | 39.1 | 41 | 48 | 64 | 50 | 90 | 50 | 150 | 150 | 100 | - | - | - | - |
| 20AE052 | E | 50 | 40 | 47.7 | 49.6 | 52 | 61.5 | 82 | 60 | 110 | 60 | 200 | 200 | 100 | - | - | - | - |

See page 33 for notes.

## 208/240V AC Single-phase Input Drive Ratings and Input Protection Devices

| Cat.No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| **208V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AB2P2 | A | 0.5 | 0.33 | 2.9 | 0.6 | 1.3 | 1.6 | 1.9 | 6 | 6 | 6 | 10 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | 3441 |
| 20AB4P2 | A | 1 | 0.75 | 5.6 | 1 | 2.4 | 2.8 | 3.7 | 10 | 10 | 10 | 17.5 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AB6P8 | B | 2 | 1.5 | 10 | 1.8 | 3.9 | 5.2 | 6.9 | 15 | 15 | 15 | 30 | 30 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AB9P6 | B | 3 | 2 | 14 | 2.6 | 5.5 | 6.1 | 8.3 | 20 | 25 | 20 | 40 | 40 | 30 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB015 | C | 5 | 3 | 16 | 2.9 | 8.6 | 9.6 | 13.3 | 20 | 35 | 20 | 70 | 70 | 30 | 140M-C2E-C20 | 140M-D8E-C20 | 140M-F8E-C20 | 3441 |
| 20AB022 | D | 7.5 | 5 | 23.3 | 4.2 | 12.7 | 13.9 | 19.0 | 30 | 50 | 30 | 100 | 100 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AB028 | D | 10 | 7.5 | 29.8 | 5.4 | 16.1 | 19 | 25.3 | 40 | 70 | 40 | 125 | 125 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AB042 | D | 15 | 10 | 39.8 | 7.2 | 21.5 | 27.8 | 37 | 60 | 100 | 60 | 175 | 175 | 70 | – | – | 140M-F8E-C45 | 5098 |
| 20AB054 | E | 20 | 15 | 57.5 | 10.4 | 31.1 | 36.2 | 48.3 | 80 | 125 | 80 | 200 | 200 | 100 | – | – | – | – |
| 20AB070 | E | 25 | 20 | 72.3 | 13.0 | 39.1 | 46.6 | 62 | 90 | 175 | 90 | 300 | 300 | 100 | – | – | – | – |
| **240V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AB2P2 | A | 0.5 | 0.33 | 2.5 | 0.6 | 1.1 | 1.2 | 1.7 | 3 | 4.5 | 3 | 8 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AB4P2 | A | 1 | 0.75 | 4.8 | 1 | 2.1 | 2.4 | 3.2 | 6 | 9 | 6 | 15 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AB6P8 | B | 2 | 1.5 | 8.7 | 1.8 | 3.4 | 4.5 | 6 | 15 | 15 | 15 | 25 | 25 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AB9P6 | B | 3 | 2 | 12.2 | 2.6 | 4.8 | 5.3 | 7.2 | 20 | 20 | 20 | 35 | 35 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB015 | C | 5 | 3 | 13.9 | 2.9 | 7.7 | 8.7 | 11.6 | 20 | 30 | 20 | 60 | 60 | 30 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AB022 | D | 7.5 | 5 | 19.9 | 4.2 | 11 | 12.2 | 16.5 | 25 | 45 | 25 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AB028 | D | 10 | 7.5 | 25.7 | 5.4 | 14 | 16.5 | 22 | 35 | 60 | 35 | 110 | 110 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AB042 | D | 15 | 10 | 38.7 | 8.1 | 21 | 23.1 | 31.5 | 50 | 90 | 50 | 150 | 150 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AB054 | E | 20 | 15 | 49.8 | 10.4 | 27 | 31.5 | 42 | 60 | 100 | 60 | 200 | 200 | 100 | – | – | – | – |
| 20AB070 | E | 25 | 20 | 64.5 | 13.4 | 35 | 40.5 | 54 | 90 | 150 | 90 | 275 | 275 | 100 | – | – | – | – |

See page 33 for notes.

## 400/480V AC Single-phase Input Drive Ratings and Input Protection Devices

| Cat.No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| **400V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AC1P3 | A | 0.37 | 0.25 | 1.6 | 0.6 | 0.7 | 0.7 | 1.0 | 3 | 3 | 3 | 5 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AC2P1 | A | 0.75 | 0.55 | 2.5 | 0.9 | 1.1 | 1.2 | 1.6 | 4 | 6 | 4 | 8 | 15 | 7 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AC3P5 | A | 1.5 | 1.1 | 4.3 | 1.5 | 1.8 | 2.3 | 3 | 6 | 6 | 6 | 12 | 15 | 7 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AC5P0 | B | 2.2 | 1.5 | 6.5 | 2.3 | 2.5 | 2.8 | 3.8 | 10 | 10 | 10 | 20 | 20 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AC8P7 | B | 4 | 3 | 11.3 | 3.9 | 4.4 | 5.0 | 6.6 | 15 | 17.5 | 15 | 30 | 30 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AC011 | C | 5.5 | 4 | 11 | 3.8 | 5.8 | 6.5 | 8.7 | 15 | 25 | 15 | 45 | 40 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AC015 | C | 7.5 | 5.5 | 15.1 | 5.2 | 7.7 | 8.6 | 11.6 | 20 | 30 | 20 | 60 | 60 | 20 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AC022 | D | 11 | 7.5 | 21.9 | 7.6 | 11 | 12.1 | 16.5 | 30 | 45 | 30 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AC030 | D | 15 | 11 | 30.3 | 10.5 | 15 | 16.5 | 22.5 | 40 | 60 | 40 | 120 | 120 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AC037 | D | 18.5 | 15 | 35 | 12.2 | 18.5 | 22.5 | 30 | 50 | 80 | 50 | 125 | 140 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AC043 | D | 22 | 18.5 | 40.7 | 14.1 | 21.5 | 28 | 37 | 60 | 90 | 60 | 150 | 160 | 70 | – | – | – | – |
| 20AC060 | E | 30 | 22 | 56.8 | 19.7 | 30 | 33 | 45 | 80 | 125 | 80 | 225 | 240 | 80 | – | – | – | – |
| 20AC072 | E | 37 | 30 | 68.9 | 23.9 | 36 | 45 | 60 | 90 | 150 | 90 | 250 | 280 | 100 | – | – | – | – |
| **480V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AD1P1 | A | 0.5 | 0.33 | 1.3 | 0.6 | 0.6 | 0.6 | 0.8 | 3 | 3 | 3 | 4 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AD2P1 | A | 1 | 0.75 | 2.4 | 1 | 1.1 | 1.2 | 1.6 | 3 | 6 | 3 | 8 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |

## 400/480V AC Single-phase Input Drive Ratings and Input Protection Devices (Continued)

| Cat.No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| 20AD3P4 | A | 2 | 1.5 | 3.8 | 1.6 | 1.7 | 2.3 | 3 | 6 | 6 | 6 | 12 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | 3441 |
| 20AD5P0 | B | 3 | 2 | 5.6 | 2.4 | 2.5 | 2.6 | 3.8 | 10 | 10 | 10 | 20 | 20 | 15 | 140M-C2E-B63 | 140M-D8E-B63 | – | 3441 |
| 20AD8P0 | B | 5 | 3 | 9.8 | 4.2 | 4 | 4.4 | 6 | 15 | 15 | 15 | 30 | 30 | 15 | 140M-C2E-C10 | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AD011 | C | 7.5 | 5 | 9.5 | 4 | 5.5 | 6.1 | 8.3 | 15 | 20 | 15 | 40 | 40 | 15 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AD014 | C | 10 | 7.5 | 12.5 | 5.2 | 7 | 8.3 | 11 | 20 | 30 | 20 | 50 | 50 | 20 | 140M-C2E-C16 | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AD022 | D | 15 | 10 | 19.9 | 8.3 | 11 | 12.1 | 16.5 | 25 | 45 | 25 | 80 | 80 | 30 | – | 140M-D8E-C25 | 140M-F8E-C25 | 5098 |
| 20AD027 | D | 20 | 15 | 24.8 | 10.3 | 13.5 | 16.5 | 22 | 35 | 60 | 35 | 100 | 100 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AD034 | D | 25 | 20 | 31.2 | 13 | 17 | 20.3 | 27 | 40 | 70 | 40 | 125 | 125 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AD040 | D | 30 | 25 | 36.7 | 19.9 | 20 | 25.5 | 34 | 50 | 90 | 50 | 150 | 150 | 50 | – | – | 140M-F8E-C45 | 5098 |
| 20AD052 | E | 40 | 30 | 47.7 | 12.8 | 26 | 30 | 40 | 60 | 110 | 60 | 200 | 200 | 70 | – | – | – | – |
| 20AD065 | E | 50 | 40 | 59.6 | 24.8 | 32.5 | 39 | 52 | 80 | 125 | 80 | 250 | 250 | 100 | – | – | – | – |

See page 33 for notes.

## 600V AC Single-phase Input Drive Ratings and Input Protection Devices

| Cat. No. | Frame[1] | Hp Rating | | Input Ratings | | Output Current Rating [A] | | | Dual Element Time Delay Fuse | | Non-time Delay Fuse | | Circuit Breaker (2) | Motor Circuit Protector (3) | 140M Motor Protector with Adjustable Current Range[4][5] | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | ND | HD | Amps | kVA | Cont. | 60 s | 3 s | Min[6] | Max[7] | Min[6] | Max[7] | Max[8] | Max[8] | Available Catalog Numbers[9] | | | Minimum Enclosure Volume (in.$^3$)[10] |
| **600V AC Input** | | | | | | | | | | | | | | | | | | |
| 20AE0P9 | A | 0.5 | 0.33 | 1.3 | 0.7 | 0.5 | 0.6 | 0.7 | 3 | 3 | 3 | 3.5 | 15 | 3 | 140M-C2E-B16 | – | – | 3441 |
| 20AE1P7 | A | 1 | 0.75 | 1.9 | 1 | 0.9 | 1 | 1.3 | 3 | 6 | 3 | 6 | 15 | 3 | 140M-C2E-B25 | 140M-D8E-B25 | – | 3441 |
| 20AE2P7 | A | 2 | 1.5 | 3 | 1.6 | 1.4 | 1.8 | 2.4 | 4 | 6 | 4 | 10 | 15 | 7 | 140M-C2E-B40 | 140M-D8E-B40 | – | 3441 |
| 20AE3P9 | B | 3 | 2 | 4.4 | 2.3 | 2 | 2.2 | 3 | 6 | 8 | 6 | 15 | 15 | 7 | – | 140M-D8E-B63 | – | 3441 |
| 20AE6P1 | B | 5 | 3 | 7.5 | 3.9 | 3.1 | 3.4 | 4.6 | 10 | 12 | 10 | 20 | 20 | 15 | – | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AE9P0 | C | 7.5 | 5 | 7.7 | 4 | 4.5 | 5 | 6.8 | 10 | 20 | 10 | 35 | 35 | 15 | – | 140M-D8E-C10 | 140M-F8E-C10 | 3441 |
| 20AE011 | C | 10 | 7.5 | 9.8 | 5.1 | 5.5 | 6.8 | 9 | 15 | 20 | 15 | 40 | 40 | 15 | – | 140M-D8E-C16 | 140M-F8E-C16 | 3441 |
| 20AE017 | D | 15 | 10 | 15.3 | 8 | 8.5 | 9.4 | 12.8 | 20 | 35 | 20 | 60 | 60 | 30 | – | – | 140M-F8E-C20 | 5098 |
| 20AE022 | D | 20 | 15 | 20 | 10.4 | 11 | 12.8 | 17 | 25 | 45 | 25 | 80 | 80 | 30 | – | – | 140M-F8E-C25 | 5098 |
| 20AE027 | D | 25 | 20 | 24.8 | 12.9 | 13.5 | 16.5 | 22 | 35 | 60 | 35 | 100 | 100 | 50 | – | – | 140M-F8E-C25 | 5098 |
| 20AE032 | D | 30 | 25 | 29.4 | 15.3 | 16 | 20.3 | 27 | 40 | 70 | 40 | 125 | 125 | 50 | – | – | 140M-F8E-C32 | 5098 |
| 20AE041 | E | 40 | 30 | 37.6 | 19.6 | 20.5 | 24 | 32 | 50 | 90 | 50 | 150 | 150 | 100 | – | – | – | – |
| 20AE052 | E | 50 | 40 | 47.7 | 24.8 | 26 | 30.8 | 41 | 60 | 110 | 60 | 200 | 200 | 100 | – | – | – | – |

(1) For IP66 (NEMA / UL Type 4X/12) enclosures, drives listed as Frame A increase to Frame B and drives listed as Frame C increase to Frame D.
(2) Circuit Breaker - inverse time breaker. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(3) Motor Circuit Protector - instantaneous trip circuit breaker. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(4) Bulletin 140M with adjustable current range must have the current trip set to the minimum range that the device does not trip.
(5) Manual Self-Protected (Type E) Combination Motor Controller, UL Listed for 208V Wye or Delta, 240V Wye or Delta, 480V Y/277 or 600V Y/347. Not UL Listed for use on 480V or 600V Delta/Delta, corner ground, or high-resistance ground systems.
(6) Minimum protection device size is the lowest rated device that supplies maximum protection without nuisance tripping.
(7) Maximum protection device size is the highest rated device that supplies drive protection. For US NEC, minimum size is 125% of motor FLA. Ratings that are shown are maximum.
(8) Maximum allowable rating by US NEC. Exact size must be chosen for each installation.
(9) The AIC ratings of the Bulletin 140M Motor Protector Circuit Breakers can vary.
(10) 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 that is specified in this column. Application-specific thermal considerations can require a larger enclosure.

# Mounting

This section includes information for mounting the drives.

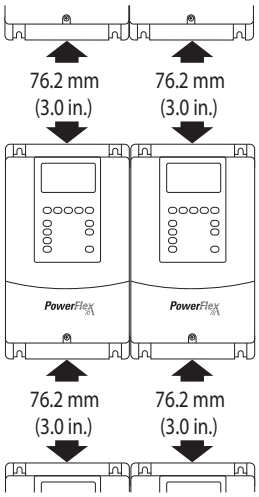
### Maximum Surrounding Air Temperature

| Enclosure Rating | Temperature Range |
|---|---|
| Open Type, IP 20, NEMA / UL Type 1 and flange mount | 0...50 °C (32...122 °F) |
| IP 66, NEMA / UL Type 4X/12 | 0...40 °C (32...104 °F) |
| IP 54, NEMA / UL Type 12 | 0...40 °C (32...104 °F) |

**IMPORTANT** Some drives are equipped with an adhesive label on the top of the chassis. Removing the adhesive label from the drive changes the enclosure rating from NEMA / UL Type 1 Enclosed to Type Open.

## Minimum Mounting Clearances

Specified vertical clearance requirements are intended to be from the drive to the closest object that can restrict airflow through the drive heatsink and chassis. The drive must be mounted in a vertical orientation as shown, and must make full contact with the mounting surface. Do not use standoffs or spacers. In addition, inlet air temperature must not exceed the product specification.




Clearances apply to all PowerFlex 70 Drives:
- Panel Mount
- Flange Mount
- NEMA Type 4X/12

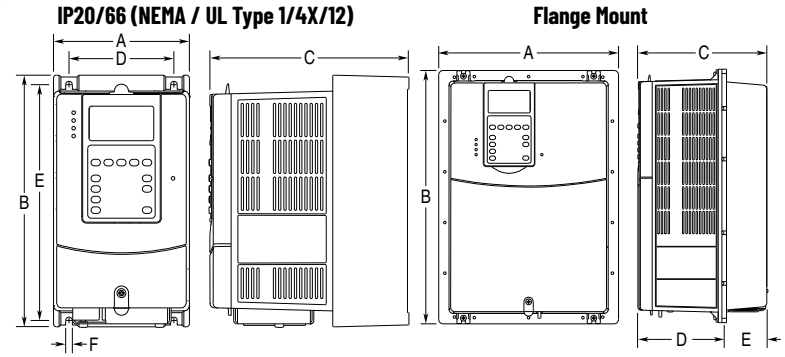
### PowerFlex 70 Frames Output Power

| Output Power | | Frame Size | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| kW ND (HD) | Hp ND (HD) | 208...240V AC Input | | | 400...480V AC Input | | | 600V AC Input | |
| | | *Not Filtered* | *Filtered* | *IP66 (4X/12)* | *Not Filtered* | *Filtered* | *IP66 (4X/12)* | *Not Filtered* | *Filtered* |
| 0.37 (0.25) | 0.5 (0.33) | A | B | B | A | B | B | A | – |
| 0.75 (0.55) | 1 (0.75) | A | B | B | A | B | B | A | – |
| 1.5 (1.1) | 2 (1.5) | B | B | B | A | B | B | A | – |
| 2.2 (1.5) | 3 (2) | B | B | B | B | B | B | B | – |
| 4 (3) | 5 (3) | – | C | D | B | B | B | B | – |
| 5.5 (4) | 7.5 (5) | – | D | D | – | C | D | C | – |
| 7.5 (5.5) | 10 (7.5) | – | D | D | – | C | D | C | – |
| 11 (7.5) | 15 (10) | – | D | D | – | D | D | D | – |
| 15 (11) | 20 (15) | – | E | E | – | D | D | D | – |
| 18.5 (15) | 25 (20) | – | E | E | – | D | D | – | – |
| 22 (18.5) | 30 (25) | – | – | – | – | D | D | – | – |
| 30 (22) | 40 (30) | – | – | – | – | E | E | – | – |
| 37 (30) | 50 (40) | – | – | – | – | E | E | – | – |

# Approximate Dimensions and Weights

This section provides the approximate dimensions for the drives.

## Frames A...E



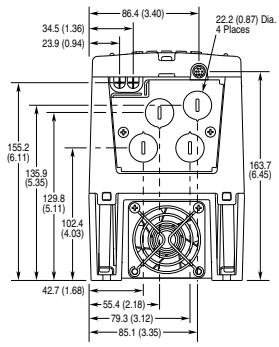

## Frame Dimensions, mm (in.)

| Frame Size | Dimension | | | | | | Weight [3] kg (lb) |
|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | F | |
| | **IP20, NEMA / UL Type 1** | | | | | | |
| A | 122.4 (4.82) | 225.7 (8.89) | 179.8 (7.08) | 94.2 (3.71) | 211.6 (8.33) | 5.8 (0.23) | 2.71 (6.0) |
| B | 171.7 (6.76) | 234.6 (9.24) | 179.8 (7.08) | 122.7 (4.83) | 220.2 (8.67) | 5.8 (0.23) | 3.60 (7.9) |
| C | 185.0 (7.28) | 300.0 (11.81) | 179.8 (7.08) | 137.6 (5.42) | 285.6 (11.25) | 5.8 (0.23) | 6.89 (15.2) |
| D | 219.9 (8.66) | 350.0 (13.78) | 179.8 (7.08) | 169.0 (6.65) | 335.6 (13.21) | 5.8 (0.23) | 9.25 (20.4) |
| E [1] | 280.3 (11.04) | 555.8 (21.88) | 207.1 (8.15) | 200.0 (7.87) | 491.0 (19.33) | 6.9 (0.27) | 18.60 (41.0) [1] |
| | **IP66, NEMA / UL Type 4X/12** | | | | | | |
| B | 171.7 (6.76) | 239.8 (9.44) | 203.3 (8.00) | 122.7 (4.83) | 220.2 (8.67) | 5.8 (0.23) | 3.61 (8.0) |
| D | 219.9 (8.66) | 350.0 (13.78) | 210.7 (8.29) | 169.0 (6.65) | 335.6 (13.21) | 5.8 (0.23) | 9.13 (20.1) |
| E [1][2] | 280.3 (11.04) | 555.8 (21.88) | 219.8 (8.65) | 200.0 (7.87) | 491.0 (19.33) | 6.9 (0.27) | 18.60 (41.0) [1] |
| | **Flange Mount** | | | | | | |
| A | 156.0 (6.14) | 225.8 (8.89) | 178.6 (7.03) | 123.0 (4.84) | 55.6 (2.19) | – | 2.71 (6.0) |
| B | 205.2 (8.08) | 234.6 (9.24) | 178.6 (7.03) | 123.0 (4.84) | 55.6 (2.19) | – | 3.60 (7.9) |
| C | 219.0 (8.62) | 300.0 (11.81) | 178.6 (7.03) | 123.0 (4.84) | 55.6 (2.19) | – | 6.89 (15.2) |
| D | 248.4 (9.78) | 350.0 (13.78) | 178.6 (7.03) | 123.0 (4.84) | 55.6 (2.19) | – | 9.25 (20.4) |
| E | 280.3 (11.04) | 555.8 (21.88) | 207.1 (8.15) | 117.2 (4.61) | 89.9 (3.54) | – | 18.60 (41.0) |

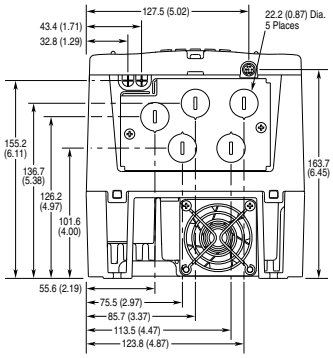
(1) IP20 and IP66 frame E drives are manufactured with a flange-like heatsink with mounting holes.
(2) Frame E is also available in IP54 NEMA/UL Type 12 as a wall/machine mount.
(3) Weights include HIM and standard I/O.

## IP20, NEMA / UL Type 1 Bottom View Dimensions, mm (in.)

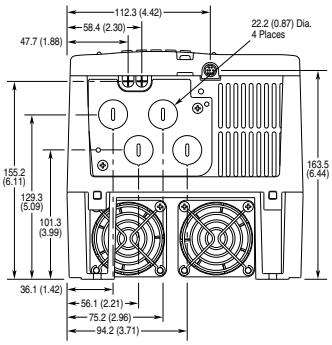
**Frame A(1)**



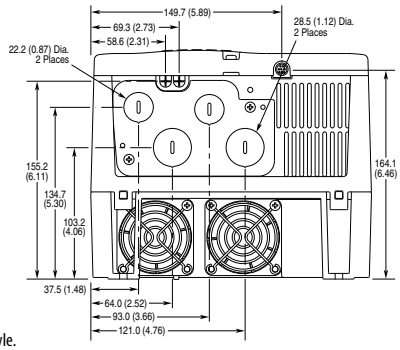

**Frame B (1)**



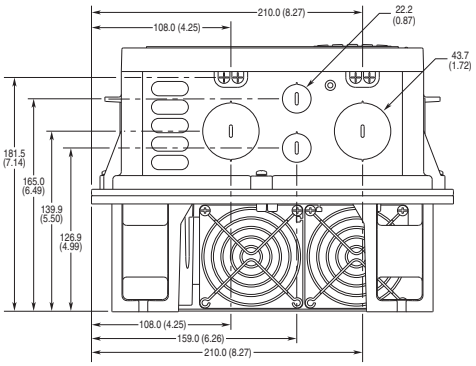

**Frame C**




**Frame D**



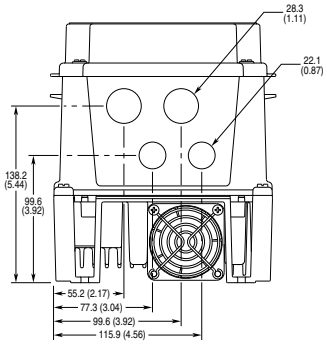

**Frame E(2)**



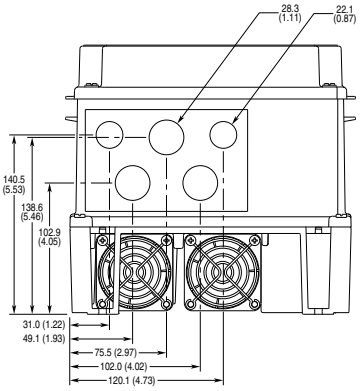

(1) Fan existence is dependent on drive rating and package style.
(2) Flange style heatsink on NEMA1.

## IP 66 (NEMA / UL Type 4X/12) Bottom View Dimensions, mm (in.)

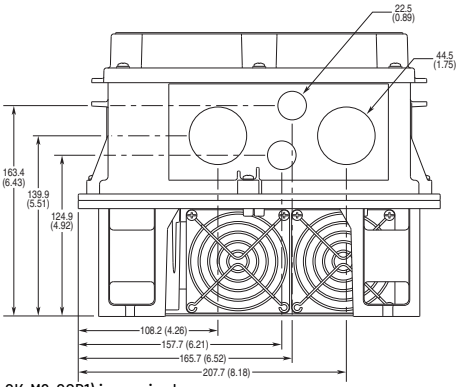
**Frame B (1)**




**Frame D (1)**



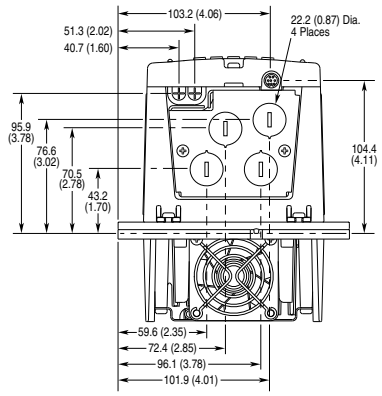

**Frame E (1)(2)**



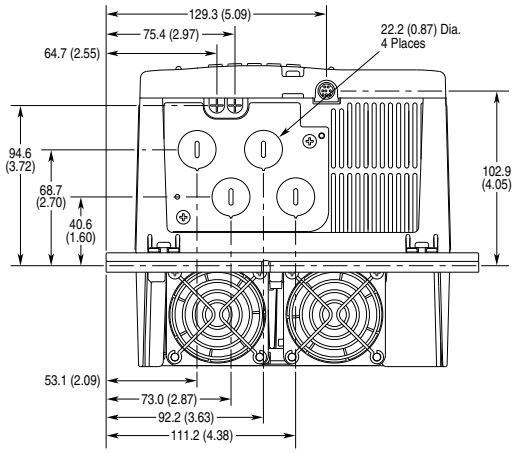

(1) DPI Port 2 is not accessible from outside of the drive standard. A service connection board (catalog number SK-M9-SCB1) is required.
(2) Frame E is also available in IP54 NEMA/UL Type 12 as a wall/machine mount.

## Flange Mount Bottom View Dimensions, mm (in.)

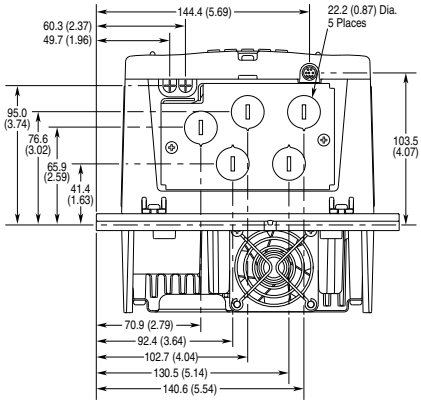
### Frame A



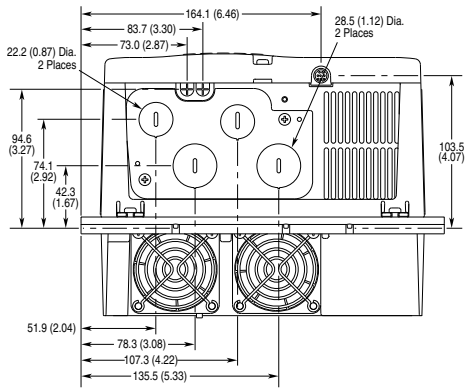

### Frame C



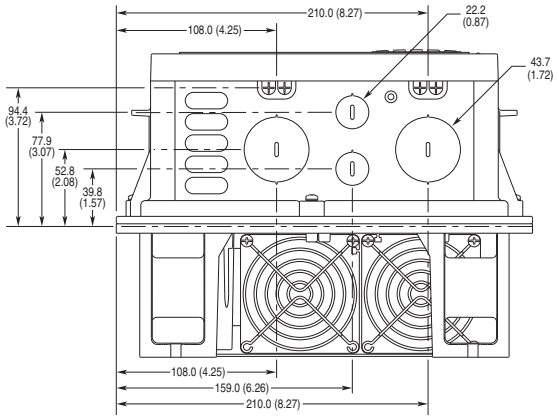

### Frame B




### Frame D

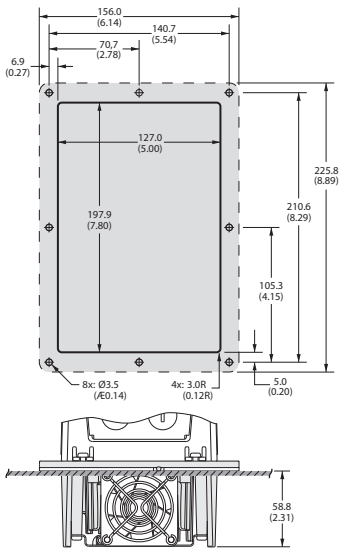



### Frame E

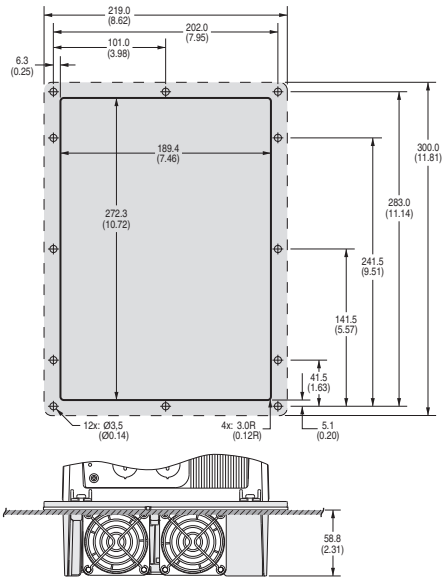


## Cutout Dimensions, mm (in.)

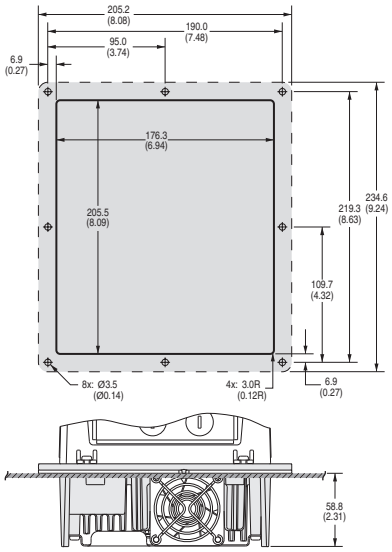
### Frame A



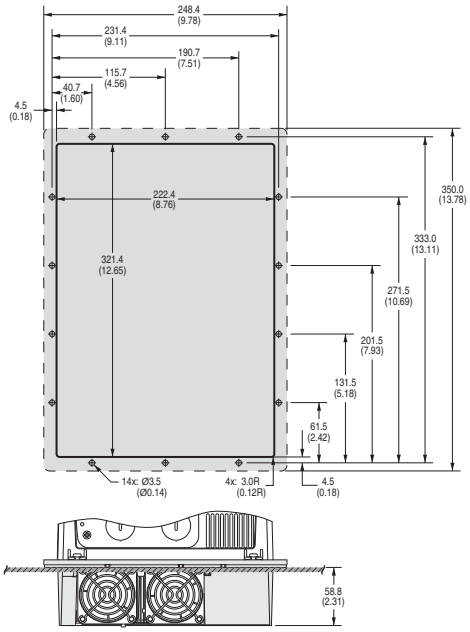

### Frame C




### Frame B

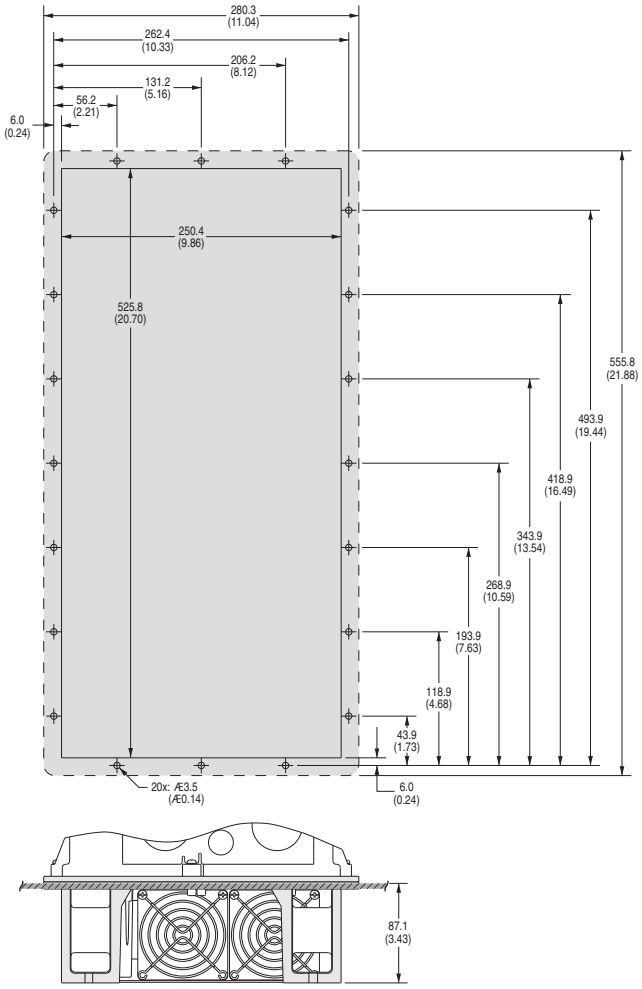



### Frame D



## Cutout Dimensions, mm (in.) (continued)

**Frame E**



# Standard Drive Certifications and Specifications

The tables in this section provide certification information and technical specifications.

## Certifications[1]

| Certifications | Description | Frames | |
|---|---|---|---|
| | | **A...E** 240...480V | **A...E** 600V |
| **ABS** | American Bureau of Shipping MA Certificate 08-HS303172A-3-PDA for auxiliary services on AB Classed vessels and offshore platforms | X | X |
| **RCM** | Certified by Rockwell Automation to be in conformity with the requirements of the applicable Australian legislation and standards that are referenced here: IEC 61800-3 | X | |
| **c-UL-us** | Listed to UL508C and CAN/CSA C22.2 No. 274-13<br>Configured drives can be listed to UL508A | X | X |
| **CE** | Certified by Rockwell Automation to be in conformity with the essential requirements of the applicable European Directives. The following standards have been applied: | – | – |
| | **2014/35/EU (Low Voltage Directive)**<br>EN 61800-5-1 Electronic Equipment for Use in Power Installations | X | X |
| | **2014/30/EU (EMC Directive)**<br>EN 61800-3 Adjustable speed electrical power drive systems - Part 3: EMC requirements and specific test methods | X | |
| **EAC** | Low Voltage TR CU 004/2011<br>EMC TR CU 020/2011 | X | X |
| **Efficiency Class** | Ecodesign regulation (EU) 2019/1781, IE2 efficiency class, refer to PowerFlex AC Drive Performance Specifications per Ecodesign Regulation (EU) 2019/1781, publication PFLEX-TD003 for additional information. | X | X |
| **SEMI F47** | SEMI F47 compliance, 480V units were tested. | X | |
| **Functional Safety** | TÜV Rheinland Certificate 01/205/0665.02/21<br>Safe Torque Off (STO) complies with the requirements of the relevant standards (Cat. 3 / PLd according to EN ISO 13849-1, SIL CL 2 according to EN ISO 13849-1, and SIL 2 according to EN 62061 / IEC 61508. | X | |
| **Korean KC Registration** | **R-R-RAA-Drive**<br>See the certificate of registration for specific drive catalog numbers that have this certification.[2] | X | X |
| **Lloyd's Register** | Lloyd's Register Type Approval Certificate 08/60014 (E1) (marine certification) (for drives manufactured before June 5, 2018) | X | |
| **Morocco** | Compliance to NM EN 61800-5-1 | X | X |
| **Plenum Rating** | Listed to UL508C<br>Suitable for installation in a compartment handling conditioned air. [2] | | |
| **Trentec** | Tested by Trentec to be compliant with AC156 Acceptance Criteria for Seismic Qualification Testing of Nonstructural Components and 2003 International Building Code for worst-case seismic level for USA excluding site class F | X | X |
| **UKCA** | Compliance to EN 61800-3, EN 61800-5-1, EN IEC 63000 | X | X |
| **Designed to Meet Applicable Requirements** | IEC 61800-2 – Adjustable speed electrical power drive systems - Part 2: General requirements - Rating specifications for low voltage adjustable frequency AC power drive systems | X | X |
| | NEMA ICS 7.1 – Safety Standards for Construction and Guide for Selection, Installation, and Operation of Adjustable Speed Drive Systems | X | X |
| | NFPA 70 – US National Electric Code | X | X |
| | NSF – Type 4X enclosure NSF Listed to meet Criteria C2 for splash and non-food zones | X | X |

(1) See the Rockwell Automation Product Certification page for current certifications, rok.auto/certifications.
(2) Flange mount enclosure, Frames A...D only.

## Specifications

| Category | Specification | | | | | |
|---|---|---|---|---|---|---|
| | **Drive** | **200... 208V** | **240V** | **380/400** | **480V** | **600V** |
| | AC input overvoltage trip | 247V AC | 285V AC | 475V AC | 570V AC | 690V AC |
| | AC input undervoltage trip | 120V AC | 138V AC | 233V AC | 280V AC | 345V AC |
| | Bus overvoltage trip | 405V DC | 405V DC | 810V DC | 810V DC | 1013V DC |
| | Bus undervoltage output shutoff | 153V DC | 153V DC | 305V DC | 437V DC | 437V DC |
| | Bus undervoltage fault level | 160V DC | 160V DC | 300V DC | 300V DC | 375V DC |
| | Bus voltage nom | 281V DC | 324V DC | 540V DC | 648V DC | 810V DC |
| | All Drives | | | | | |
| **Protection** | Heatsink thermistor | Monitored by microprocessor overtemp trip | | | | |
| | Drive overcurrent trip:<br>• Software current limit<br>• Hardware current limit<br>• Instantaneous current limit | • 20...160% of rated current<br>• 200% of rated current (typical)<br>• 220...300% of rated current (dependent on drive rating) | | | | |
| | Line transients | Up to 6000 volts peaks per IEEE C62.41-1991 | | | | |
| | Control logic noise immunity | Showering arc transients up to 1500V peak | | | | |
| | Power ride-through | 15 ms at full load | | | | |
| | Logic control ride-through | 0.5 s min, 2 s typ | | | | |
| | Ground fault trip | Phase-to-ground on drive output | | | | |
| | Short circuit trip | Phase-to-phase on drive output | | | | |
| **Environment** | Altitude | 1000 m (3300 ft) max without derating | | | | |
| | Maximum surrounding air temperature without derating:<br>• IP20, NEMA / UL Type 1<br>• flange mount<br>• IP66, NEMA / UL Type 4X/12 (indoor) | • 0...50 °C (32...122 °F)<br>• 0...50 °C (32...122 °F)<br>• 0...40 °C (32...104 °F) | | | | |
| | Cooling fan operation:<br>• Frames A and C<br>• Frames B, D, and E | • Fan operates when power is applied.<br>• Fan operates when power is applied and in Run condition. | | | | |
| | Storage temperature (all const.) | -40...+70 °C (-40...+158 °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 immediately, store the drive where it is not exposed to a corrosive atmosphere. | | | | |
| | Relative humidity | 5...95% non-condensing | | | | |
| | Shock | 15 g peak for 11 ms duration (±1.0 ms) | | | | |
| | Vibration | 0.152 mm (0.006 in.) displacement, 1 g peak | | | | |
| | Pollution degree of the surrounding environment:<br>• Pollution degree 1 and 2<br>• Pollution degree 3 and 4<br>See Pollution Degree Ratings According to EN 61800-5-1 for descriptions of pollution degree rating. | • All enclosures are acceptable for pollution degree 1 and 2.<br>• An enclosure that meets or exceeds IP54, NEMA / UL Type 12, is required for pollution degree 3 and 4. | | | | |

## Pollution Degree Ratings According to EN 61800-5-1

| Pollution Degree | Description |
|---|---|
| 1 | One of the following is true:<br>• No pollution occurs.<br>• Only dry non-conductive pollution occurs, and has no influence. |
| 2 | Normally only non-conductive pollution occurs. Occasionally a temporary conductivity, caused by condensation, is expected when the drive is out of operation. |
| 3 | At least one of the following is true:<br>• Conductive pollution occurs.<br>• Dry non-conductive pollution occurs and becomes conductive due to condensation. |
| 4 | The pollution generates persistent conductivity that is caused, for example, by conductive dust, rain, or snow. |

## Specifications

| Category | Specification | |
|---|---|---|
| Electrical | Voltage tolerance | -10% of minimum, +10% of maximum. See the PowerFlex 70 Adjustable Frequency AC Drives User Manual, publication 20A-UM001, for Full Power and Operating Range. |
| | Input frequency tolerance | 47...63 Hz |
| | Input phases | Three-phase input provides full rating for all drives. Single-phase operation provides 50% of rated current. |
| | Displacement power factor (all drives) | 0.98 across speed range. |
| | Efficiency | 97.5% at rated amps, line volts nom. |
| | Short circuit rating max | 200,000 amps symmetrical. |
| | Short circuit current rating max (by using the recommended fuse or circuit breaker type) | Maximum short circuit current rating to match specified fuse/circuit breaker capability. |
| | Drive to motor power ratio:<br>• Minimum<br>• Maximum | <br>• Recommended not less than 1:2 ratio<br>• Recommended not greater than 2:1 ratio |
| Control | Method | Sine coded PWM with programmable carrier frequency. Ratings apply to all drives. |
| | Carrier frequency | 2, 3, 4, 5, 6, 7, 8, 9, and 10 kHz Standard.<br>2, 4, 8, and 12 kHz EC.<br>Drive rating based on 4 kHz. |
| | Output voltage range | 0 to rated motor voltage |
| | Output frequency range | 0...400 Hz Standard. 0...500 Hz EC. |
| | Frequency accuracy:<br>• Digital input<br>• Analog input | <br>• Within ±0.01% of set output frequency.<br>• Within ±0.4% of maximum output frequency. |
| | Frequency control - speed regulation | with slip compensation (Volts per Hertz mode)<br>0.5% of base speed across 40:1 speed range<br>40:1 operating range<br>10 rad/sec bandwidth |
| | | with slip compensation (Sensorless Vector mode)<br>0.5% of base speed across 80:1 speed range<br>80:1 operating range<br>20 rad/sec bandwidth |
| | | with feedback (Sensorless Vector mode) EC<br>0.001% of base speed across 40:1 speed range<br>0.1% of base speed across 80:1 speed range<br>80:1 operating range<br>20 rad/sec bandwidth |
| | Speed control - speed regulation | without feedback (Vector Control mode) EC<br>0.1% of base speed across 120:1 speed range<br>120:1 operating range<br>30 rad/sec bandwidth |
| | | with feedback (Vector Control mode) EC<br>0.001% of base speed across 120:1 speed range<br>1000:1 operating range<br>125 rad/sec bandwidth |
| | Torque regulation | without feedback +/-10% EC |
| | | with feedback +/-5% EC |
| | Selectable motor control | Sensorless Vector with full tuning. Standard VHz with full custom capability and vector control. |
| | Stop modes | Multiple programmable stop modes including - Ramp, Coast, DC-Brake, Fast Brake, Ramp to Hold, and S-curve. |
| | Accel/Decel | Two independently programmable accel and decel times. Each time can be programmed from 0...3600 seconds in 0.1 second increments |
| | Intermittent overload | 110% Overload capability for up to 1 minute<br>150% Overload capability for up to 3 seconds |
| | Current limit capability | Proactive current limit programmable from 20...160% of rated output current.<br>Independently programmable proportional and integral gain. |
| | Motor overload protection | 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 E59272. |

## Specifications (Continued)

| Category | Specification | |
|---|---|---|
| Encoder | Type | Incremental, dual channel |
| | Supply | 5V/12V Configurable ±5% |
| | Quadrature | 90° ±27° |
| | Duty cycle | 50% +10% |
| | Requirements[1] | Encoders must be line driver type, quadrature (dual-channel), or pulse (single-channel), single-ended or differential and capable of supplying 10 mA min per channel.<br>The encoder interface board accepts 5V or 12V DC square-wave with a high state voltage of 3.5V DC min (5V mode), and 7.0V DC min (12V mode).<br>Low state voltage max is 1V DC (for both 5V and 12V modes).<br>Input frequency max is 250 kHz. |

(1) Drive is not CE EMC certified when the encoder interface option is installed.

## Watts Loss (rated load, speed, and PWM) [1]

| Voltage | ND Hp | External Watts | Internal Watts | Total Watts Loss |
|---|---|---|---|---|
| 208V | 0.5 | 12.2 | 19.2 | 31.4 |
| | 1.0 | 30.7 | 20.5 | 51.2 |
| | 2.0 | 44.6 | 22.6 | 67.2 |
| | 3.0 | 67.3 | 25.4 | 92.7 |
| | 5.0 | 141.3 | 33.2 | 174.5 |
| | 7.5 | 205.7 | 34.2 | 239.9 |
| | 10 | 270.4 | 48.1 | 318.5 |
| | 15 | 385.6 | 40.3 | 425.9 |
| | 20 | 494.6 | 44.9 | 539.5 |
| | 25 | 650.7 | 51.6 | 702.3 |
| 240V | 0.5 | 12.2 | 19.2 | 31.4 |
| | 1.0 | 30.7 | 20.5 | 51.2 |
| | 2.0 | 44.6 | 22.6 | 67.2 |
| | 3.0 | 67.3 | 25.4 | 92.7 |
| | 5.0 | 141.3 | 33.2 | 174.5 |
| | 7.5 | 205.7 | 34.2 | 239.9 |
| | 10 | 270.4 | 48.1 | 318.5 |
| | 15 | 385.6 | 40.3 | 425.9 |
| | 20 | 494.6 | 44.9 | 539.5 |
| | 25 | 650.7 | 51.6 | 702.3 |
| 400V | 0.37 | 11.5 | 17.9 | 29.4 |
| | 0.75 | 27.8 | 19.5 | 47.3 |
| | 1.5 | 43.6 | 21.6 | 65.2 |
| | 2.2 | 64.6 | 24.0 | 88.6 |
| | 4.0 | 99.5 | 28.2 | 127.7 |
| | 5.5 | 140.0 | 27.8 | 167.8 |
| | 7.5 | 193.3 | 32.0 | 225.3 |
| | 11 | 305.4 | 34.2 | 339.6 |
| | 15 | 432.9 | 42.9 | 475.8 |
| | 18.5 | 363.8 | 40.5 | 404.3 |
| | 22 | 396.8 | 41.5 | 438.3 |
| | 30 | 500.8 | 50.0 | 550.8 |
| | 37 | 632.0 | 57.7 | 689.7 |
| 400V (cont.) | 0.5 | 11.5 | 17.9 | 29.4 |
| | 1.0 | 27.8 | 19.5 | 47.3 |
| | 2.0 | 43.6 | 21.6 | 65.2 |
| | 3.0 | 64.6 | 24.0 | 88.6 |
| | 5.0 | 99.5 | 28.2 | 127.7 |
| | 7.5 | 140.0 | 27.8 | 167.8 |
| | 10 | 193.3 | 32.0 | 225.3 |
| | 15 | 305.4 | 34.2 | 339.6 |
| | 20 | 432.9 | 42.9 | 475.8 |
| | 25 | 363.8 | 40.5 | 404.3 |
| | 30 | 396.8 | 41.5 | 438.3 |
| | 40 | 500.8 | 50.0 | 550.8 |
| | 50 | 632.0 | 57.7 | 689.7 |
| 480V | 0.5 | 11.5 | 17.9 | 29.4 |
| | 1.0 | 27.8 | 19.5 | 47.3 |
| | 2.0 | 43.6 | 21.6 | 65.2 |
| | 3.0 | 64.6 | 24.0 | 88.6 |
| | 5.0 | 99.5 | 28.2 | 127.7 |
| | 7.5 | 140.0 | 27.8 | 167.8 |
| | 10 | 193.3 | 32.0 | 225.3 |
| | 15 | 305.4 | 34.2 | 339.6 |
| | 20 | 432.9 | 42.9 | 475.8 |
| | 25 | 363.8 | 40.5 | 404.3 |
| | 30 | 396.8 | 41.5 | 438.3 |
| | 40 | 500.8 | 50.0 | 550.8 |
| | 50 | 632.0 | 57.7 | 689.7 |
| 600V | 0.5 | 11.5 | 17.9 | 29.4 |
| | 1.0 | 27.8 | 19.5 | 47.3 |
| | 2.0 | 43.6 | 21.6 | 65.2 |
| | 3.0 | 64.6 | 24.0 | 88.6 |
| | 5.0 | 99.5 | 28.2 | 127.7 |
| | 7.5 | 140.0 | 27.8 | 167.8 |
| | 10 | 193.3 | 32.0 | 225.3 |
| | 15 | 305.4 | 34.2 | 339.6 |
| | 20 | 432.9 | 42.9 | 475.8 |
| | 25 | 281.4 | 42.4 | 323.8 |
| | 30 | 311.9 | 43.4 | 355.3 |
| | 40 | 389.9 | 51.8 | 441.7 |
| | 50 | 501.4 | 59.9 | 561.3 |

(1) Worst case condition including Enhanced Control board, HIM, and Communication Module.

# Voltage Tolerance

This section provides information to help you determine the voltage tolerance for your drive installation.

### Voltage Tolerance[1]

| Drive Rating | Line Voltage nom | Motor Voltage nom | Drive Full Power Range | Drive Operating Range |
|---|---|---|---|---|
| 200...240 | 200 | 200[2] | 200...264 | 180...264 |
| | 208 | 208 | 208...264 | |
| | 240 | 230 | 230...264 | |
| 380...480 | 380 | 380[2] | 380...528 | 342...528 |
| | 400 | 400 | 400...528 | |
| | 480 | 460 | 460...528 | |
| 500...600 | 600 | 575[2] | 575...660 | 432...660 |

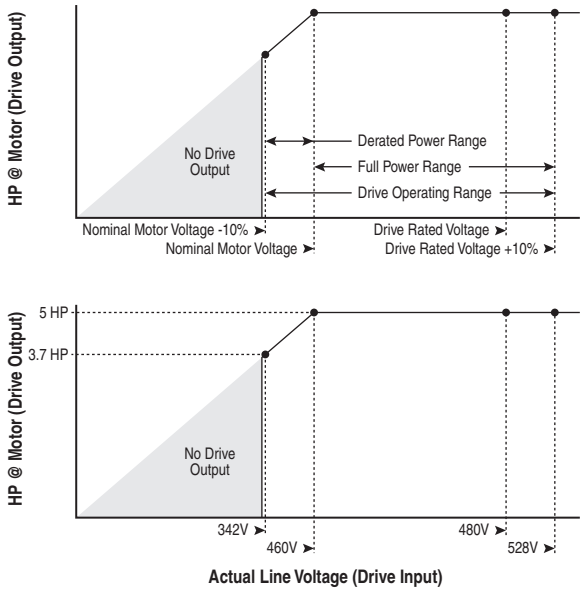
(1) Drive full power range = Nominal motor voltage to drive rated voltage +10%. Rated current is available across the entire drive full power range.
(2) Drive operating range = Lowest nominal motor voltage -10% to drive rated voltage +10%. Drive output is linearly derated when actual line voltage is less than the nominal motor voltage.

**EXAMPLE:**

Calculate the maximum power of a 5 Hp, 460V motor connected to a 480V rated drive supplied with 342V actual line voltage input.

- Actual Line Voltage / Nominal Motor Voltage = 74.3%
- 74.3% × 5 Hp = 3.7 Hp
- 74.3% × 60 Hz = 44.6 Hz

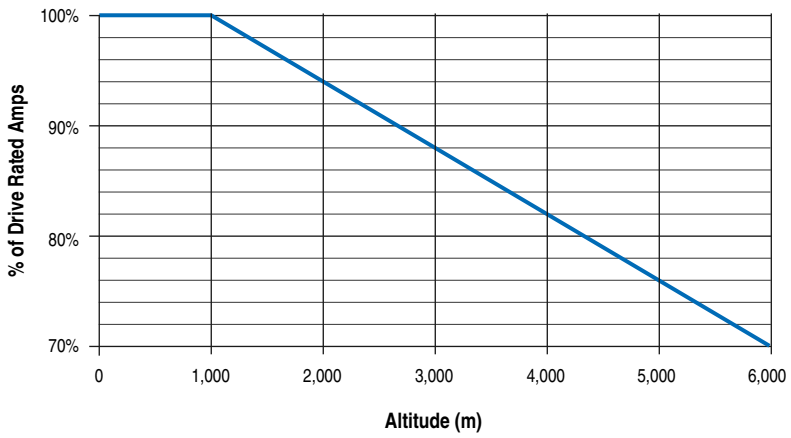
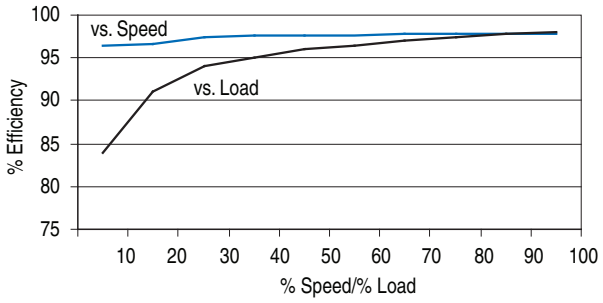
At 342V actual line voltage, the maximum power the 5 Hp, 460V motor can produce is 3.7 Hp at 44.6 Hz.



# Derating Guidelines

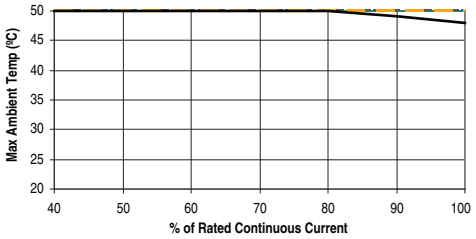
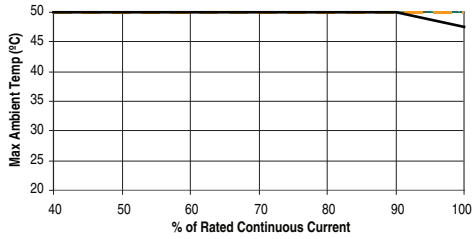
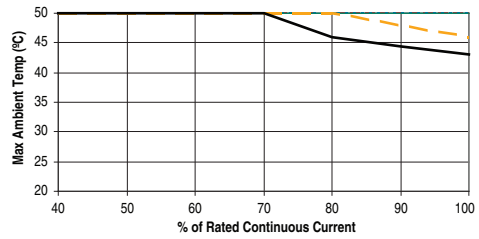
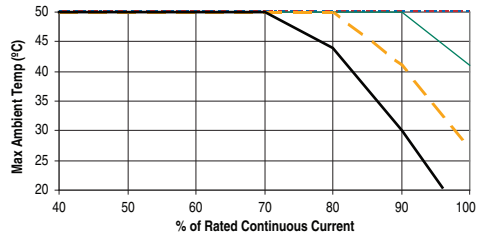
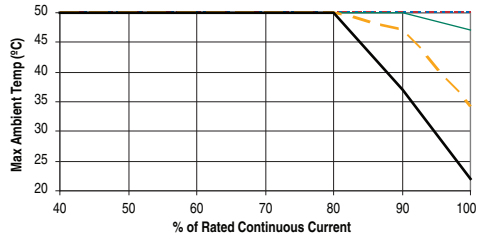
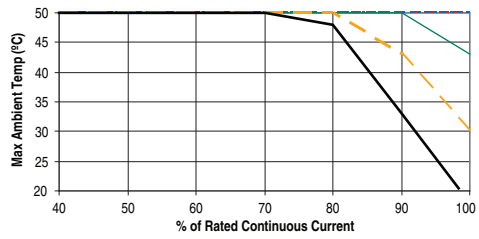
Follow these guidelines for derating your drive installation.

## Altitude and Efficiency

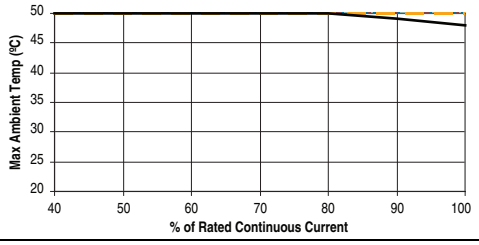
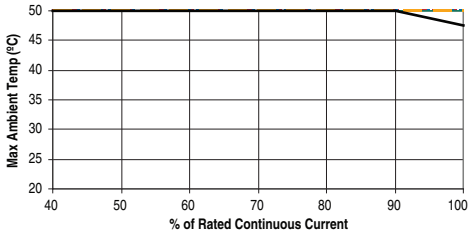
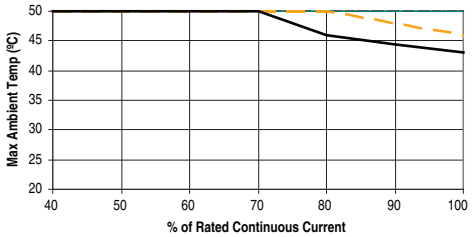
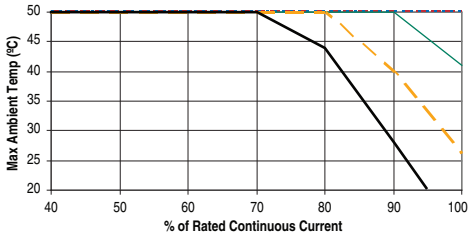
| Frame | Type | Derate |
|---|---|---|
| All | Altitude |  |
| | Efficiency (typical) |  |

# Ambient Temperature/Load

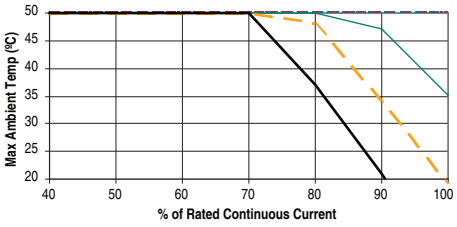
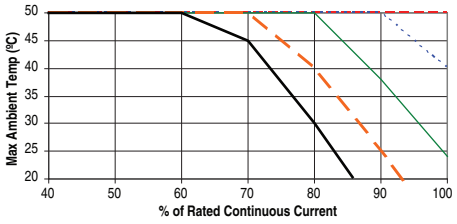
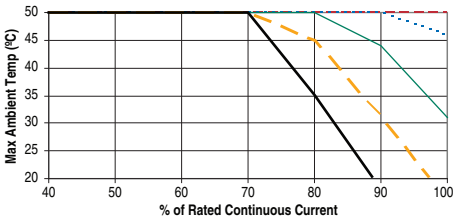
## 240V AC

| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND Hp | HD Hp | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **240 Volts** | | |
| 0.5...3.0 | 0.33...2.0 | None |
| 5.0 | 3.0 |  |
| 7.5 | 5.0 |  |
| 10 | 7.5 |  |
| 15 | 10 |  |
| 20 | 15 |  |
| 25 | 20 |  |

## 400V AC

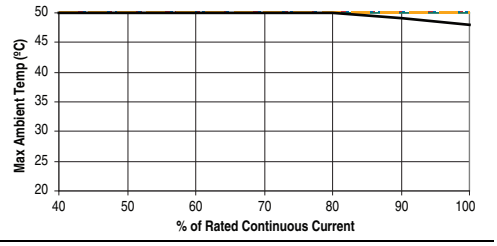
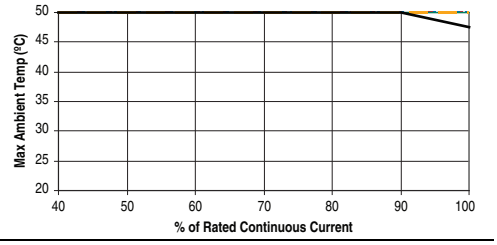
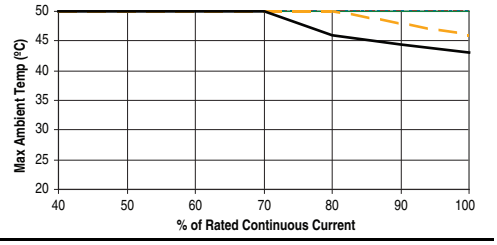
| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND kW | HD kW | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **400 Volts** | | |
| 0.37...5.5 | 0.25...4.0 | None |
| 7.5 | 5.5 |  |
| 11 | 7.5 |  |
| 15 | 11 |  |
| 18.5 | 15 |  |

## 400V AC (Continued)

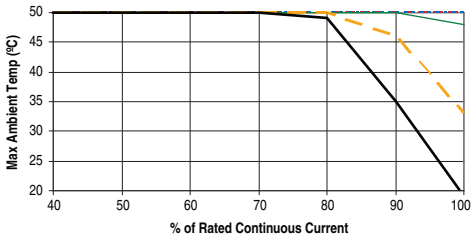
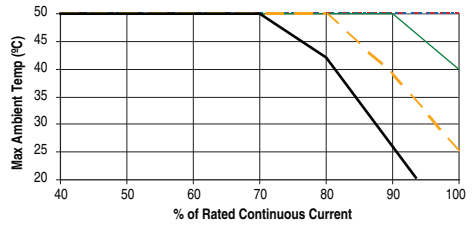
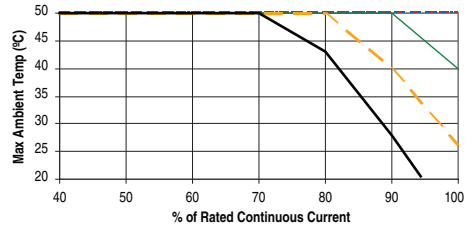
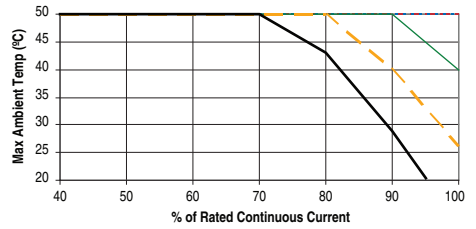
| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND kW | HD kW | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **400 Volts** | | |
| 22 | 18.5 |  |
| 30 | 22 |  |
| 37 | 30 |  |



## 480V AC

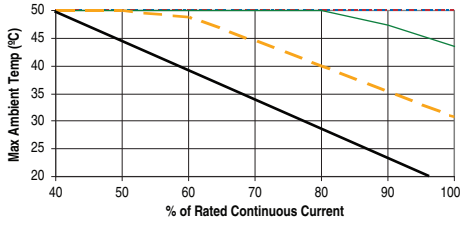
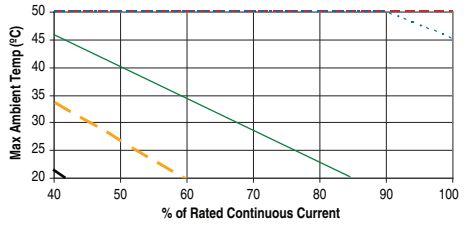
| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND Hp | HD Hp | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **480 Volts** | | |
| 0.5...7.5 | 0.33...5.0 | None |
| 10 | 7.5 |  |
| 15 | 10 |  |
| 20 | 15 |  |

## 480V AC (Continued)

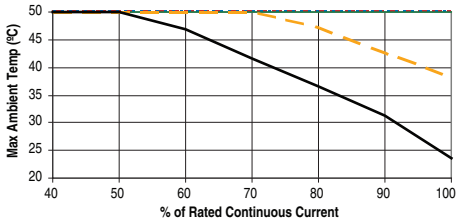
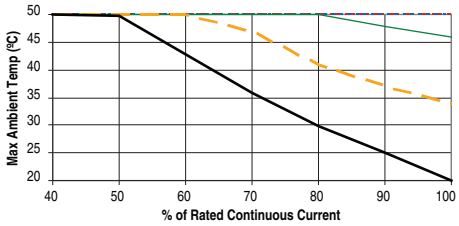
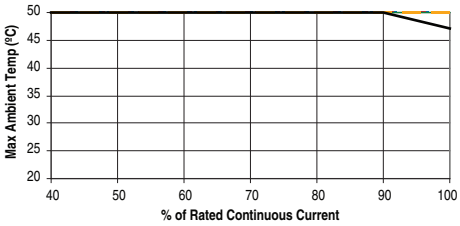
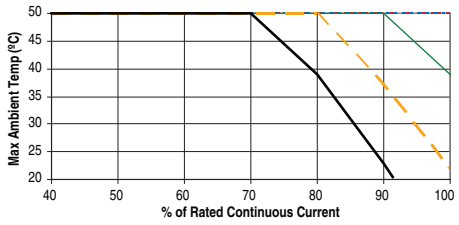
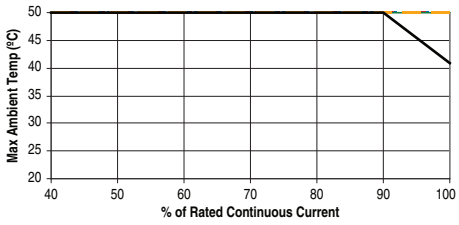
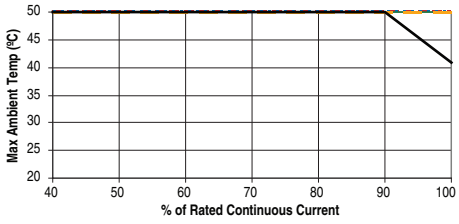
| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND Hp | HD Hp | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **480 Volts** | | |
| 25 | 20 |  |
| 30 | 25 |  |
| 40 | 30 |  |
| 50 | 40 |  |



## 600V AC

| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND Hp | HD Hp | 2 kHz 4 kHz 6 kHz 8 kHz 10 kHz |
| **600 Volts** | | |
| 0.5...5.0 | 0.33...3.0 | None |
| 7.5 | 5.0 |  |
| 10 | 7.5 |  |

## 600V AC (Continued)

| PowerFlex 70 Power Rating | | Derating |
|---|---|---|
| ND Hp | HD Hp | 2 kHz, 4 kHz, 6 kHz, 8 kHz, 10 kHz |
| **600 Volts** | | |
| 15 | 10 |  |
| 20 | 15 |  |
| 25 | 20 |  |
| 30 | 25 |  |
| 40 | 30 |  |
| 50 | 40 |  |

# Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

| Resource | Description |
|---|---|
| Preventive Maintenance of Industrial Control and Drive System Equipment, publication DRIVES-TD001 | Provides a guide to performing preventive maintenance. |
| PowerFlex 70 Adjustable Frequency AC Drive User Manual, publication 20A-UM001 | Provides the basic information that is needed to start up and troubleshoot the PowerFlex® 70 Adjustable Frequency AC Drive. |
| PowerFlex 70 EC and 700 VC Reference Manual, publication PFLEX-RM004 | Provides detailed drive information including operation, parameter descriptions, and programming. |
| PowerFlex 70 and 700 Adjustable Frequency AC drives Reference Manual, publication PFLEX-RM001 | Provides detailed information for specifications and dimensions, operation, and dynamic brake selection for the drive. |
| PowerFlex 70 Adjustable Frequency AC Drive Installation Instructions, publication 20A-IN009 | Provides the five basic steps that are needed to install and perform a basic start up of the PowerFlex 70 drive. |
| Wiring and Grounding Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-IN001 | Provides the basic information that is needed to properly wire and ground Pulse Width Modulated (PWM) AC drives. |
| Communication adapter options, publications 20COMM-UM*xxx* | Provides the information to install the communication option kit based on the 20-COMM-X that is chosen. By searching the specific COMM card, a detailed description of the card features and parameters can be explored. These communication cards are optional and vary depending on configuration. |
| PowerFlex DriveGuard Safe Torque Off User Manual - Series B. publication PFLEX-UM003 | Provides compatibility information for using the DriveGuard® Safe Torque Off option, with PowerFlex 40P or PowerFlex 70 drives and other safety components. |
| Industry Installation Guidelines for Pulse Width Modulated (PWM) AC Drives, publication DRIVES-AT003 | Provides basic information for enclosure systems and environmental/ location considerations (to help protect against environmental contaminants), and power and grounding considerations that are needed to properly install AC drives. |
| Safety Guidelines for the Application, Installation, and Maintenance of Solid State Control, publication SGI-1.1 | Provides general guidelines for the application, installation, and maintenance of solid-state control. |
| Guarding Against Electrostatic Damage, publication 8000-4.5.2 | Provides practices for guarding against Electrostatic damage (ESD) |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |

You can view or download publications at rok.auto/literature.

You can access declarations of conformity, certificates, and other certification details at: rok.auto/certifications.

## Rockwell Automation Support

Use these resources to access support information.

| | | |
|---|---|---|
| **Technical Support Center** | Find help with how-to videos, FAQs, chat, user forums, and product notification updates. | rok.auto/support |
| **Knowledgebase** | Access Knowledgebase articles. | rok.auto/knowledgebase |
| **Local Technical Support Phone Numbers** | Locate the telephone number for your country. | rok.auto/phonesupport |
| **Literature Library** | Find installation instructions, manuals, brochures, and technical data publications. | rok.auto/literature |
| **Product Compatibility and Download Center (PCDC)** | Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes. | rok.auto/pcdc |

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## Waste Electrical and Electronic Equipment (WEEE)

At the end of life, this equipment should be collected separately from any unsorted municipal waste.



Rockwell Automation maintains current product environmental compliance information on its website at rok.auto/pec.

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