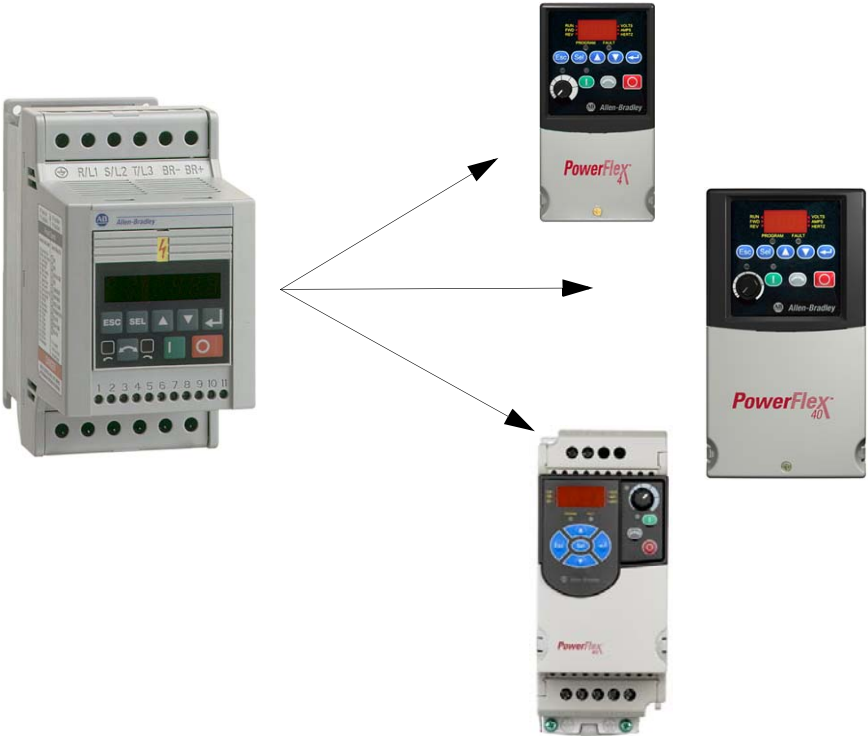




Allen-Bradley

Bulletin 160 to PowerFlex® 4M, 4 & 40 Conversion Guide



Rockwell Automation's Technical Representatives and highly trained Distributor Drives Specialists will help you transition to the New, World-Class PowerFlex 4M, 4 or 40 AC Drive

**Rockwell
Automation**

Overview of PowerFlex 4M

Providing users with powerful motor speed control in a compact, space saving design, the Allen-Bradley PowerFlex 4M AC drive is the smallest and most cost effective member of the PowerFlex family of drives. Ideal for machine level speed control, the PowerFlex 4M drive provides the application versatility to meet the demands of global OEMs and end users who require space savings and easy-to-use AC drives that provide application flexibility, feed-through wiring and ease-of-programming.



The PowerFlex 4M AC drive is available in three frame sizes (A, B and C) and power ratings from 0.2 to 11 kW (0.25 to 15 Hp) and in voltage classes of 120, 240 and 480 volts.

Product Features

- DIN Rail Mounting Design
- Feed-through Wiring Design
- Versatile Programming and Network Solutions
- Energy Savings with Speed Control and Regulation

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Specifications and Features

| Drive Model | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 | |
|-----------------------|----------------------|---|--|---|--|
| <i>Catalog Number</i> | 160-AAxxxx | 22F-xxxxxxx | 22A-xxxxxxx | 22B-xxxxxxx | |
| Power Ratings | 120V | N/A | 0.25 - 1.5 HP (0.2 - 1.1 kW) | 0.25-1.5 HP (0.2-1.1 kW) | 0.5-1.5 HP (0.4-1.1 kW) |
| | 240V, 1-Phase | 0.5-2 HP (0.37-1.5 kW) | 0.25 - 3 HP (0.2 - 2.2 kW) | 0.25-3 HP (0.2-2.2 kW) | 0.5-3 HP (0.4-2.2 kW) |
| | 240V, 3-Phase | 0.5-5 HP (0.37-4.0 kW) | 0.25 - 10 HP (0.2 - 7.5 kW) | 0.25-5 HP (0.2-3.7 kW) | 0.5-10 HP (0.4-7.5 kW) |
| | 480V | 0.5-5 HP (0.37-4.0 kW) | 0.5 - 15 HP (0.4 - 11 kW) | 0.5-5 HP (0.4-3.7 kW) | 0.5-15 HP (0.4-11 kW) |
| | 575V | N/A | N/A | N/A | 1-15 HP (0.75-11 kW) |
| | Normal Duty Overload | | | | |
| | Continuous | N/A | N/A | N/A | N/A |
| | 1 Minute | N/A | N/A | N/A | N/A |
| | 3 Seconds | N/A | N/A | N/A | N/A |
| | Heavy Duty Overload | | | | |
| | Continuous | 100% | 100% | 100% | 100% |
| | 1 Minute | 150% | 150% | 150% | 150% |
| | 3 Seconds | 200% for 30 Sec. | 200% for 3 Sec. | 200% for 3 Sec. | 200% |
| | Power Wiring | Feed through | Feed through | Bottom Fed | Bottom Fed |
| Specifications | Frequency Control | 240 Hz Max. | 400 Hz Max | 240 Hz Max. | 400 Hz Max. |
| | PWM Frequency | 2-8 kHz | 2 - 10 kHz | 2-16 kHz | 2-16 kHz |
| | Enclosures Types | Open, Type IP20, Type 12/4/4X IP40/54/65 all Frames Heatsink Out the Back | Open, Type IP20 | Open, Type IP20, Type 1 IP30 (with kit), Type 1/12/4/ 4X IP40/54/65 all Frames Heatsink Out the Back | Open, Type IP20, Type 1 IP30 (with kit), Type 1/12/4/ 4X IP40/54/65 C Frame Heatsink Out the Back |
| | Ambient Temp | 0° to 50° C Open 0° to 40° C IP66 (NEMA 12/4/4X) | -10° to 50° C | -10° to 50° C | -10° to 50° C |
| | Torque Control | | | | |
| | Open Loop Accuracy | N/A | | | |
| | Closed Loop Accuracy | N/A | | | |
| | Speed Control | | | | |
| | Open Loop Accuracy | 1% - 40:1 | ±2% across 40:1 Speed Range, with Slip Comp. | ±2% across 40:1 Speed Range, with Slip Comp. | 1% across 80:1 Speed Range, with Slip Comp. |
| | Closed Loop Accuracy | N/A | N/A | N/A | N/A |
| | HP w/DC Link Choke | N/A | N/A | N/A | 15 Hp |
| | HP w/AC line Choke | N/A | N/A | N/A | N/A |
| | Volt Tolerance | ±10% | | | |
| | Frequency Tolerance | 47-63 Hz | | | |
| Compliance Marks | CE, UL, cUL, C-Tick | | | | |
| Maximum Altitude | 1000m | | | | |

Specifications and Features *(continued)*

| Drive Model | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 | |
|---------------------------|--|---|---|---|--|
| <i>Catalog Number</i> | 160-AAxxxx | 22F-xxxxxxx | 22A-xxxxxxx | 22B-xxxxxxx | |
| Hardware | EMC Filtering | External-1 ϕ , External-3 ϕ | Internal - 1 ϕ & 3 ϕ , External - 3 ϕ | Internal-1 ϕ , External-3 ϕ | Internal-1 ϕ 230V only, External- 3 ϕ |
| | Heatsink Out the Back | Yes, All Frames | No | Yes, All Frames | Yes, All Frames |
| | Zero Stacking | Yes | Yes | Yes | Yes |
| | Internal DB Transistor | Yes, all Frames | C frame only (7.5 HP and higher) | 0.5-5 HP | 0.5-15 HP |
| | Internal DB Resistor Option | No | N/A | N/A | N/A |
| | Encoder Input Standard | N/A | N/A | N/A | N/A |
| | Additional Feedback Options | N/A | N/A | N/A | No |
| | Number of Comms. Supported Simultaneously in Drive | 1 | 0 | 0 | 1 |
| | Removable MOV to Ground | No | Yes | Yes | Yes |
| | Safe-Off | No | No | No | N/A |
| Max. Short Circuit Rating | 100,000A | 100,000A | 100,000A | 100,000A | |
| Inputs/Outputs | Standard Discrete Inputs | 3 - 24V Sink/ Source (Start/ Stop/Prog. Input Mode) | 5 - 24V Sink/ Source (3 - Start/ Stop/Reverse, 2 - Fully Prog.) | 5 - 24V Sink/ Source (3 - Start/ Stop/Reverse, 2 - Fully Prog.) | 7 -- 24V Sink/ Source (3 - Start/ Stop/Reverse, 4 - Fully Prog.) |
| | Analog Inputs | 1 - (Bipolar 0-10 V or Unipolar 4-20 mA) | 1 unipolar (0-10 V or 4-20 mA) | 1 Unipolar (0-10V or 4-20 mA) | 1 Bipolar, \pm 10V or 4-20 mA, 1 Unipolar 4-20mA |
| | Discrete Outputs | 1-Form C Relay | 1 - Form C Relay | 1-Form C Relay | 1-Form C Relay, 2-optos |
| | Analog Outputs | No | No | No | 1 - (0-10V or 4-20 mA) |
| | Pulse Output | No | No | No | No |
| | Optional I/O Voltage | 115V | N/A | N/A | N/A |
| | PTC Input | No | No | No | Yes (Analog In) |
| | Encoder Input | No | No | No | No |
| | Pulse Input | No | No | No | No |
| | Additional I/O | N/A | N/A | N/A | No |
| | Input Timer / Counter Functions | No | No | No | Yes |
| | Output Timer / Counter Functions | No | No | No | No |
| Encoder Output | No | No | No | No | |

Specifications and Features *(continued)*

| Drive Model | | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 |
|-----------------------------|--|-------------------------------------|-------------------------------------|-------------------------------------|-------------------------------------|
| Catalog Number | | 160-AAxxxx | 22F-xxxxxxxx | 22A-xxxxxxxx | 22B-xxxxxxxx |
| Input/Output Specifications | Digital Input Scan Time (Not Through Put Time) | 10m seconds | 2 ms | 2 ms | 1 ms |
| | Analog Input Resolution | 10 Bit | 10 Bit | 10 Bit | 10 Bit |
| | Analog Input Scan Time (Not Through Put Time) | 8 ms | 12 ms | 12 ms | 10 ms |
| | Analog Output Resolution | N/A | N/A | N/A | 10 Bit |
| | Analog Output Scan Time (Not Through Put Time) | N/A | N/A | N/A | 10 ms |
| HIM Information | HIM - Local LCD | No | | | |
| | HIM - Remote LCD | Yes | | | |
| | HIM - Hand-held | Yes | | | |
| | HIM - CopyCat function | Yes | | | |
| | HIM - Languages | (1) Remote HIM | (7) Remote HIM | (7) Remote HIM | (7) Remote HIM |
| | HIM - Local LED | Yes, including pot and control keys | Yes, including pot and control keys | Yes, including pot and control keys | Yes, including pot and control keys |
| | HIM - Auto/ Manual function | No | No (Yes - Remote HIM) | No (Yes-Remote HIM) | No (Yes-Remote HIM) |
| Features | Motor Control Type | V/Hz | V/Hz | V/Hz | V/Hz and Sensorless Vector |
| | Flying Start | No | Yes | Yes | Yes |
| | Bus Regulator | Yes | No | No | Yes |
| | S - Curve | Yes | Yes | Yes | Yes |
| | Drive Overload Protection | Yes | Yes | Yes | Yes |
| | Advanced Diagnostics | No | | | |
| | Input Phase Loss | No | | | |
| | User Sets | No | | | |
| | Preset Speeds | 8 | 4 | 4 | 8 |
| | Process Control Loop | Yes | No | No | PID |
| | Fast Flux Up | No | | | |
| | Fast Brake to Stop | No | | | |
| | Flux Braking | No | | | |
| | Feedback Loss Switchover | No | | | |
| | Battery Back-up | No | | | |
| Multi-Motor Parameters | No | | | | |

Specifications and Features *(continued)*

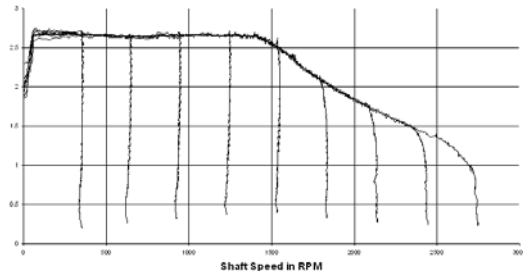
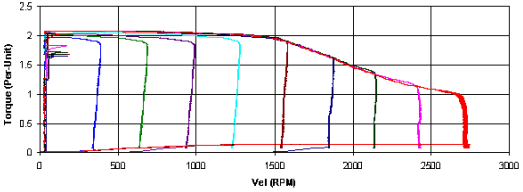
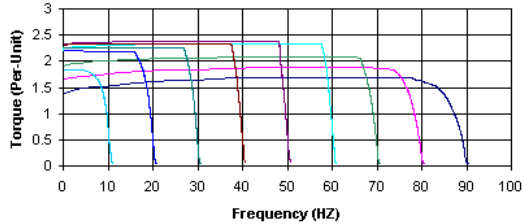
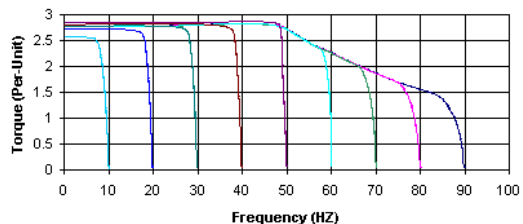
| Drive Model | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 | |
|-----------------------------|-------------------------------|--------------|--------------|--------------|----------------------------|
| <i>Catalog Number</i> | 160-AAxxxx | 22F-xxxxxxx | 22A-xxxxxxx | 22B-xxxxxxx | |
| Application Features | SynchLink | No | | | |
| | Motion Controller | No | | | |
| | Inertia Adaptation | No | | | |
| | Power Up Time | 0.8 Sec. | 1.5-2.5 Sec. | 1.5-2.5 Sec. | 1.5-2.5 Sec. |
| | Speed Profiles | No | No | No | Step Logic |
| | Position Control | No | No | No | Basic, Using Digital Input |
| | P-jump (traverse function) | No | | | |
| | Lifting Application | No | | | |
| | Winder Application | No | | | |
| | Electronic Gearing/Line Shaft | No | | | |

Dimensions

| Bulletin 160 | | | | PowerFlex 4M | | | |
|--------------|--------------|-------------|-------------|--------------|--------------|-------------|-------------|
| Frame/ HP | Height mm | Width mm | Depth mm | Frame/ HP | Height mm | Width mm | Depth mm |
| A/0.5-3 | 152 | 80 | 165.4 | A/0.5- 2 | 174 | 72 | 136 |
| B/5 | 192.5 | 92 | 193.3 | B/3-5 | 174 | 100 | 136 |
| | | | | C/7.5-10 | 260 | 130 | 180 |

| PowerFlex 4 | | | | PowerFlex 40 | | | |
|--------------|--------------|-------------|-------------|--------------|--------------|-------------|-------------|
| Frame/ HP | Height mm | Width mm | Depth mm | Frame/ HP | Height mm | Width mm | Depth mm |
| A/0.5-2 | 152 | 80 | 136 | B/0.5-5 | 180 | 100 | 136 |
| B/3-5 | 180 | 100 | 136 | C/7.5-15 | 260 | 130 | 180 |
| | | | | | | | |





Torque Performance

| Drive | | Notes |
|--------------|---|---------------------------------------|
| Bulletin 160 |  | Reflects optimized parameter settings |
| PowerFlex 4M |  | Reflects factory default settings |
| PowerFlex 4 |  | Reflects factory default settings |
| PowerFlex 40 |  | Reflects factory default settings |

Terminal Comparison

| Description | Terminal Designation | | | |
|----------------------------|----------------------|--------------|-------------|-------------------|
| | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 |
| Input AC Line - R(L1) | R (L1) | R (L1) | R (L1) | R (L1) |
| Input AC Line - S(L2) | S (L2) | S (L2) | S (L2) | S (L2) |
| Input AC Line - T(L3) | T (L3) | T (L3) | T (L3) | T (L3) |
| Motor - U (T1) | U (T1) | U (T1) | U (T1) | U (T1) |
| Motor - V (T2) | V (T2) | V (T2) | V (T2) | V (T2) |
| Motor - W (T3) | W (T3) | W (T3) | W (T3) | W (T3) |
| Brake Resistor | BR+ | BR+ | BR+ | BR+ |
| Brake Resistor | BR- | BR- | BR- | BR- |
| DC Bus - | DC- | DC- | | DC- |
| DC Bus + | DC+ | DC+ | | DC+ |
| DC Bus Inductor Connection | | | | P2 (C Frame Only) |
| DC Bus Inductor Connection | | | | P1 (C Frame Only) |
| Motor Ground | PE | PE | PE | PE |
| Drive Ground | PE | PE | PE | PE |
| Analog Input 1 Comm. | 3 | 14 | 14 | 14 |
| Analog Input 1 (+/-) | 2 - (0-10V) | 13 | 13 | 13 |
| Shield | | | | 19 |
| Analog Input 2 Comm. | 3 | | | |
| Analog Input 2 (+/-) | 4 - (4-20 mA) | | | |
| Analog Input 3 (NTC-) Com. | | | | |
| Analog Input 3 (NTC+) | | | | |
| Shield | | | | |
| Analog Output 1 (-) | | | | |
| Analog Output 1 (+) | | | | |
| Analog Common | | | | |
| Analog Output 2 (-) | | | | |
| Analog Output 2 (+) | | | | |
| +10v Reference | 1 | 12 | 12 | 12 |
| Reference Common | 3 | 14 | 14 | 14 |
| -10V Reference | | | | |
| Encoder A | | | | |
| Encoder A (Not) | | | | |
| Encoder B | | | | |
| Encoder B (Not) | | | | |
| Encoder Z | | | | |
| Encoder Z (Not) | | | | |

Terminal Comparison *(continued)*

| Description | Terminal Designation | | | |
|--|---|---|---|---|
| |  |  |  |  |
| | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 |
| Encoder Reference (+) | | | | |
| Encoder Reference (-) | | | | |
| Encoder Shield | | | | |
| 24V DC Common (-) | 7 | | | |
| 24V DC Source (+) | | 11 | 11 | 11 |
| Digital/Relay Output 1(N.O) | 11 | R1 | R1 | R1 |
| Digital/Relay Output 1Com. | 10 | R2 | R2 | R2 |
| Digital/Relay Output 1(N.C) | 9 | R3 | R3 | R3 |
| Digital/Relay Output 2 (N.O) | | | | |
| Digital/Relay Output 2 Com. | | | | |
| Digital/Relay Output 2 (N.C) | | | | 17 |
| Digital/Relay Output 3 (NC) | | | | 18 |
| Digital/Relay Output 3 Com. | | | | |
| Digital/Relay Output 3 (NO) | | | | |
| Digital/Relay Output 4 (NC) | | | | |
| Digital/Relay Output 4 Com. | | | | |
| Digital/Relay Output 4 (NO) | | | | |
| Digital Input 1-3 Comm. | 7 | 4 | 4 | 4 |
| Digital Input 1 | 5 | 1 | 1 | 1 |
| Digital Input 2 | 6 | 2 | 2 | 2 |
| Digital Input 3 | 8 | 3 | 3 | 3 |
| Digital Input 4-6 Comm. | | 4 | 4 | 4 |
| Digital Input 4 | | 5 | 5 | 5 |
| Digital Input 5 | | 6 | 6 | 6 |
| Digital Input 6 | | | | 7 |
| Digital Input 7 | | | | 8 |
| Digital Input 8 | | | | |
| Digital Input 9 | | | | |
| Digital Input 10 | | | | |
| 48V Control Power Supply | | | | |
| +24V User Output | | | | |
| Drive Enable (Secure Disable Function) | Enabled could be terminal #8 | | | |
| HW PTC Input 1 | | | | |
| HW PTC Input 2 | | | | |

Communications

| Product Model Number | Bulletin 160 | PowerFlex 4M | PowerFlex 4 | PowerFlex 40 |
|----------------------|--------------|--------------------------|--------------------------|--------------------------|
| DF1 | Yes | Yes (with SCM adapter) | Yes (with SCM adapter) | Yes (with SCM adapter) |
| AS-i | No | No | No | No |
| BACnet | No | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| CANopen | No | No | No | No |
| CC-Link | No | No | No | No |
| ControlNet | No | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| Data Highway | No | No | No | No |
| DeviceNet | Yes | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| Ethernet | No | No | No | No |
| EtherNet/IP | No | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| FIP I/O | No | No | No | No |
| Foundation Fieldbus | No | No | No | No |
| Interbus | Yes | No | No | No |
| LonWorks | No | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| Metasys N2 | No | No | No | No |
| Modbus ASCII | No | No | No | No |
| Modbus Plus | No | No | No | No |
| Modbus RTU | No | Yes (Standard) | Yes (Standard) | Yes (Standard) |
| Modbus TCP/IP | No | No | No | No |
| PROFIBUS DP | Yes | Yes (with X-Comm) | Yes (with X-Comm) | Yes |
| PROFINET | No | No | No | No |
| Remote I/O | No | No | No | No |
| SERCOS | No | No | No | No |
| Siemens P1 | No | No | No | No |
| Uni-Telway | No | No | No | No |
| USB | No | Yes (with USB converter) | Yes (with USB converter) | Yes (with USB converter) |

Software

| Description | Software Feature | DriveTools SP/DriveExplorer |
|----------------------------|------------------------|--|
| Software Versions | Full version | Yes |
| | 'Lite' version | Yes (freeware) |
| | Pocket PC version | Yes |
| | Palm version | No |
| Connectivity | Serial Point-to-Point | Yes |
| | Serial Multi-drop | Yes |
| | Ethernet Direct | Yes |
| | ControlNet | Yes |
| | DeviceNet | Yes |
| | Profibus DP | No |
| | Bluetooth | Yes |
| | WiFi | Yes |
| | Other / Proprietary | Yes |
| | Select Features | Offline capability |
| Setup Wizards | | Yes |
| Diagram Views | | Yes |
| User-created Views | | Yes |
| I/O Terminal Configuration | | No |
| Control | | Yes |
| Oscilloscope / Graph | | Yes |
| Project Management | | No |
| Flash | | Yes |
| File Conversion Tool | | Yes |
| On-line Help | | Yes |
| Multi-language | | English only |
| Used With ... | | PowerFlex 7-Class, PowerFlex 4-Class, SMC Flex, 160, SCANport-based products |

Notes

Support Information

Distributor Sticker Here

Rockwell Automation Office Sticker Here

Rockwell Automation-Mequon

Tel: (1) 262.512.8200

Internet

Drives Home Page

www.ab.com/drives

Literature Library

www.rockwellautomation.com/literature

Drives Service & Support Page

www.ab.com/support/abdrives

PowerFlex Public Forum

www.ab.com/support/abdrives

PowerFlex Private Forum

www.ab.com/support/abdrives

Energy Savings Information

http://www.ab.com/drives/energy_savings/index.html