PowerFlex® 525 AC Drive

Allen-Bradley

The Next Generation of PowerFlex® Compact Drives

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Allen-Bradley • Rockwell Software

Rockwell Automation

The New **PowerFlex® 525** AC Drive

The Next Generation of Powerful Performance and Flexible Control

The new Allen-Bradley® PowerFlex® 525 AC drive delivers an innovative design that is remarkably versatile and can accommodate systems ranging from standalone machines to simple system integration.

By combining a variety of motor control options, communications, energy savings and standard safety features in a cost-effective drive, the PowerFlex 525 drive is suitable for a wide array of applications.

See how the PowerFlex 525 AC drive can help you maximize your system performance and reduce your time to design and deliver better machines.

Leading Class

- Power ratings of 0.4 to 22 kW/0.5 to 30 Hp at 380/480V; global voltage classes from 100-600V
- The modular design features an innovative removable control module that allows installation and configuration at the same time to help increase productivity
- An embedded port for EtherNet/IP™ supports seamless integration into the Logix environment and EtherNet/IP networks
- An optional dual port EtherNet/IP card provides more connectivity options, including device level redundancy (DLR) functionality
- Simplify programming with intuitive software and configure drives faster using a standard USB interface
- A dynamic LCD human interface module (HIM) supports multiple languages and features descriptive QuickView™ scrolling text
- Get your drive up and running faster with application specific parameter groups for applications like conveyors, mixers, pumps and fans using the AppView™ tool
- Define your own group of parameters with the CustomView™ tool
- Help reduce energy costs with Economizer mode, energy monitoring features and permanent magnet motor control
- Help protect personnel with embedded Safe Torque-Off
- Endures high ambient temperatures up to 50°C (122°F); and with current derating and a control module fan kit, up to 70°C (158°F)
- A wide range of motor control, including volts per hertz, sensorless vector control, closed loop velocity vector control and control for permanent magnet motors
- Offers a very compact footprint relative to its power range


DANGER
Power
R/L1
S/L2
T/L3
Motor
U/T1
V/T2
W/T3
PowerFlex
525

Innovative, **Modular Design**

Ease Installation and Configuration

The PowerFlex 525 AC drive is made up of two modules that can be detached for simultaneous and independent wiring and software configuration.

This innovative design allows you to begin mounting the power modules while configuration of the control module is performed elsewhere, expediting installation. The same control module accommodates the entire power range of the PowerFlex 525 AC drive, which offers a power rating of 0.4 to 22 kW/0.5 to 30 Hp with global voltage classes of 100 to 600V.

Configuring the control module while the power module is being installed is fast and convenient with MainsFree™ configuration. Simply connect the PowerFlex 525 drive to your PC with a standard USB cable, and you can quickly upload and download new settings to the drive using Connected Components Workbench software.

The PowerFlex 525 AC drive can accommodate an optional accessory communication card and encoder card at the same time while maintaining its compact footprint.

- Modular design for simultaneous configuration and installation
- The same control module for the entire power range
- MainsFree configuration allows the control module to be powered from the USB connection
- Simultaneous support for two accessory cards without affecting footprint

Ease of **Programming**

Tools Make It Simple

There are several ways to quickly and easily configure PowerFlex 525 AC drives. From the built-in human interface module (HIM), to Connected Components Workbench™ or the Studio 5000™ environment, we provide you with powerful, intuitive tools to help enhance your user experience and reduce your development time so you can deliver machines faster and more efficiently.

QuickView™ Scrolling Text

The dynamic LCD human interface module (HIM) supports multiple languages and displays parameter numbers and other codes followed by simple descriptions in scrolling text. These QuickView™ details allow users to easily understand what each code means, saving time.

- Five-digit, 16-segment liquid crystal display HIM with scrolling descriptive text
- Supports multiple languages

Connected Components Workbench™

Connected Components Workbench™ software supports PowerFlex drives as well as Micro800 controllers and PanelView™ component graphic terminals. This software uses Rockwell Automation and Microsoft® Visual Studio® technologies for fast and easy drive configuration.

With Connected Components Workbench, you can quickly and easily configure your PowerFlex 525 AC drives with online or offline configuration, a linear list

Download Connected Components Workbench software at:
http://www.ab.com/go/ccws/

parameter editor, application programming groups and custom parameter groups that can help reduce your development time. The software provides a convenient development tool that allows you to add devices using simple drag-and-drop functionality.

- Supports plug-and-play connectivity through a standard USB connection
- Provides application programming groups

Application Programming Groups

The AppView™ tool is another powerful feature to speed up your PowerFlex 525 drive configuration. This feature, available through the HIM, Connected Components Workbench and Studio 5000 Logix Developer, provides parameter groups for several of the most common applications, including conveyors, mixers, compressors, pumps and blowers. With the settings to run these applications already in place, you can get your machine up and running faster, increasing your productivity.

You can customize your machine and further reduce future design and development time by quickly defining your own group of parameters using the CustomView™ tool. This configuration option, which is also available through the HIM, Connected Components Workbench and Studio 5000 Logix Designer, allows you to customize your configuration by adding or removing parameters from an AppView group or save your own custom group of parameters.

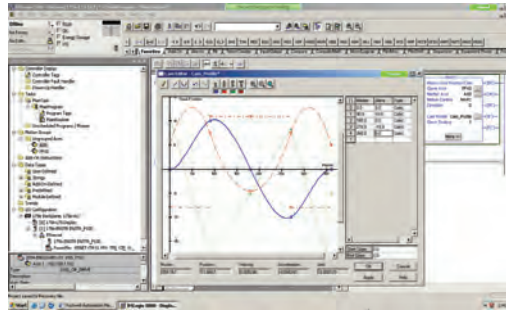
- AppView configuration provides parameters for common applications
- Create and save a user defined group of parameters using the CustomView tool

Premier **Integration**

Streamline Development, Use and Maintenance

The power of Rockwell Automation® Integrated Architecture™ combined with the communication capabilities of PowerFlex 525 AC drives offer an exceptional level of integration that can reduce development costs and time.

You can benefit from Premier Integration with add-on profiles (AOPs) for PowerFlex 525 AC drives and Allen-Bradley programmable automation controllers (PACs). The Studio 5000 Logix Designer application can help reduce programming time by automatically populating drive parameters in the controller memory as controller tags. These AOPs for PowerFlex drives also place themselves in the I/O tree, eliminating mismatch errors and further reducing configuration time. Configuration files from Studio 5000 Logix Designer can transfer directly to the PowerFlex 525 AC drive over EtherNet/IP, allowing for fluid, dynamic updates.



The Studio 5000 Logix Designer application provides complete support for PowerFlex 525 AC drives.

Automatic Device Configuration (ADC) is another productivity enhancing feature available with the Studio 5000 environment and PowerFlex 525 drives. This feature, enabled by EtherNet/IP, allows a Logix controller to automatically detect a replaced PowerFlex 525 drive and download firmware and all configuration parameters, minimizing the need for manual reconfiguration.

Only PowerFlex drives with embedded EtherNet/IP networking can help reduce maintenance time and increase productivity with Automatic Device Configuration.

- Single software environment to configure your entire system
- Add-on profiles provide seamless integration into the Logix environment
- Automatic Device Configuration downloads configuration parameters to a replaced drive

Studio 5000

The Studio 5000 environment is the new design and management suite from Rockwell Automation. Using the Studio 5000 Logix Designer application, you can configure your PowerFlex 525 drives similarly to previous versions of *RSLogix 5000™.

Use a single software tool to reduce your programming time, ease startup and commissioning and streamline diagnostics.

*PowerFlex 525 AC drives are compatible with RSLogix 5000 (v17 and higher)

Scaling to **Any Solution**

Single Control Platform

When you combine the PowerFlex 525 AC drive with a Logix controller, you can gain an enhanced Integrated Architecture ideal for Midrange Systems, allowing you to select the right control system to match your needs and standardize on a single software tool.

The Midrange System is a control architecture that can adjust to suit your changing control system requirements. With an embedded port for EtherNet/IP, Safe Torque-Off and a variety of motor control, PowerFlex 525 AC drives accommodate these scalable, modular control systems with the safety, performance and information management capabilities to match your application's requirements.

The PowerFlex 525 AC drive provides all of the performance and flexibility in motor control you're looking for in a compact, innovative design, with simplified programming, EtherNet/IP communications, embedded safety and energy savings to help you maximize system performance and reduce your time to design, develop and deliver your machines.

With an embedded port for EtherNet/IP, PowerFlex 525 AC drives are ideal for seamless integration into your Midrange System. EtherNet/IP allows you to connect your entire enterprise on a single network and collect detailed status information to make data-driven decisions.

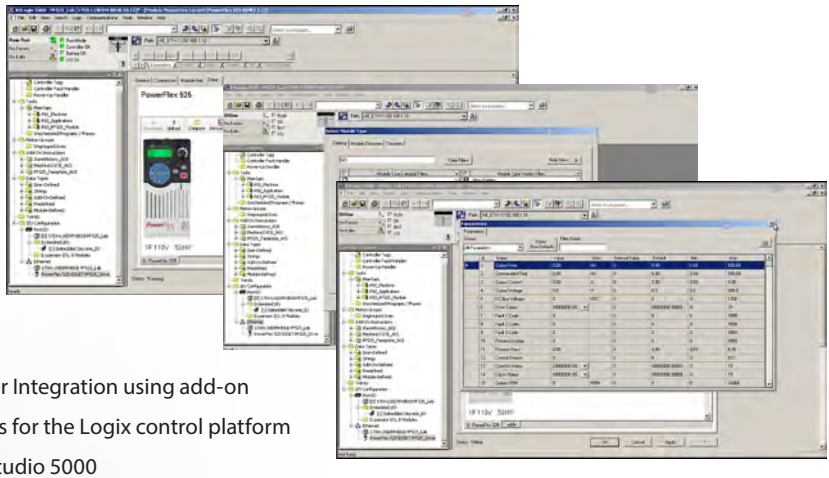
An optional dual port EtherNet/IP card allows PowerFlex 525 AC drives to support linear, star and ring topologies and provides DLR functionality. DLR can help reduce your cabling needs, gives your system resiliency from the loss of one network connection and provides fault-tolerant connectivity for optimum drive availability.

Automatic Device Configuration, which is also available over EtherNet/IP, allows a Logix controller to detect a replaced PowerFlex 525 drive and download configuration parameters, helping reduce maintenance time.

PowerFlex 525 AC drives deliver versatile motor control in a space saving form factor that provides an ideal fit for compact machines. With an embedded port for EtherNet/IP, an optional dual port EtherNet/IP card and add-on profiles, PowerFlex 525 AC drives support the single network architecture and single development environment that can help simplify the design, maintenance and development of your machines.

Help Improve Reliability and Uptime

The Rockwell Automation® Integrated Architecture system is unique in that it offers scalability, integrated safety, motion control and visualization capabilities for users who want a single control and development environment, regardless of application size, discipline or complexity.



Premier Integration using add-on profiles for the Logix control platform with Studio 5000


Allen-Bradley
FWD
60.01
HERTZ
ENET LINK
EtherNet/IP
FAULT
Esc
Sel
PowerFlex®
525
PORT
MOD
NET A
NET B

Communications

A Wide Variety of Options

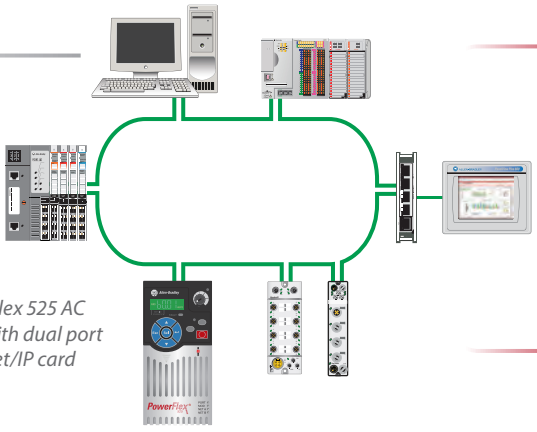
The seamless exchange of information between drives and Logix controllers saves time and increases efficiency, and the PowerFlex 525 AC drive offers several features that will help you easily manage data throughout your operations. With an embedded port for EtherNet/IP, the drive allows you to easily configure, control and collect drive data over the network and supports Premier Integration into the Logix environment.

The PowerFlex 525 drive is available with an optional dual port EtherNet/IP card that supports ring topologies with DLR functionality. DLR networks can help reduce configuration time and costs by reducing cabling needs and provide fault-tolerant connectivity for optimum drive availability.

An optional dual port EtherNet/IP card supports ring topologies with DLR functionality

Linear and star network topologies are also supported, and additional communication modules are available for other industrial networks.

- Embedded port for EtherNet/IP
- Dual port EtherNet/IP option card
- DeviceNet® communications option card
- Embedded DSI port
- Support for other open industrial networks



PowerFlex 525 AC drive with dual port EtherNet/IP card

DLR is an ODVA standard and requires no additional hardware to implement. This single fault tolerant network provides resiliency.

Energy **Savings**

Increase Efficiency

Improved motor control performance boosts efficiency, and the PowerFlex 525 AC drive can provide an immediate and measurable impact on energy use.

In addition to the inherent energy savings associated with using a variable frequency drive, the PowerFlex 525 AC drive offers additional savings in Economizer mode when using sensorless vector control. Economizer measures power consumption and optimizes current output to meet the demands of the application.

The PowerFlex 525 AC drive can also monitor and report energy usage data and provide that information in a standard format to help you develop and manage an energy strategy for your operations.

PowerFlex 525 AC drives control permanent magnet motors, which provide more precise and synchronous speed and more power density. This means you can buy a solution that accurately matches your power needs.

- Adjust energy use and reduce costs with Economizer mode
- Monitors and reports energy usage to help make data-driven decisions
- Control permanent magnet motors

Energy Savings Calculators

See how installing a PowerFlex drive for your fan or pump can reduce energy costs when compared with traditional flow control methods.

Download the tools at: **http://www.rockwellenergycalc.com/**

Available on the App Store

GET IT ON Google play

Enhance **Safety**

Help Protect Personnel

Safe Torque-Off is a standard safety feature of the PowerFlex 525 drive to help protect personnel and equipment. Integrated Safe Torque-Off suits several safety situations that require removing rotational power from the motor without powering down the drive.

Safe Torque-off allows you to restart your application faster after a safety-related situation. The system, which meets ISO 13849-1 standards, provides safety ratings up to and including SIL2/PLd Cat 3.

Embedded safety can help lower your total system costs, boost machine availability and reduce downtime.

- Safe Torque-Off functionality removes rotational power without powering down the drive
- Embedded safety reduces wiring and saves on installation space
- Rated SIL 2/PLd Cat 3

Excellent **Reliability**

Versatile Installation

A high temperature tolerance, flexible mounting options and a compact footprint allow PowerFlex 525 AC drives to meet your needs for flexibility and space savings.

Optimize panel space when installing PowerFlex 525 AC drives by leveraging the 50mm (1.96 in) clearance requirement at the top and bottom of the drives. Drives can be installed vertically, horizontally and vertically side-by-side. Control module fan kits also allow horizontal Zero-Stacking™ of PowerFlex 525 drives for even more flexibility.

Generous venting allows PowerFlex 525 AC drives to operate in high ambient temperatures of up 50°C (122°F) without current derating and 60°C (140°F) with current derating. Only PowerFlex 525 AC drives can run in temperatures up to 70°C (158°F) with current derating using a control module fan kit. These drives are built with robust components that resist extreme temperatures.

- Offers a very compact footprint
- Requires only a 50mm mounting clearance for air flow at the top and bottom*
- Operates in temperatures up to 70°C (158°F) with current derating using a control module fan kit
- Horizontal drive mounting with control module fan kit
- Conformal coating to IEC 60721 3C2 standards over the circuitry

*Frame E at 60°C to 70°C requires 95mm (3.74 in) airflow gap at the top of the drive

A control module fan kit allows PowerFlex 525 drives to run in temperatures up to 70°C (158°F) with current derating and horizontal Zero-Stacking (pictured top of page)

Flexible **Control**

Suitable For Many Applications

The PowerFlex 525 AC drive provides a variety of motor control options for a vast array of applications, including volts per hertz, sensorless vector control, closed loop velocity vector control and permanent magnet motor control. The drive can also provide closed-loop feedback for positioning capability with an optional encoder card.

For applications requiring stops at designated positions regardless of the speed or load, and without the help of an encoder, the PowerFlex 525 AC drive utilizes PointStop™. This set of parameters directs the drive to adjust its deceleration rate based on its speed when a command is initiated, allowing a motor to stop in the same position.

And for position control applications such as diverters, smart conveyors and packaging machines, the PowerFlex 525 AC drive provides point to point positioning in a cost effective and flexible package to meet your needs.

- Volts per hertz
- Sensorless vector control
- Closed loop velocity vector control
- Control for permanent magnet motors

The PowerFlex 525 AC drive can accommodate an accessory communication card and an encoder card at the same time while maintaining its compact form factor.

Maximize
System Performance

Control
- Volts per hertz
- Sensorless vector control (SVC)
- Closed loop velocity vector control
- Support for permanent magnet motors
- Multiple preset speeds with programmable control through digital inputs or communications

Positioning Control
- PointStop™ stops motor load in a consistent position without encoder feedback
- Closed loop feedback with an optional encoder card
- Point to point positioning mode

Communications
- Built-in port for EtherNet/IP
- Dual port EtherNet/IP option card
- Embedded DSI port
- DeviceNet and PROFIBUS® option cards

Energy Savings
- Economizer mode in SVC adjusts current output to help reduce energy costs
- Energy data monitoring and reporting capability
- Permanent magnet motor control

Safety
- Embedded Safe Torque-Off to SIL2/PLd Cat 3 meeting ISO 13849-1 standards

Hardware
- Modular design with removable control modules
- Same control module for the entire power range
- Built-in USB port, uses standard USB cable
- Vertical, side-by-side Zero Stacking™ mounting to reduce panel space (frames A, B and C)
- Horizontal Zero-Stacking with control module fan kit
- High ambient operating temperatures
- IP20 NEMA/Open, IP30 NEMA/UL Type 1 (with conduit kit)
- EMC filtering embedded at 200V and 400V; optional EMC filtering available for all voltages
- Standard conformal coating IEC 60721 3C2 (chemical only)

Programming and Commissioning
- HIM supports multiple languages and features QuickView scrolling text
- Application specific parameter groups and customized application settings using AppView and CustomView tools
- Simplified configuration and MainsFree programming using standard USB cables
- Connected Components Workbench™ software for fast and easy drive configuration
- Premier Integration using AOPs for the Logix control platform with Studio 5000 Logix Designer

PowerFlex® 525 AC Drives	
Power Ratings	100 - 120V: 0.4 to 1.1 kW / 0.5 to 1.5 Hp 200 - 240V: 0.4 to 2.2 kW / 0.5 to 20 Hp 380 - 480V: 0.4 to 22 kW / 0.5 to 30 Hp 525 - 600V: 0.4 to 22 kW / 0.5 to 30 Hp
Motor Control	Volts per Hertz Sensorless Vector Control Closed Loop Velocity Vector Control Permanent Magnet Motor Control
Application	Open Loop Speed Regulation Closed Loop Speed Regulation
Overload Capability	Normal Duty Application: 110% for 60 seconds, 150% for 3 sec Heavy Duty Application: 150% for 60 seconds, 180% for 3 sec (200% programmable)
Input Specification	1 Phase Voltage: 100 … 120V/200 … 240V Voltage: Adjustable 0V to rated motor voltage; -15% / +10% voltage tolerance 3 Phase Voltage: 200 … 240V/380 ... 480V/525 … 600V Frequency: 50 to 60 Hz Logic Control Ride Through: >0.5 seconds, 2 seconds typical 1/2 DC Bus operation (selectable) Maximum Short Circuit Rating: 100,000 amps symmetrical
Output Voltage Range	Adjustable 0V to rated motor voltage Intermittent Current: 150% for 60 seconds
Frequency Range	Max Output Frequency 500 Hz Input Frequency Variation 47 to 63 Hz
Ambient Operating Temperatures*	-20°C to 50°C (-4°F to 122°F) -20°C to 60°C (-4°F to 140°F) with current derating -20°C to 70°C (-4°F to 158°F) with current derating (with optional control module fan kit)
Altitude	1000 m (3280 ft) with derating guideline for up to max 4000 m (13,123 ft), with the exception of 600V at max 2000 m (6,561ft)
Enclosures	IP20 NEMA/Open IP30 NEMA/UL Type 1 (with conduit kit)
Mounting	DIN rail (frames A,B and C) Zero Stacking 50mm (1.96 in) air-flow gap at the top and bottom**
Configuration	Integral HIM, LCD, 5 digits, 16 segments, multi-language Connected Components Workbench Software Studio 5000™
Control I/O	7 Digital Inputs (24V DC, 6 programmable) 1 Analog Output (1 unipolar voltage or current) 2 Digital Outputs 2 Relays (1 form A relay & 1 form B relay; 24V DC, 120V AC, 240V AC) 2 Analog Inputs (1 bipolar voltage, 1 current)
Dynamic Braking	7th IGBT braking, DC braking
Carrier Frequency	2 to 16 kHz. 4 kHz default
EMC Filtering	Embedded 1 ph 240V and 3 ph 480V. Available as an external option for all voltages
Safety	Embedded ISO 13849-1 SIL2/PLd Cat 3 Safe Torque-Off
Communications	Embedded EtherNet/IP port Dual port EtherNet/IP option card DeviceNet option card Integral RS485 with Modbus RTU/DSI PROFIBUS® DP option card
Feedback Types	Line Driver Type Encoder Quadrature (dual channel) or Single Channel -Single ended or differential (A, B channel); Duty cycle of 50%, +10% Pulse-Train Input (1 to 100kHz) -Configurable Input Voltage: 5VDC (±10%); 10-12VDC (±10%), or 24V DC (±15%) Allowance Pulse Frequency -DC to 250Kz Frequency controlled PWM Allowable Pulse Frequency
Protection	Fault history log, Password-lock security
Standards	UL, TUV, C-Tick, Semi F47, ATEX, CE Marine (RINA) RoHS, ACS 156, CE, cUL, GOST-R, KCC
Control Features	Flying start V/F ratioBus regulator Process PID Common DC Bus StepLogic™ functions (relays and timers) Fiber application specific features PTC input compatible Position Control Regulation with encoder feedback or analog input 1/2 DC Bus Operation
Accessories	70°C (158°F) control module fan kit (may require external power) Incremental encoder EMC plates NEMA/UL Type 1 kits Line reactors Dynamic brake resistors EMC line filters
Dimensions mm (in)	Frame A: 152 (5.98) H x 72 (2.83) W x 172 (6.77) D Frame B: 180 (7.08) H x 87 (3.42) W x 172 (6.77) D Frame C: 220 (8.66) H x 109 (4.29) W x 184 (7.24) D Frame D: 260 (10.23) H x 130 (5.11) W x 212 (8.34) D Frame E: 300 (11.81) H 185 (7.28) W x 279 (10.98) D

* Environmental considerations may apply

**Frame E at 60°C to 70°C requires 95mm (3.74 in) airflow gap at the top of the drive

PowerFlex 525 AC Drives							
	Normal Duty (ND)		Heavy Duty (HD)				
50/60Hz	HP	kW	HP	kW	Output Current	Catalog No.	Frame Size
100-120V, 1Ø No Filter	0.5	0.4	0.5	0.4	2.5A	25B-V2P5N104	A
	1	0.75	1	0.75	4.8A	25B-V4P8N104	B
	1.5	1.1	1.5	1.1	6.0A	25B-V6P0N104	B
200-240V, 1Ø No Filter	0.5	0.4	0.5	0.4	2.5A	25B-A2P5N104	A
	1	0.75	1	0.75	4.8A	25B-A4P8N104	A
	2	1.5	2	1.5	8.0A	25B-A8P0N104	B
	3	2.2	3	2.2	11.0A	25B-A011N104	B
200-240V, 1Ø EMC Filter	0.5	0.4	0.5	0.4	2.5A	25B-A2P5N114	A
	1	0.75	1	0.75	4.8A	25B-A4P8N114	A
	2	1.5	2	1.5	8.0A	25B-A8P0N114	B
	3	2.2	3	2.2	11.0A	25B-A011N114	B
200-240V, 3Ø No Filter	0.5	0.4	0.5	0.4	2.5A	25B-B2P5N104	A
	1	0.75	1	0.75	5.0A	25B-B5P0N104	A
	2	1.5	2	1.5	8.0A	25B-B8P0N104	A
	3	2.2	3	2.2	11.0A	25B-B011N104	A
	5	4	5	4	17.5A	25B-B017N104	B
	7.5	5.5	7.5	5.5	24.0A	25B-B024N104	C
	10	7.5	10	7.5	32.2A	25B-B032N104	D
	15	11	15	11	48.3A	25B-B048N104	E
	20	15	15	11	62.1A	25B-B062N104	E
380-480V, 3Ø No Filter	0.5	0.4	0.5	0.4	1.4A	25B-D1P4N104	A
	1	0.75	1	0.75	2.3A	25B-D2P3N104	A
	2	1.5	2	1.5	4.0A	25B-D4P0N104	A
	3	2.2	3	2.2	6.0A	25B-D6P0N104	A
	5	4	5	4	10.5A	25B-D010N104	B
	7.5	5.5	7.5	5.5	13.0A	25B-D013N104	C
	10	7.5	10	7.5	17.0A	25B-D017N104	C
	15	11	15	11	24A	25B-D024N104	D
	20	15	15	11	30A	25B-D030N104	D
	25	18.5	20	15	37A	25B-D037N114*	E
	30	22	25	18.5	43A	25B-D043N114*	E
380-480V, 3Ø EMC Filter	0.5	0.4	0.5	0.4	1.4A	25B-D1P4N114	A
	1	0.75	1	0.75	2.3A	25B-D2P3N114	A
	2	1.5	2	1.5	4.0A	25B-D4P0N114	A
	3	2.2	3	2.2	6.0A	25B-D6P0N114	A
	5	4	5	4	10.5A	25B-D010N114	B
	7.5	5.5	7.5	5.5	13.0A	25B-D013N114	C
	10	7.5	10	7.5	17.0A	25B-D017N114	C
	15	11	15	11	24A	25B-D024N114	D
	20	15	15	11	30A	25B-D030N114	D
	25	18.5	20	15	37A	25B-D037N114	E
	30	22	25	18.5	43A	25B-D043N114	E
525- 600V, 3Ø No Filter	0.5	0.4	0.5	0.4	0.9A	25B-E0P9N104	A
	1	0.75	1	0.75	1.7A	25B-E1P7N104	A
	2	1.5	2	1.5	3.0A	25B-E3P0N104	A
	3	2.2	3	2.2	4.2A	25B-E4P2N104	A
	5	4	5	4	6.6A	25B-E6P6N104	B
	7.5	5.5	7.5	5.5	9.9A	25B-E9P9N104	C
	10	7.5	10	7.5	12.0A	25B-E012N104	C
	15	11	15	11	19.0A	25B-E019N104	D
	20	15	15	11	22.0A	25B-E022N104	D
	25	18.5	20	15	27.0A	25B-E027N104	E
	30	22	25	18.5	32.0A	25B-E032N104	E

*With EMC filter

www.rockwellautomation.com/services

www.ab.com/powerflex525

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