

PowerFlex® Medium Voltage AC Drives



Powerful Performance. Flexible Control.



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**Rockwell
Automation**

PowerFlex Medium Voltage AC Drives

Powerful Performance. Flexible Control.

As the global economy continues to expand, constraints to growth arise as energy demands approach power generating capabilities. Smart and efficient energy use is critical to sustainable economic expansion and a better environment.

Medium voltage motors are typically some of the largest consumers of power in many heavy industries. Applying variable frequency drives for these applications can dramatically help reduce power consumption and energy costs, along with increased process control and information sharing across your enterprise. The environment also benefits as reductions in power use directly correspond to lower CO₂ and other emissions from power plants.

Around the world, Allen-Bradley® PowerFlex® medium voltage drives from Rockwell Automation have built a reputation for providing efficient and reliable motor control for industry's most demanding applications.

Now, our PowerFlex medium voltage drive family can deliver the performance your application demands across a broader range than ever before. The PowerFlex 7000 drive has added even more performance and safety features to address evolving users' needs in the premium drives market segment. The PowerFlex 6000 drive has been added to the product portfolio to address users' need in the general fan and pump market segment, where users are more focused on a simple, easy-to-use, and cost-effective feature set.

The PowerFlex 7000 medium voltage AC drive product line is designed to meet a broad variety of heavy industry needs and configurations from 2.4 kV to 6.6 kV, with motor current up to 720 A for synchronous or induction motors. High performance, safety, and robust communication features help improve asset utilization and lower safety risk for your critical applications from offshore oil platforms, natural gas or oil pipelines, mining sites, water/wastewater facilities, to marine applications and beyond.

PowerFlex 7000 medium voltage AC drives offer drive configurations and control options such as Active Front End (AFE) with Direct-to-Drive™ technology and high performance torque control to help meet application demands. Add to this the option for Safe Torque Off and the PowerFlex 7000 drive can provide a complete solution for your critical assets.

Trust Your Critical Applications to a Market Leader

Rockwell Automation®, the world's largest company dedicated to industrial automation and information, has been developing leading medium voltage motor control technology for over eighty years.

More than a decade ago (2005), we introduced the industry's first Active Front End (AFE) transformerless solution for medium voltage drives. Our continuous enhancements and trusted experience with Direct-to-Drive technology has allowed us to stay ahead of our competition and help reduce unforeseen risks to your critical applications.

In addition to our drive family, Rockwell Automation medium voltage solutions include Allen-Bradley motor controllers, soft starters and motor protection relays. We can develop and deliver complete power and control solutions, engineered to your specifications.

The PowerFlex 6000 medium voltage AC drive extends voltage ratings to address markets requiring variable speed motor control from 2.3 kV up to 10 kV. These easy-to-use drives are well-suited for variable torque applications like simple, stand-alone centrifugal fans and pumps.

No matter where your applications are located – and whether your requirements are simple or complex, count on PowerFlex medium voltage drives for the optimal solution.

Drive Productivity with the Medium Voltage PowerFlex AC Drives

We understand the challenges to increase production while keeping the costs of sustaining operations down, that is why the PowerFlex medium voltage portfolio of drives has been designed to help optimize production. From robust hardware with a low parts count, a design for fast maintenance, and communication options for seamless integration into your control system, PowerFlex medium voltage drives deliver a solution to help optimize production processes, increase profits and reduce costs.

A key to productivity is the access to valuable information from your systems. Better information leads to higher asset availability, reduced energy and maintenance costs, and asset and personnel protection – all resulting in an increased return on your investment and real bottom-line savings.



PowerFlex 6000 Medium Voltage AC Drives

Cost-Effective Variable Torque Control



Automatic Power Cell Bypass

In the unlikely event of a power cell failure, the automatic power cell bypass option allows the PowerFlex 6000 drive to bypass that power cell, along with the corresponding cells in the other two phases, so that the drive will remain running at a reduced capacity, providing time to plan for a scheduled shut-down.

- Unique to our UL/CSA certified product
- Helps achieve less downtime in your critical applications

Particularly suitable for new and retrofit centrifugal fan and pump applications, PowerFlex 6000 drives provide cost-effective solutions for motor control applications from 200 kW to 5600 kW (190 Hp to 7500 Hp), for motors rated from 2.3 kV to 10 kV.

Air-cooled PowerFlex 6000 drives are designed to maximize energy efficiency by enabling soft-starting and variable-speed control in normal duty applications.

To achieve low input harmonics and near-unity power factor, the drives utilize a Cascaded "H" Bridge (CHB) topology. This topology combines an integrally mounted phase-shifting isolation transformer with series-connected power modules for each phase.

Drives include an intuitive, easy-to-use, color touchscreen operator interface to monitor and control your application.

PowerFlex 6000 AC drives allow for flexibility in a variety of applications and are available in many configurations based on motor voltage and available to meet either IEC or UL/CSA requirements.

The PowerFlex 6000 portfolio includes:

18-Pulse Rectifier

IEC: For motors from 320 kW to 1720 kW at 3/3.3 kV (**up to 380 Amps**)

UL/CSA: For motors from 137 kW to 670 kW at 2.3/2.4 kV (**up to 200 Amps**)

24-Pulse Rectifier

IEC: For motors from 225 kW to 2350 kW at 4/4.16 kV (**up to 420 Amps**)

UL/CSA: For motors from 225 kW to 1190 kW at 4/4.16 kV (**up to 200 Amps**)

36-Pulse Rectifier

IEC: For motors from 200 kW to 3720 kW at 6/6.6 kV (**up to 420 Amps**)

UL/CSA: For motors from 300 kW to 1940 kW at 6/6.3/6.6 kV (**up to 200 Amps**)

54-Pulse Rectifier

IEC: For motors from 200 kW to 5600 kW at 10 kV motor voltage (**up to 420 Amps**)



User-Friendly Control for Variable Torque Applications

The PowerFlex 6000 drive provides a cost-effective, simple solution for new and retrofit variable torque applications.

- Controls speed, stopping and starting of normal duty induction motors; help **improve asset utilization** in your critical applications
- **Improves efficiency** by operating at near unity power factor throughout the speed range
- Integrally mounted multi-pulse isolation transformer helps ensure low line-side harmonics and high input power factor **improving asset utilization and lowering enterprise risk**
- Automatic power cell bypass helps achieve **less downtime** in your critical applications (optional)
- All power modules are identical and designed for easy removal **minimizing Mean Time To Repair (MTTR)**
- Intuitive, **easy to use** color touchscreen HMI
- Standard supplied on-line UPS helps **improve your asset utilization**
- Self-powered cooling fans to **reduce customer supplied power requirements**
- Kirk-key and electromechanical interlocks help protect personnel from exposure to medium voltage for **added safety**



PowerFlex 6000 air-cooled drive



PowerFlex 7000 Medium Voltage AC Drives

Efficient & Integrated High-Power Performance



Control Options

Safe Torque Off

Help save time and costs through decreased downtime, while helping to protect personnel and property from preventable accidents by increasing the functional safety of your system with Safe Torque Off. This feature is TÜV Certified and helps achieve requirements for SIL 3/PLe/IEC 61508/ISO 13849-1. This option is available for AFE PowerFlex 7000 drives.

High Performance Torque Control

PowerFlex 7000 medium voltage AC drives now offer the option of zero speed holding torque control capabilities and TorqProve control. Ideal for applications such as hoists, drag lines, winches and test stands, the PowerFlex 7000 drive can now deliver 100% torque at zero speed. This control capability continuously helps to control torque around zero speed and provides a higher drive speed and torque response required for these applications. This option is available for AFE PowerFlex 7000 drives.

The Allen-Bradley PowerFlex 7000 family of medium voltage AC drives deliver flexibility and highly efficient performance in a single solution for motor control applications from 150 kW to 25,400 kW (200 Hp to 34,000 Hp), rated from 2.4 kV to 6.6 kV.

To help reduce energy costs and motor wear and tear, PowerFlex 7000 drives enable soft-starting and variable-speed control of processes with high power demands. Our entire product line provides near-sinusoidal current and voltage waveforms to allow the use of standard or existing motors and motor cables.

Thanks to advanced power semiconductor technology and a simple, straightforward design, the drive's component count is the lowest of any medium voltage drive available. The result? Increased reliability, less downtime and fewer spare parts. To achieve even more efficiency, choose a configuration with Direct-to-Drive technology – and connect a motor directly to the drive without an isolation transformer.

PowerFlex 7000 drives incorporate Intelligent Motor Control information and communication capabilities and an intuitive, easy-to-use, color touchscreen operator interface to monitor and control your processes.

The PowerFlex 7000 portfolio includes:

Air-Cooled Drives

For motors from 150 kW to 6000 kW (200 Hp to 8000 Hp) at 2.4 kV to 6.6 kV. This drive offers different frame sizes and heat sink or heat pipe configurations to accommodate various power ranges

Liquid-Cooled Drives

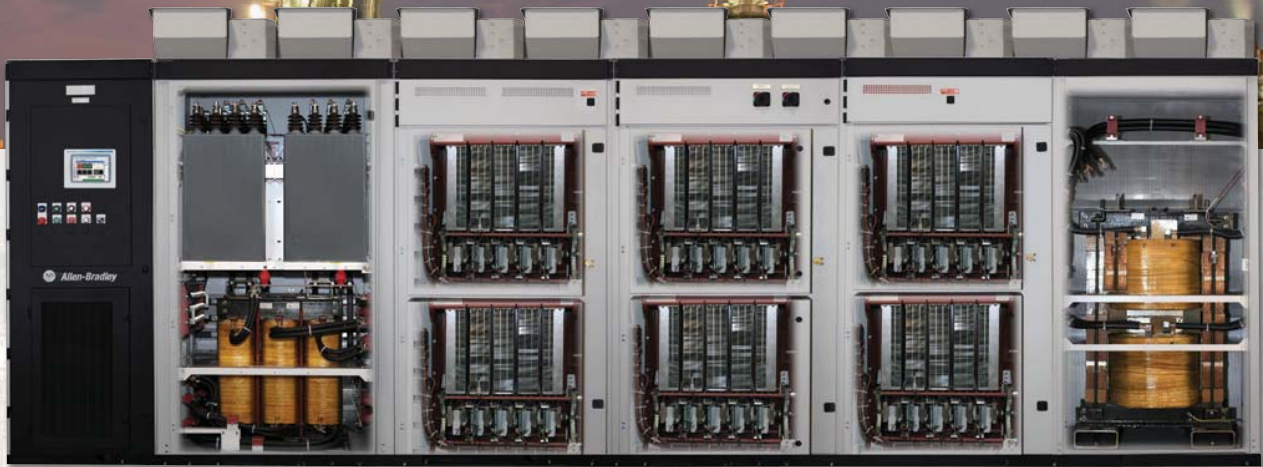
For motors from 2240 kW to 6340 kW (3000 Hp to 8500 Hp) at 4.16 kV to 6.6 kV. This configuration uses a closed-loop liquid-cooling system with liquid-to-air or liquid-to-liquid heat exchanger options and provides redundant pumps as standard, for optimal reliability.

Marine Drives

With power ratings from 600 kW to 24 MW (800 Hp to 32,000 Hp), these liquid-cooled marine drives use Direct-to-Drive technology to conserve space and weight and is built to withstand the rigors at sea.

Extended Power Configurations

Available up to 25,400 kW (up to 34,000 Hp), these high power air-cooled and liquid-cooled drive modules are effective solutions for hot back-up and redundancy, Load Commutated Inverter (LCI) retrofits and power upgrades.



PowerFlex 7000 air-cooled drive (720A configuration with high efficiency heat pipe technology)

Capabilities Across a Broad Range of Applications

The PowerFlex 7000 drive is a flexible, easy-to-use solution designed to meet diverse application requirements across a wide spectrum of heavy industrial settings.

- Controls **speed, torque and direction** of induction or synchronous AC motors, **normal duty or heavy duty**
- **Broad power range:** 150 kW to 25,400 kW (200 Hp to 34,000 Hp)
- Achieves **near unity power factor** throughout the typical operating speed range for variable torque loads
- Virtually perfect sinusoidal current and voltage waveforms **allow use of standard motors**
- Accommodates **motor cable lengths up to 15 km**
- **EtherNet/IP™** communication interface. Optional interfaces for a variety of network protocols
- Drive control: Sensorless vector control or **full vector control** with tachometer feedback (optional)
- **Flexible input configurations:** Direct-to-Drive (transformerless), Active Front End (AFE) rectifier or 18-pulse rectifier
- Patented PowerCage™ allows **SGCT replacement in less than ten minutes**
- Achieve requirements for Safety Integrity Level 3 (SIL 3) and Performance Level e (PL e) with TÜV **Certified Safe Torque Off**
- **Premier Integration** into the Logix control platform with Studio 5000 Logix Designer™ software **reduces development and integration time**
- **Robust Design** – PowerFlex 7000 higher power drive structures are designed to help contain and redirect energy in the event of an incident with enhanced enclosures and fault containment
- **Help reduce downtime** with built-in diagnostic and detection features that monitor the health of drive components
- Synchronous bypass and transfer to control **multiple motor systems**
- Local and remotely mounted **HMI options.**
- Remote **Virtual Support Engineer™** service available



Optimize Your Solution

Comprehensive Testing & Training

When you select a PowerFlex medium voltage drive, you are assured of a solution that is thoroughly tested – before it arrives at your facility.

Rockwell Automation performs load testing of medium voltage drives on medium voltage induction motors installed in our test facility, this test allows for simulation of two load profiles:

- Constant torque – conveyor and reciprocating compressor applications, etc.
- Variable torque – pump, fan and centrifugal compressor applications, etc.

We can also conduct combined testing of your motor and the drive – and test large transformers with the drive system.

In addition, our testing facilities offer extensive hands-on training sessions focused on programming and safely operating and servicing your PowerFlex drive.

To meet the needs of our global customers, production, training, and testing facilities are located in Cambridge, Canada; Harbin, China; Jundiai, Brazil; and Katowice, Poland.

Global Support – Locally

At Rockwell Automation, we build our PowerFlex medium voltage drives at manufacturing locations around the world – in Asia, Europe, Latin America and North America. Building our drives locally shortens your delivery time and reduces shipping costs – and is one more way we help lower your total cost of ownership.

Protect Your Investment

By leveraging our global infrastructure of support centers and subject matter experts, we're here to help you protect your automation investment. Real-time access to our global network of technical support engineers and online resources or services performed at your site to supplement maintenance and engineering activities are available to help keep your facilities up and running.





Maximize Your Uptime with Virtual Support Engineer

Keeping your system healthy is paramount. That's why we offer Virtual Support Engineer. Through this service, Rockwell Automation technical support engineers proactively monitor your drive's critical performance parameters – remotely.

If your system experiences a fault, warning, or performs out of its defined tolerance, you are immediately contacted by a Remote Support Engineer and notified via email or text message. This cost effective solution provides you the continuous support you need – and features a secure connection, data collection and analytics and incident notification.

Real-time Remote Monitoring and Alarming

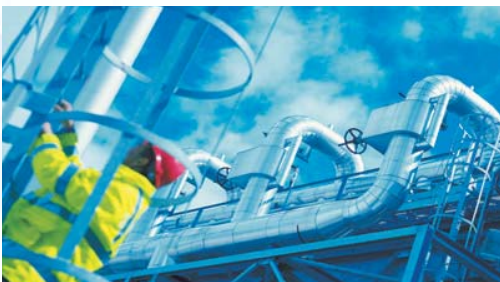
- Guaranteed response time by Rockwell Automation Remote Support Engineers
- Immediate notification by a Rockwell Automation engineer by your choice of communication

Data Collection & Analytics

- Data and analytics available on the web, including from mobile smart devices
- View alarm data and analytics, status, uptime and warning/fault queues through a single portal
- Look at multiple systems or locations in one portal

Simple and Secure Connectivity

- Secure socket layer (SSL) through a standard internet connection
- No inbound packet transfer for a secure connection



PowerFlex Medium Voltage AC Drives

Technical Specifications

PowerFlex 6000 AC Drive	IEC	UL/CSA
Input Voltages (kV)	3, 3.3, 4.16, 6, 6.6, 10	2.4, 4.16, 6.6, 6.9 [†]
Typical Applications	Variable torque	
Topology	<ul style="list-style-type: none"> • 18 Pulse • 24 Pulse • 36 Pulse • 54 Pulse 	<ul style="list-style-type: none"> • 18 Pulse • 24 Pulse • 36 Pulse
Cooling Type	Air-cooled	
Drive System Configurations	Stand-alone	
Motor Current Rating	Up to 420 A	Up to 200 A
Motor Types	Induction	
Input Harmonics	Meets IEEE 519-1992, GB/T 14549-1993, EN 61000-2/3*	
Input Power Factor	>.95	
Automatic Cell Bypass	No	Yes
Regeneration	No	
HMI	7" WinCE Color Touch Screen	
Drive Control	Volts/Hertz	
Motor Cable Lengths	Up to 300 m	
Enclosure Ratings	IP31 (standard)	IP21 (standard)
Certification	IEC/CE	UL/CSA
Communication Protocols	Modbus-RTU RS485, Modbus-TCP, Modbus-PLUS RS485, Profibus RS485, EtherNet/IP	
Configuration	HMI	
Remote Monitoring Program	-	
UPS	Standard	

Please contact factory for any requirements not shown.

[†] Other voltage inputs available up to 13.8 kV.

* In most cases.



PowerFlex 6000 drive
18 Pulse (2.3 kV, 3 kV, 3.3 kV motor voltages)



PowerFlex 6000 drive
24 Pulse (4/4.16 kV motor voltages)



PowerFlex 6000 drive
36 Pulse (6 kV, 6.6 kV motor voltages)



PowerFlex 6000 drive
54 Pulse (10 kV motor voltage)

Technical Specifications

PowerFlex 7000 AC Drive

Input Voltages (kV)	2.4, 3.3, 4.16, 6.6
Typical Applications	Variable torque, constant torque
Topology	AFE (transformerless) – Direct-To-Drive AFE with integral transformer AFE with separate transformer 18 Pulse with separate transformer
Cooling Type	Air-cooled, liquid-cooled
Drive System Configurations	Stand-alone, synchronous transfer for multiple motors, load-sharing
Motor Current Rating	Up to 720 A
Motor Types	Induction, synchronous
Input Harmonics	Meets IEEE 519-1992, GB/T 14549-1993, EN 61000-2/-3*
Input Power Factor	>.95 (AFE - typical operating speed range for variable torque loads)
Regeneration	Yes
HMI	10" WinCE Color Touch Screen
Drive Control	Sensorless vector control, full vector control (with encoder input)
Motor Cable Lengths	Up to 15 km (no additional output filter required)
Enclosure Ratings	IP21
Standards Certification	UL/CSA/IEC/CE
Safety	Safe Torque Off, SIL3/PLe
Communication Protocols	EtherNet/IP, DeviceNet, ControlNet, Profibus DP, Modbus, and others
Configuration	HMI, Connected Components Workbench Studio 5000 Logix Designer
Remote Monitoring Program	Virtual Support Engineer
UPS	Optional

* In most cases.



PowerFlex 7000 A Frame: Air-cooled and optimized for lower power ratings up to 750 kW (1000 Hp)



PowerFlex 7000 B Frame: Air-cooled and optimized for high power ratings up to 6000 kW (8000 Hp)



PowerFlex 7000 C Frame: Liquid-cooled and optimized for higher power ratings up to 23,800 kW (32,000 Hp)

Rockwell Automation Services & Support

Global Support. Local Address. Peace of Mind.

Providing the resources you need, when and where you need them, Rockwell Automation has an integrated, global network of ISO-certified repair centers, exchange hubs, field service professionals, IACET-recognized training centers, certified technical phone support centers and online tools.





www.rockwellautomation.com/go/services



Meet Your Everyday Technical Needs

Remote Support & Monitoring	Training Services	OnSite Services	Repair Services
<ul style="list-style-type: none"> Real-time product, system and application-level support Unlimited online resources and tools Live chat and support forums Secure equipment monitoring, alarming and diagnostics 	<ul style="list-style-type: none"> Instructor-led and computer or web-based courses Virtual classroom Training assessments Workstations and job aids 	<ul style="list-style-type: none"> Embedded engineering Preventive maintenance Migrations and conversions Start-up and commissioning 	<ul style="list-style-type: none"> Product remanufacturing Repair services on a full range of industrial automation brands and products Annual repair agreements
			

Maximize Your Automation Investment

MRO Demand Management	Lifecycle Extension & Migrations	Network & Security Services	Safety Services
<ul style="list-style-type: none"> Comprehensive asset management planning Reliability services Warranty tracking Quick access to global spare parts inventory 	<ul style="list-style-type: none"> Installed Base Evaluation™ Pinpoint obsolescence risk Tools and Lifecycle support service agreements to mitigate production risk 	<ul style="list-style-type: none"> Control system lifecycle services Manage network convergence Security technology, policies and procedures services 	<ul style="list-style-type: none"> Safety assessments and remediation Safety design, integration and validation services
			

Visit the Rockwell Automation Support Center at www.rockwellautomation.com/knowledgebase for technical information and assistance, plus:

- View technical/application notes
- Obtain software patches
- Subscribe for product/service email notifications
- Submit a Question, Live Chat, Support Forums and more

Visit Get Support Now at www.rockwellautomation.com/go/support to select your country and find your local support information.

 Connect with us.

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