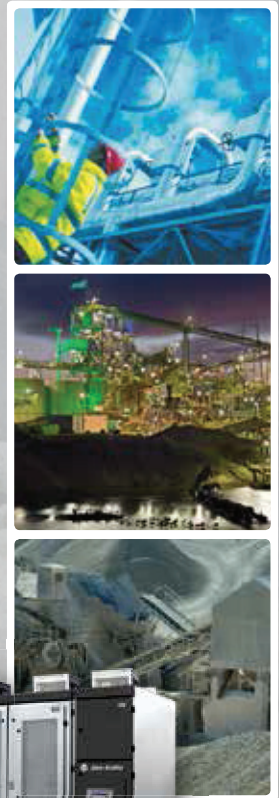


PowerFlex® Medium Voltage AC Drives

Powerful Performance. Flexible Control.



LISTEN.
THINK.
SOLVE.®

 Allen-Bradley • Rockwell Software

**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 reduce power consumption and energy costs, along with significantly better 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.

Our flagship PowerFlex 7000 product line, rated from 2.4 kV to 6.6 kV, offers multiple configurations and high-performance, customizable options to meet the diverse needs of heavy industry – from offshore oil platforms, natural gas or oil pipelines, mining sites, water/wastewater facilities, to marine applications and beyond.

With the introduction of the PowerFlex 6000 medium voltage drive, Rockwell Automation extends voltage ratings to address markets requiring variable speed control of motors rated up to 10 kV.

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.



Trust Your Critical Applications to a Market Leader

Rockwell Automation, a global leader in industrial automation, has been developing leading medium voltage motor control technology for over eighty years.

In 2005, we introduced the industry's first Active Front End (AFE) transformerless solution for medium voltage drives. Thanks to continuous enhancements, this revolutionary Direct-to-Drive™ technology maintains a leadership position today.

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.

Lower Line Harmonics – and Better Power Quality

Medium voltage PowerFlex AC drives offer flexible options to address the concerns of line-side harmonics. The PowerFlex 7000 offers an Active Front End (AFE) rectifier, that features a single rectifier bridge to keep component count and system complexity in check, with solutions that lower line harmonics – and improve power quality. The PowerFlex 6000 features a multi-pulse configuration optimized for the three principal motor voltage classes it serves. Each of these feature low input harmonics and near unity power factor.

Reap the Benefits of Motor-Friendly Waveforms

Motor-friendly waveforms have been a hallmark of Allen-Bradley medium voltage drives since their introduction in 1989. All PowerFlex medium voltage drives are compatible with standard motors without derating and do not require an inverter duty motor. PowerFlex configurations have near-sinusoidal output current and voltage waveforms at all speeds and loads.



PowerFlex 6000 Medium Voltage AC Drives

Cost-Effective Variable Torque Control

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, for motors rated from 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 medium voltage, normal duty applications.

To achieve the low input harmonics and near-unity power factor that make this an ideal solution for standard motors, the drives utilize 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 three configurations based on motor voltage requirements.

Our PowerFlex 6000 portfolio includes these configurations:

PowerFlex 6000 18-Pulse Rectifier (up to 380 Amps)

For motors from 320 kW to 1720 kW at 3/3.3 kV.

PowerFlex 6000 36-Pulse Rectifier (up to 420 Amps)

For motors from 200 kW to 3720 kW at 6/6.6 kV.

PowerFlex 6000 54-Pulse Rectifier (up to 420 Amps)

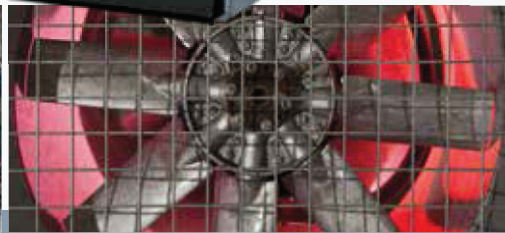
For motors from 200 kW to 5600 kW at 10 kV motor voltage.



User-Friendly Control for Variable Torque Applications

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

- Controls **speed, stopping and starting** of induction AC motors, **normal duty**.
- Power range: 200 kW to 5600 kW. Motor voltage **ratings extend to 10 kV**.
- Achieves **near unity power factor** throughout the speed range.
- Virtually perfect sinusoidal current and voltage waveforms **allow use of standard motors**.
- Power module design eases **IGBT replacement**.
- Locally mounted intuitive, easy-to-use, **color touchscreen operator interface**.
- Designed to **maximize uptime** with a UPS supplied as standard.
- **Automatic switch over** to internally fed power if single-phase customer-supplied control power is lost.
- **Internally supplied power** for all cooling fans.



PowerFlex 7000 Medium Voltage AC Drives

Efficient & Integrated High-Power Performance

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, rated from 2.4 kV to 6.6 kV.

To 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 virtually perfect 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 drives available. The result? Increased reliability, less downtime and fewer spare parts and 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 – and optimize performance and maintenance.

Our PowerFlex 7000 portfolio includes:

PowerFlex 7000 Air-Cooled Drives

For motors from 150 kW to 6000 kW 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.

PowerFlex 7000 Liquid-Cooled Drives

For motors from 2240 kW to 6340 kW 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.

PowerFlex 7000 Extended Power Configurations

Available up to 25,400 kW, 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 Marine Drives

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

PowerFlex 7000 AC drives with TorqProve™ Control

PowerFlex 7000 medium voltage AC drives now offer the option of enhanced torque control capabilities with TorqProve control. Ideal for heavy industry applications, such as hoists, drag lines, winches and teststands, the PowerFlex 7000 can now deliver 100% torque at zero speed. This new capability continuously helps to control torque around zero speed and provides a higher drive speed and torque response required for these applications. This feature is a firmware option available in any configuration of a PowerFlex 7000 AC drive.





Air-cooled - optimized for highest power ratings (up to 720 Amps)

Optimizing 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.
- 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**.
- Incorporates **safety elements:** Key interlocks, remote drive control options, arc-resistant semiconductors.
- Intelligent Motor Control: **Premier Integration** of the PowerFlex 7000 drive with the Logix control platform reduces development time, eases use and speeds maintenance.
- **Configure, control and monitor** with Studio 5000™.
- **Diagnostic tools** provide real time motor and drive operating data.
- Synchronous by-pass and transfer to control **multiple motor systems**.
- Local and remotely mounted **HMI options**. Multi-language support.
- 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
- Variable torque – pump, fan and centrifugal compressor applications

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, 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 notified via email or text message. In addition, system data and analytics are available on the web, including from mobile devices.

This scalable, cost-effective solution provides you the support you need – and features simple and secure one-way connectivity through a standard Internet connection.



PowerFlex Medium Voltage AC Drives

Technical Specifications

PowerFlex 6000 AC Drive

Input Voltages (kV)	3, 3.3, 6, 6.6, 10, 11
Typical Applications	Variable Torque (fans and pumps)
Topology	<ul style="list-style-type: none">• 18 Pulse (3 kV, 3.3 kV motor voltages)• 36 Pulse (6 kV, 6.6 kV motor voltages)• 54 Pulse (10 kV motor voltage)
Cooling Type	Air-cooled
Drive System Configurations	Stand-alone
Motor Current Rating	Up to 420A
Motor Types	Induction
Input Harmonics	Meets IEEE 519-1992, GB/T 14549-1993, EN 61000-2/-3*
Input Power Factor	>.95 (typical operating speed range for variable torque loads)
Regeneration	No (two quadrant operation)
HMI	7" WinCE Color Touch Screen
Drive Control	Volts/Hertz
Motor Cable Lengths	Up to 300 m (contact factory for longer cable distance requirements)
Enclosure Ratings	IP 31, 42
Standards Certification	IEC / CE
Communication Protocols	Ethernet/IP, Modbus, Modbus Plus, Profibus DP, and others
Remote Monitoring Program	–
Premier Integration	–
UPS	Standard

* In virtually all cases



PowerFlex 6000 AC Drive
18 Pulse (3 kV, 3.3 kV motor voltages)



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



PowerFlex 6000 AC 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 720A
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 (four quadrant operation)
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	IP 21, 42
Standards Certification	UL / CSA / IEC / CE
Communication Protocols	Ethernet/IP, DeviceNet, ControlNet, Profibus DP, Modbus, and others
Remote Monitoring Program	Virtual Support Engineer
Premier Integration	Yes
UPS	Optional

* In virtually all cases



PowerFlex 7000 AC Drive
Air-cooled - optimized for lower power ratings



PowerFlex 7000 AC Drive
Air-cooled - optimized for mid-range to high power ratings



PowerFlex 7000 AC Drive
Liquid-cooled - optimized for high power ratings

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/services

Meet Your Everyday Technical Needs



Online & Phone Support	Training Services	OnSite Services	Repair Services
<ul style="list-style-type: none"> • System level support • Unlimited, real-time support • Unlimited, online resources and tools • Live chat and support forums 	<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 • Troubleshooting and repair • Extended warranty 	<ul style="list-style-type: none"> • Product remanufacturing • Third-party repair • Annual repair agreements

Maximize Your Automation Investment

MRO Asset Management	Network & Security Services	Safety Services	Energy Services
<ul style="list-style-type: none"> • Warranty tracking • Consolidated asset reports • Quick access to global spare parts inventory • Owned and managed spare parts inventory 	<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 • Safety design, integration and, validation services 	<ul style="list-style-type: none"> • Energy monitoring and analysis services • General and comprehensive energy audits

Visit the Rockwell Automation Support Center, <http://rockwellautomation.custhelp.com/> for technical information and assistance, plus:

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

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

Rockwell Automation, Inc. (NYSE:ROK), the world's largest company dedicated to industrial automation, makes its customers more productive and the world more sustainable. Throughout the world, our flagship Allen-Bradley® and Rockwell Software® product brands are recognized for innovation and excellence.

Follow ROKAutomation on Facebook & Twitter. Connect with us on LinkedIn.

Allen-Bradley, Connected Components Workbench, PowerFlex, Studio 500 and Virtual Support Engineer are trademarks of Rockwell Automation, Inc. All other registered trademarks and trademarks are property of their respective companies.

www.rockwellautomation.com

Power, Control and Information Solutions Headquarters

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
 Europe/Middle East/Africa: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
 Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846