Let us help with the heavy lifting

PowerFlex Drives for Crane and Hoist Applications

Allen-Bradley

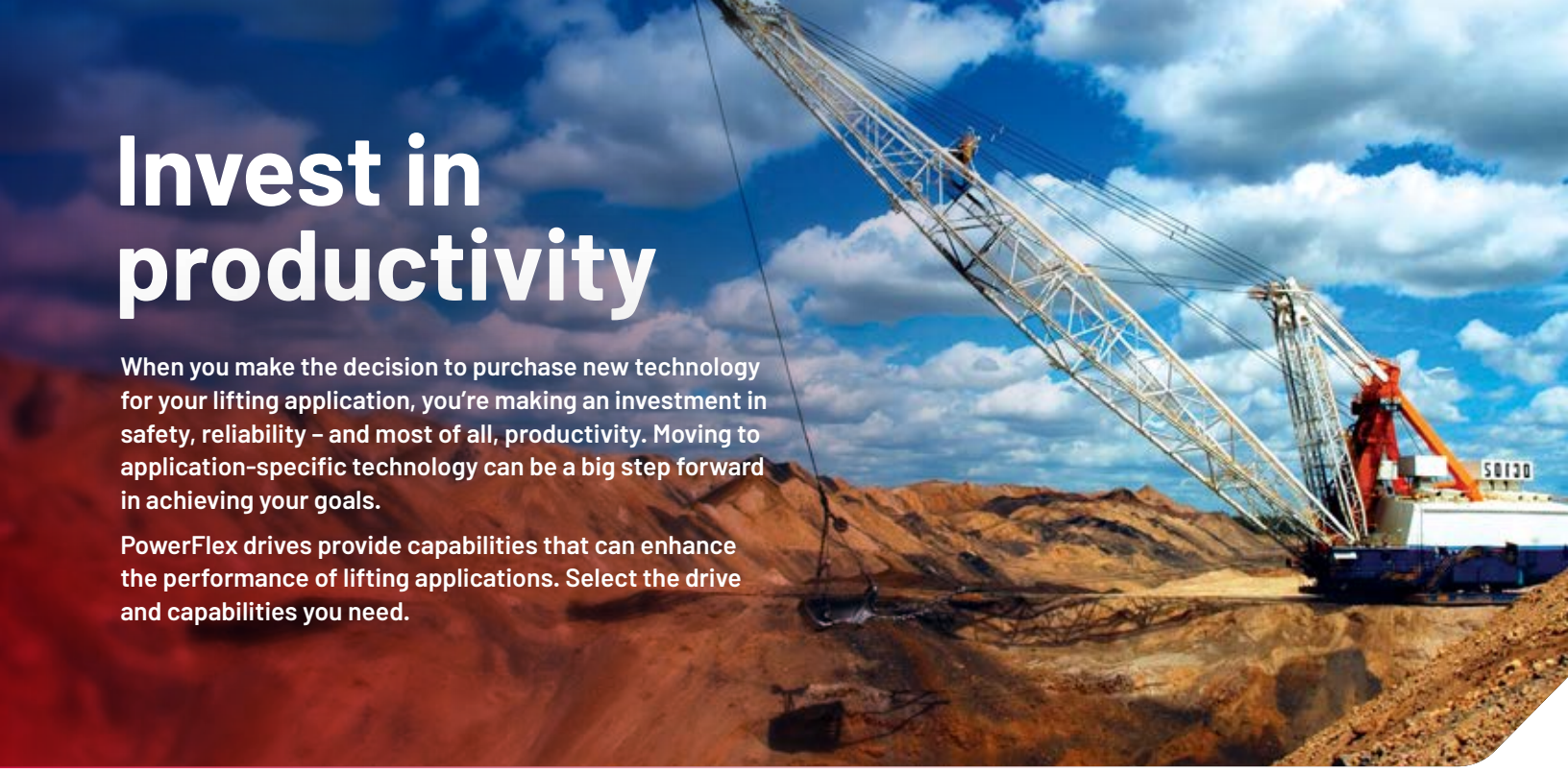
by ROCKWELL AUTOMATION

Take a load off your mind

If your work involves cranes, hoists or the lifting of any type of load, you understand the unique challenges posed by these types of applications. Safety, reliability and productivity are always on your mind. Fortunately, Allen-Bradley® drives are specifically designed to make your job easier. And you can select the type of drive that best meets your needs. AC. DC. Low voltage. Medium voltage.

Put these PowerFlex® drive capabilities to work for you and invest in improved performance:

- **TorqProve™ Control** helps verify control of a load in lifting applications
- **Anti-sway capability** is designed to improve safety and efficiency by reducing the swinging of a moving load
- **Regeneration** enables a drive to put energy back on the incoming line, providing a braking solution that is far more energy efficient than resistive braking
- **Premier Integration** is the exclusive experience of integrating Allen-Bradley smart devices into the Logix control environment. It helps you save configuration time and simplify your application



Invest in productivity

When you make the decision to purchase new technology for your lifting application, you're making an investment in safety, reliability – and most of all, productivity. Moving to application-specific technology can be a big step forward in achieving your goals.

PowerFlex drives provide capabilities that can enhance the performance of lifting applications. Select the drive and capabilities you need.

Product	TorqProve™ technology	Anti-Sway capability	Regeneration	Premier Integration
PowerFlex 755TR Low Voltage AC Drive	✔	✔	✔	✔
PowerFlex 755TM Low Voltage AC Drive System	✔	✔	✔	✔
PowerFlex 755TL Low Voltage AC Drive	✔	✔		✔
PowerFlex 755TS Low Voltage AC Drive	✔	✔		✔
PowerFlex DC Low Voltage DC Drive	✔		✔	✔
PowerFlex 7000 Medium Voltage AC Drive	✔		✔	✔

Patented TorqProve technology helps verify control of a load

When you use PowerFlex drives, you're getting well-established products that are designed for application flexibility and ease of use.

The TorqProve feature is specifically tailored for applications needing coordinated and sustained control of a load and brake. TorqProve helps to verify control of the load in lifting applications of all kinds. Control capability helps confirm that the mechanical brake has control of the load when stopping the drive, and the drive has control of the load when releasing the brake during any move command.

Combined with excellent low and zero speed performance with accurate torque and speed regulation, TorqProve helps eliminate concerns with brake timing.

It can also help to significantly reduce wear and tear on the mechanical brake with smooth operation and reduced machine stress.

Use TorqProve in any application where coordination between the drive and the mechanical brake is required:

- Cranes
- Hoists
- Draglines
- Material handling lifts (vertical conveyors)
- Automatic Storage and Retrieval Systems (ASRS)
- Palletizer lifts

PowerFlex Drives with TorqProve technology help your application

Reduced Set-up Time

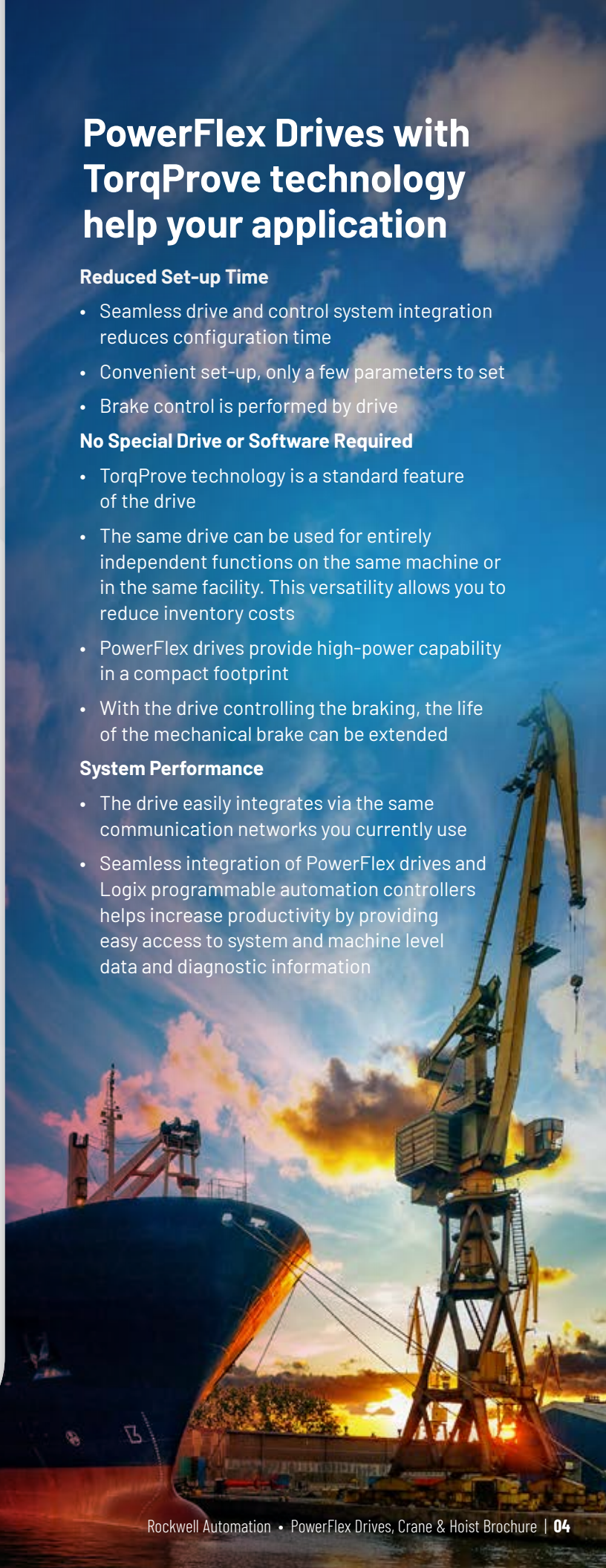
- Seamless drive and control system integration reduces configuration time
- Convenient set-up, only a few parameters to set
- Brake control is performed by drive

No Special Drive or Software Required

- TorqProve technology is a standard feature of the drive
- The same drive can be used for entirely independent functions on the same machine or in the same facility. This versatility allows you to reduce inventory costs
- PowerFlex drives provide high-power capability in a compact footprint
- With the drive controlling the braking, the life of the mechanical brake can be extended

System Performance

- The drive easily integrates via the same communication networks you currently use
- Seamless integration of PowerFlex drives and Logix programmable automation controllers helps increase productivity by providing easy access to system and machine level data and diagnostic information



Anti-sway capability

One major challenge for many lifting applications involves the swinging of a load. Any time a crane moving a load accelerates or stops, it causes the load to sway back and forth. The heavier the load, the more potentially dangerous and disruptive the swinging becomes. Production time is lost while waiting for the load to stabilize when in position. To address these concerns, PowerFlex 755T drives provide built-in anti-sway capability.

Anti-sway capability in PowerFlex 755T drives:

- Helps protect personnel and assets by reducing the unpredictable, pendulum-like movements of a load
- Helps improve productivity by reducing the time needed to wait for a swinging load to stabilize
- Helps control sway of a load without the need for additional sensors, external controller or complex programming
- Doesn't require application expertise – just configure a few drive parameters
- Helps extend the life of mechanical components
- Can be used with a manual or automatic operation mode

"With anti-sway, we can have a higher cycle time because the deceleration is managed by this feature, which allows us to lower the hoist when we arrive at the destination. We don't have to wait."

Charles MONGEAU, ing., P. Eng. REEL COH Inc. Québec, Canada

The benefits of anti-sway capability also extend to applications that involve the movement of fluids.

Use drives with built-in regeneration capability to help reduce energy consumption

Using built-in regeneration capability, some PowerFlex drives can help reduce energy consumption by putting energy back on the incoming power supply, providing a solution that is far more energy efficient than resistive or mechanical braking. Regenerative drives also help to eliminate the need for braking resistors and cooling equipment along with associated wiring, labor, installation and maintenance costs.

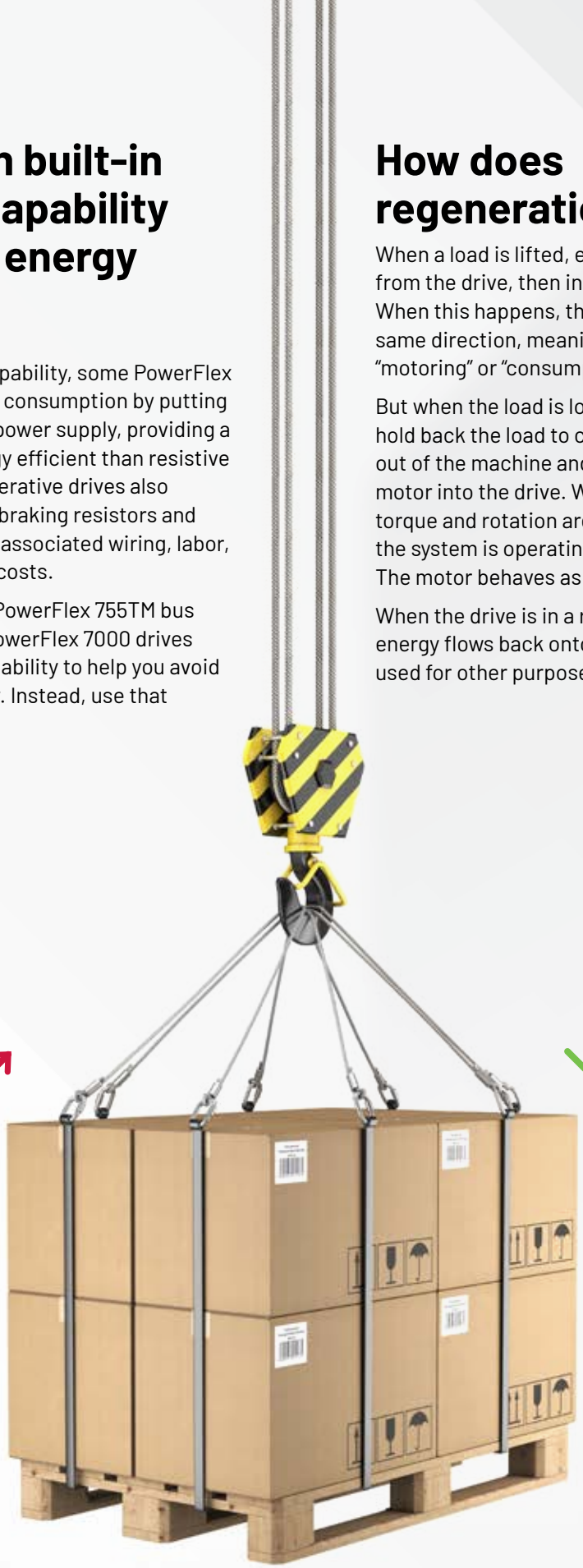
The PowerFlex 755TR drives, PowerFlex 755TM bus supplies, PowerFlex DC and PowerFlex 7000 drives have built-in regeneration capability to help you avoid wasteful dissipation of energy. Instead, use that energy for other applications.

How does regeneration work?

When a load is lifted, energy goes into the motor from the drive, then into the machine from the motor. When this happens, the motor and rotation are in the same direction, meaning the system is operating in a "motoring" or "consumption" mode.

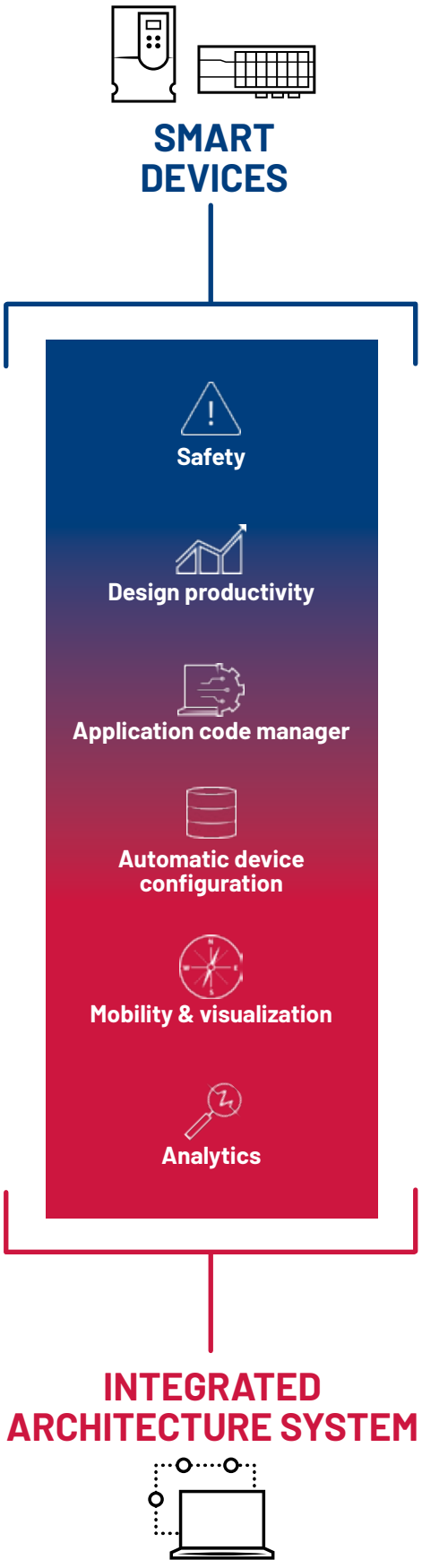
But when the load is lowered, the motor and drive must hold back the load to control its speed. Energy comes out of the machine and into the motor, then from the motor into the drive. When this happens, the motor torque and rotation are not in the same direction and the system is operating in a "regeneration" mode. The motor behaves as a generator.

When the drive is in a regeneration mode, energy flows back onto the mains and can be used for other purposes.



MOTORING MODE
energy is consumed

REGENERATION MODE
energy flows back onto the mains and can be used for other purposes.



Premier Integration

Premier Integration is the exclusive experience of using Allen-Bradley smart devices in the Logix control environment.

The Studio 5000® environment serves as a single programming tool for the design and configuration of your application. You need only one software package for discrete, process, batch, safety, and drive-based applications.

- Drive configuration is saved as part of the Studio 5000 Logix Designer® project file and stored in the Logix controller. You only need one file for both the controller and all drive configurations.
- Consolidating controller programming and device system configuration helps reduce complication and eliminates mismatch errors
- Drive profiles provide a visual interface for automatic tag generation, instant pairing of controller to drive, and tools to assist drive configuration
- Diagnostic, fault, alarm and event information are integral to the Studio 5000 environment

Leverage the Studio 5000 environment to manage application libraries

- Rockwell Automation provides libraries of application code that enable you to take pre-built code and apply it to any Allen-Bradley automation device, making set up of the equipment fast and easy
- Application Code Manager enables time savings during commissioning and enhanced productivity by reusing application code independent of automation device platform

Analytics and visualization

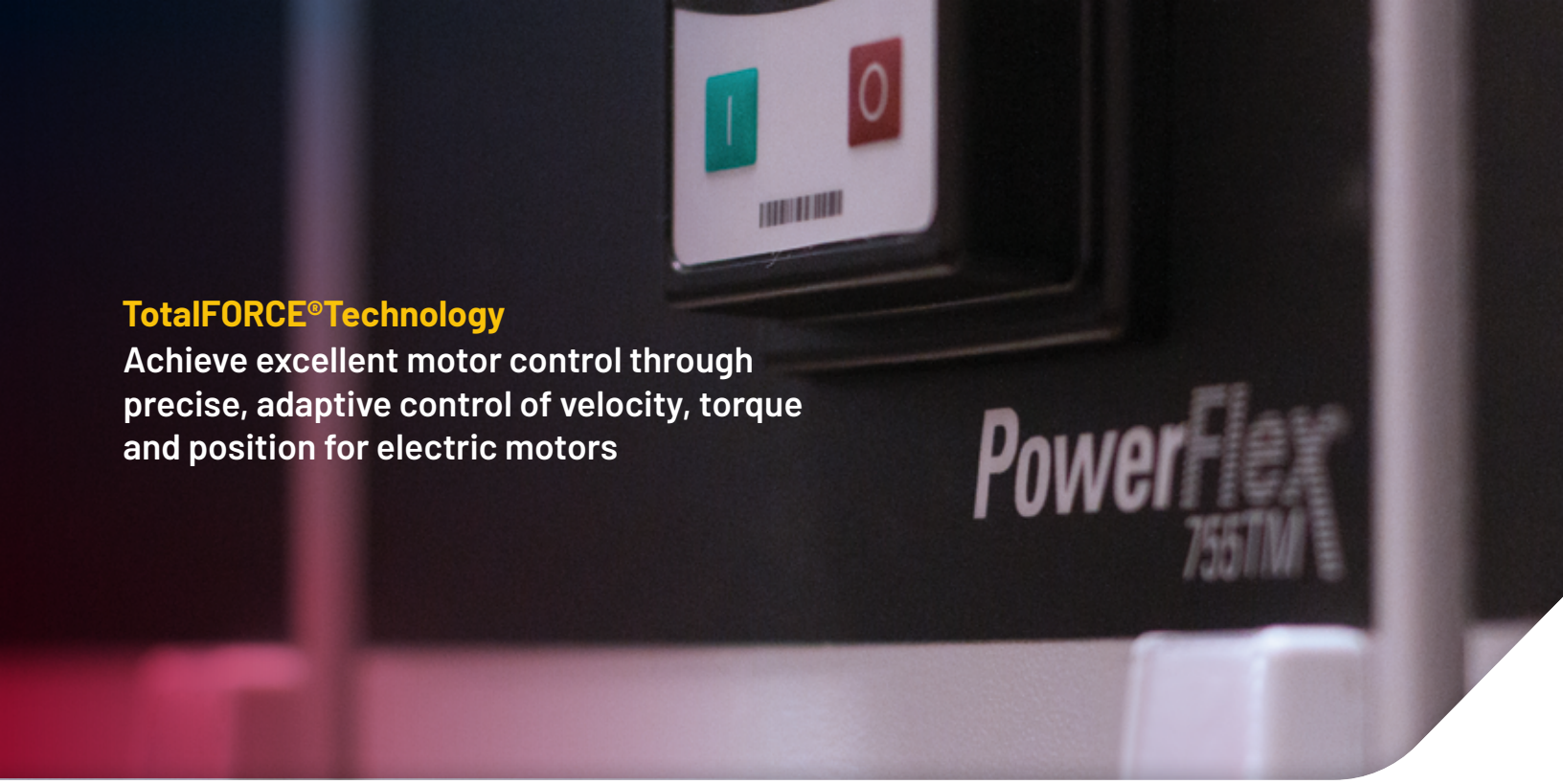
Analytics and visualization provide windows into critical production and process information gathered from self-aware and system-aware smart devices like Powerflex Drives. Enabling you to:

- Predict mechanical problems and help improve performance with diagnostics in real-time
- Investigate, collaborate and troubleshoot in the plant - instantly with no setup and very little change to your infrastructure
- Provide a common user experience for all Rockwell Automation devices with pre-engineered faceplates that provide necessary information for engineers, operators, and maintenance personnel

Safety solutions help improve productivity

Integrated functional safety helps to increase productivity in machine operation and maintenance. Safety ratings up to SIL3, PLe, and CAT 4 are available.

- Decreased set-up times for networked solutions compared with hardwired safety
- Diagnostics become more accessible as part of the overall system
- Safety instructions and functions integrate into the controller for modularity and scalability



TotalFORCE® Technology
Achieve excellent motor control through precise, adaptive control of velocity, torque and position for electric motors

Gain total control over challenging applications

PowerFlex 755T drives are the only VFDs on the market to offer the combination of TorqProve technology, anti-sway capability, regeneration and Premier Integration. Using patented technology, they offer a variety of exclusive benefits to help improve the safety, dependability and productivity of your lifting application.

Available in a wide power range of 0.5...6000 Hp / 0.37...4550 kW, the PowerFlex 755T drives include:

- **PowerFlex 755TL Drive** – Provides harmonic mitigation and power factor correction through the use of active front end technology. By reducing the adverse effects of harmonic distortion, the drive helps to improve energy efficiency, reduce energy costs and minimize power distribution issues on the factory floor.
- **PowerFlex 755TR Drive** – Features built-in regeneration capability that helps decrease energy consumption by delivering regenerative energy from motors back to the incoming supply. Line regeneration reduces the need for braking resistors and associated cooling equipment and helps avoid wasteful dissipation of energy. The drive also offers harmonic mitigation.
- **PowerFlex 755TM Drive System** – Select from a series of predesigned configurations for regenerative common bus supplies and common bus inverters to optimize your system design and power consumption. A common bus drive system offers advantages such as design flexibility, energy optimization and reduced installation costs. PowerFlex 755TM systems provide harmonic mitigation and built-in regeneration capability.
- **PowerFlex 755TS Drive** – Use this for common traditional applications as well as specialized applications that require high-performance motor control. Because it supports multiple motor control modes, you can use a common VFD throughout the plant – simplifying parts, training and support.

Key benefits of the PowerFlex 755T drives

A broad power range 1 10...6000 Hp / 7 .5...4550 kW allows the drives to be used in a wide variety of applications. The lower power ratings are provided in compact, panel mount drives.

Predictive diagnostics and maintenance 2 improve productivity by monitoring drive operating conditions and calculating the remaining life span of drive components, so preventive action can be taken if necessary

Adaptive control features 3 monitor machine characteristics that can change over time and automatically compensate for the changes that occur

Harmonic mitigation 4 select drives enable your system to meet the IEEE 519 standard (5% or less of total harmonic distortion)

Simplified serviceability 5 with key components that are modular in design and easily accessible

Roll in/out design 6 for floor mount drives makes the power and filter modules easy to install and service. Power wiring can stay connected while unit is rolled out.

Patented slot-based hardware structure 7 allows you to select option modules for safety, feedback, communications and I/O. Option modules can be added when you need them.

DeviceLogix™ control 8 provides built-in drive capability to process logic locally and reduce demands on the controller and network. The ability to operate the drive independently or complementary to supervisory control can help speed reaction time by reducing dependency on network throughput.

Permanent magnet motor control 9 provides an energy-efficient addition to the wide variety of motors supported

For more information

- **www.ab.com/Drives**
- **PowerFlex 755T Brochure, publication 755T-BR001**

Maximize your productivity

Take advantage of PowerFlex Drives

In addition to providing exclusive features for lifting applications, the robust family of PowerFlex AC and DC drives provide ease of use, flexibility and performance for a variety of industrial applications

PowerFlex 7000 AC Drives

The PowerFlex 7000 family of medium voltage AC drives delivers flexibility and highly efficient performance in a single solution for motor control applications from 200 to 34,000 Hp (150 kW to 25,400 kW), rated from 2.4 kV to 6.6 kV. To help protect personnel and equipment while reducing machine downtime, the drive offers safety solutions up to and including PLe/SIL3, Cat 3. Choose a configuration with Direct-to-Drive™ technology – and connect a drive directly to the line without the use of an isolation transformer. Direct-to-Drive technology combines an active front end (AFE) rectifier to lower line-side harmonics and a patented DC link inductor to address common mode voltage at its source. This allows the use of standard motors, making it ideal for both new projects and upgrades of existing applications.

PowerFlex DC Drives

The PowerFlex DC drive combines powerful performance between 1.5 to 1400 Hp (1.2 to 1044 kW), with flexible control to produce a highly functional, cost-effective drive and control solution. PowerFlex DC drive modules are available in both regenerative and non-regenerative configurations and standard IP20 open type enclosure. The PowerFlex DC includes an armature converter, regulated field converter for field weakening or economy applications, an advanced regulator with integrated DPI functionality, DC tachometer and encoder capability. Unlike many other DC drives available today, the PowerFlex DC can be easily integrated into your complete manufacturing system. With drive profiles for Premier Integration, end users can now have a single software approach to configure their controller, drive system, and for operation and maintenance.

PowerFlex AC Drives

High-performance solutions for a wide range of global applications

	PowerFlex 755TS AC Drive	PowerFlex 755TL Drive	PowerFlex 755TR Drive	PowerFlex 755TM Drive System
Ratings 200V	0.37…132 kW	N/A	N/A	N/A
Ratings 240V	0.5…200 Hp	N/A	N/A	N/A
Ratings 400V	0.75…270 kW 315…1400 kW (PowerFlex 755)	7.5…1250 kW	7.5…3640 kW	Common Bus Inverter: 160…3640 kW Regenerative Bus Supply: 87. . .4358 kW
Ratings 480V	1…400 Hp 400…2000 Hp (PowerFlex 755)	10…1800 Hp	10…6000 Hp	Common Bus Inverter: 250. . .6000 Hp Regenerative Bus Supply: 90…4818kW
Ratings 600V	1…300 Hp 300…1500 Hp (PowerFlex 755)	10…1500 Hp	10…5100 Hp	Common Bus Inverter: 250. . . 5100 Hp Regenerative Bus Supply: 69…4432 kW
Ratings 690V	7.5…250 kW 250…1500 kW (PowerFlex 755)	11…1400 kw	11…4596 kw	Common Bus Inverter: 200. . .4550 kW Regenerative Bus Supply: 84. . .4714 kW
Class of service	• CMAA Class A – F Service • AISE TR6 Class 1 – 4 • AsME HST – 4M H1 – H5	• CMAA Class A – F Service • AISE TR6 Class 1 – 4 • AsME HST – 4M H1 – H5	• CMAA Class A – F Service • AISE TR6 Class 1 – 4 • AsME HST – 4M H1 – H5	• CMAA Class A – F Service • AISE TR6 Class 1 – 4 • AsME HST – 4M H1 – H5
Speed control sources	• Up to 7 Distinct Stepped Speeds • 2-Step Infinitely Variable • 3-Step Infinitely Variable • Analog (0 – 10V DC, 4 – 20 mA, +/- 10V DC) • Digital Pulse Train Input/Output	• Up to 7 Distinct Stepped Speeds • 2-Step Infinitely Variable • 3-Step Infinitely Variable • Analog (0 – 10V DC, 4 – 20 mA, +/- 10V DC) • Digital Pulse Train Input/Output	• Up to 7 Distinct Stepped Speeds • 2-Step Infinitely Variable • 3-Step Infinitely Variable • Analog (0 – 10V DC, 4 – 20 mA, +/- 10V DC) • Digital Pulse Train Input/Output	• Up to 7 Distinct Stepped Speeds • 2-Step Infinitely Variable • 3-Step Infinitely Variable • Analog (0 – 10V DC, 4 – 20 mA, +/- 10V DC) • Digital Pulse Train Input/Output
Communication interface	• Built-in Dual-Port EtherNet/IP • ControlNet • DeviceNet • PROFIBUS DP • Profinet IO	• Built-in dual EtherNet/IP ports • ControlNet • DeviceNet • PROFIBUS DP • PROFINET	• Built-in dual EtherNet/IP ports • ControlNet • DeviceNet • PROFIBUS DP • PROFINET	• Built-in dual EtherNet/IP ports • ControlNet • DeviceNet • PROFIBUS DP • PROFINET
Safety options	• Safe Torque Off • Safe Speed Monitoring • Networked Safe Torque Off • Networked Integrated Safety Functions	• Safe Torque Off • Safe Speed Monitoring • Networked Safe Torque Off • Networked Integrated Safety Functions	• Safe Torque Off • Safe Speed Monitoring • Networked Safe Torque Off • Networked Integrated Safety Functions	• Safe Torque Off • Safe Speed Monitoring • Networked Safe Torque Off • Networked Integrated Safety Functions
Enclosure types	• IP20/Type 1 • Flange Mount • IP54/Type 12	• IP21/Type 1 • IP54/Type 12	• IP21/Type 1 • IP54/Type 12	• IP21/Type 1 • IP54/Type 12
Ambient temperature ratings	• IP00/IP20, NEMA/UL Open Type = 0…50 °C (32…122 °F)* • NEMA/UL Type 1 Kit = 0…40 °C (32…104 °F) • Flange Mount Front: IP00/IP20, NEMA/UL Open Type = 0…50 °C (32…122 °F)* • Flange Mount Back: IP66, NEMA/UL Type 4X = 0…40 °C (32…104 °F) • IP54, NEMA/UL Type 12 = 0…40 °C (32…104 °F)	-20…40 °C -20…55 °C with derate	-20…40 °C -20…55 °C with derate	-20…40 °C -20…55 °C with derate

PowerFlex Medium Voltage and DC Drives

A variety of drive types to meet a wide range of applications

PowerFlex 7000 Medium Voltage AC Drive

Ratings(1)	Heavy Duty 150% OL	• 2400V: 200...2000 Hp • 3300V: 187...1865 kW • 4160V: 350...3000 Hp • 6600V: 400...3000 kW
Motor control	• Flux Vector with a Feedback Device • Induction Motor Control • Single Drive Multi-Motor Synchronous Transfer Capability • Multi Drive Loadshare Operation	
Speed control sources	• Analog (0 – 10V DC, 4 – 20 mA, +/- 10V DC) • Digital Pulse Train Input/Output • Drive Generated Segmented Ramp or S Curve • Serially Communicated Digital Reference	
Communication interface	• EtherNet/IP • DeviceNet • Modbus • ControlNet	• Profibus RS485 DF1 • Lon Works • Can Open • USB
Safety	• Safe Torque Off	
Enclosure types	• IP21 • IP42	
Applications	Hoists, Draglines, Conveyors, Winches, Grinding Mills	

(1) Drive power rating based on single module unit. Please consult factory for PowerFlex 7000 extended power configurations.

* Encoder card required when using PowerFlex 7000 with TorqProve Control.

PowerFlex DC Drive

Ratings	• 200...240V: 1.2...224 kW / 1.5...300 Hp / 7...1050 A • 380...380V: 1.5...671 kW / 2...900 Hp / 4.1...1494 A • 500...600V: 37...932 kW / 50...1250 Hp / 67.5...1688 A • 690V: 298...1044 kW / 400...1400 Hp / 452...1582 A
Motor control	• Full Wave Regeneration • 6 Pulse • Regulated Field Supply • Field Weakening and Economize
Additional features	• Overload Protection • PID Control (Speed or Torque) • Adaptive Gain, Droop, Feedback Loss Switchover • TorqProve Control
Certifications	• cULus • CE • China RoHS • KCC • RCM • RoHS For a complete list, search **PowerFlex Certifications** on literature.rockwellautomation.com
Communication interface	• EtherNet/IP • BACnet • ControlNet • DeviceNet • HVAC • Modbus/TCP • PROFIBUS DP • Dual port EtherNet/IP
Enclosure types	• IP20, NEMA/UL Type Open
Applications	Cranes, Hoists, Conveyors, Elevators, Palletizers, ASRS

Rockwell Automation

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