



DC DRIVE CRANE CONTROL UPGRADES

PAR
SYSTEMS

ENGINEERING SOLUTIONS TO DRIVE YOUR BUSINESS FORWARD

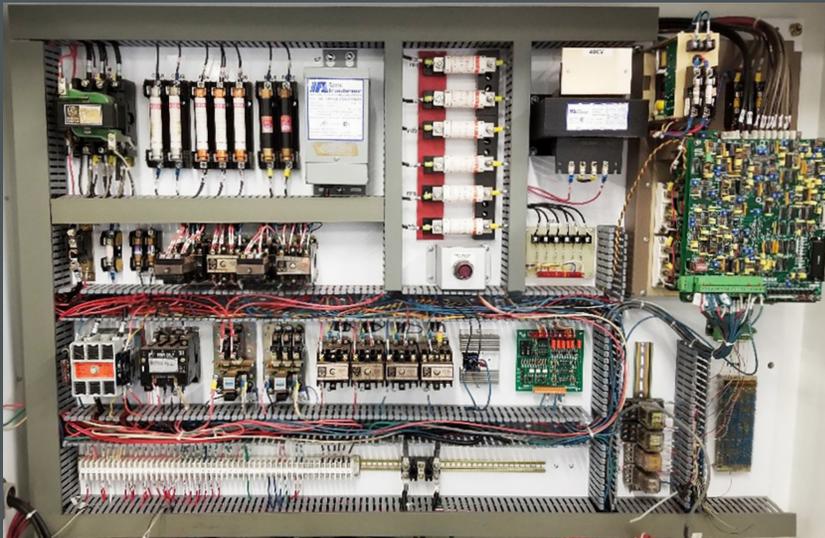
Do you have a crane with old DC controls? PAR Systems has expertise in upgrading your crane's DC drives to modern controls. This method of modernizing your crane has many benefits including improving overall performance, lowering necessary crane maintenance and operational costs, and many more.

Aging overhead cranes built with dated DC control drive technologies may not be able to meet your increasing business performance requirements. Whether this is a result of excessive equipment repair, maintenance down time, or simply from the crane's own operational performance inefficiencies, these are often the primary drivers when considering whether it is time to modernize your crane's obsolescent DC controls. While the vast majority of new cranes manufactured today utilize AC drive technology, significant reasons still exist to modernize your crane with today's state of the art DC drive controls.

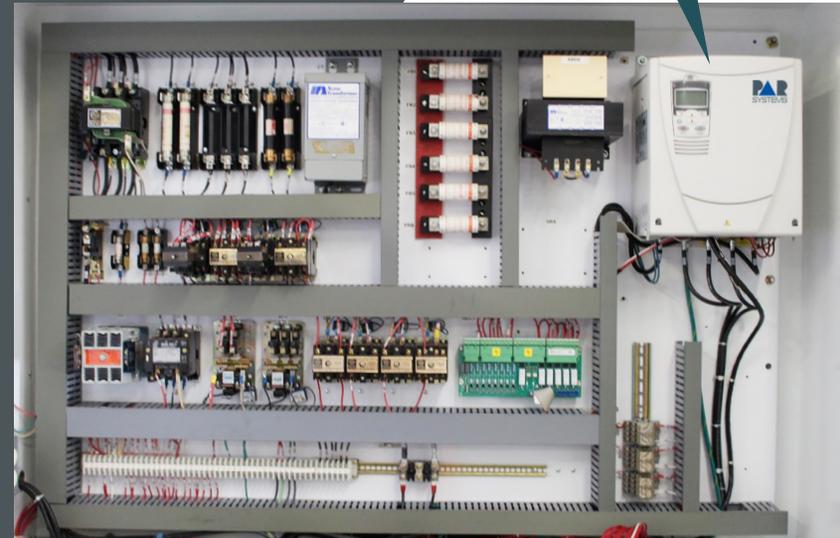
NO OTHER CONTROL PANEL MODIFICATIONS REQUIRED



BEFORE DRIVE UPGRADE



AFTER DRIVE UPGRADE



KEY FEATURES

- Torque Monitoring
- Fast Stop and Slow Speed Functions
- Torque Proving
- Power Optimization
- Load Sharing and Speed Matching
- Adaptive programming for custom applications
- Optional add-on: Anti-sway technology

BENEFITS OF DC UPGRADES

Cost-savings of as much as 6x what a full AC controls conversion would cost

Option to keep your existing crane control system components: Motors, Gearboxes, Brakes, Speed feedback devices, Control panels and Crane wiring scheme

Significantly less engineering and installation labor costs

Time and ease of install

Performance:

- Improvement to the drive's responsiveness
- Improve the operator's ability to precisely control the load
- Enhanced safety features
- Compatible with most existing control devices
- No need to re-train operators on controls operation

Improve spare parts availability & reliability

Conserves energy and reduces power costs

On-call tech drive support and maintenance personnel

New drives will fit within the existing control enclosures

One of the most environmentally friendly upgrade options available today

INDUSTRIES SERVED

- Portal
- Lumber
- Steel
- Shipyard
- Pulp/paper
- Nuclear
- Aerospace
- Gas Turbine
- Hydro-electric
- Mining



HOW TO GET STARTED? The steps to modernization

1 How's your crane operating?

The first step is to understand the current operational and performance levels of your crane.

Step one begins with a **Crane Reliability Assessment**, a detailed review of your cranes service history, maintenance and down time records, and a thorough review of your spare parts inventory or availability status. PAR Systems' assessment can also include a component life expectancy analysis, whereby providing the crane owner with a comprehensive evaluation of your current problem areas, potential problem areas, and what are the current operational risks associated with your crane. This step is the most important thing you can do as a crane equipment owner and operator when you begin looking to modernizing your crane.

2 Have your needs changed?

Next you will want to understand if your crane's operational needs have changed or will be changing in the future.

Does your crane need more capacity? Will your crane be performing more frequent lifts, running longer duty cycles, or performing more repeated heavy/capacity type lifts? You could potentially be changing your crane's original design classification if the answer was "YES" to any of those questions. At this stage, you will need to have a **Crane Feasibility Study** completed for your crane. If your crane's needs are changing or have changed, it may be possible to modify your crane's capacity or service class to the levels required. It is important to understand this early in the process.





3

What needs to be upgraded?

An itemized list of the components or types of equipment that will need to be upgraded should be identified.

Once you've completed your Crane Reliability Assessment and Feasibility Study, PAR will help you evaluate your performance and capacity needs. You should now have an itemized list of the components or types of equipment that will need to be upgraded, modernized, or replaced to complete the intended uprate or controls modernization of your crane. You will want to review this upgrade list carefully and understand what new features and nuances your modernized crane will have. For a lot of crane owners, a crane uprate or control modernization will only be done once in the crane's entire service life. Other than the basic necessities for your crane's control modernization, it may also be the time to explore what additional features or add-ons are available that could help support your crane operators performance, provide additional plant or equipment safety, and/or meet long term goals of your asset care or management program. PAR can provide you with an array of options that will fit any variety of crane performance situations.

4

Develop a Modernization Plan

No single modernization plan is a one size fits all plan for every crane owner.

Each individual modernization plan ultimately depends on the exact components or options that you select for upgrade or replacement as the crane owner. Uprates or crane modernizations may also require a third party or Professional Engineers (PE) to sign-off on the design changes, so you will also want to understand what your state or local building codes require. PAR will be able to provide any number of customized installation plans to suit your particular requirements and budget. Whether this is a full turnkey installation, commissioning, and load test of your crane or just supervisory installation services, PAR Systems will have a solution to meet your needs.

PaR's DC Controls upgrades are available for any type of drive your crane may have.



ADD-ON OPTIONS



Radio Remote Control



Ergonomic Crane Cab Chair



HMI Operator Display Panels



Crane Positioning & Feedback



Load Weighing Capabilities



Regenerative Braking



Crane Scoreboards



Equipment Data Logging



Anti-Sway Technologies

UPRATE CAPABILITIES

PAR Systems has over 70 Engineers worldwide experienced in uprate capabilities, spanning every discipline required for a successful and efficient crane uprate project.

Disciplines:

- Mechanical
- Structural
- Controls
- Software

* PE Stamping Available

Affiliations and Competencies:

- Active Executive Member of CMAA Engineering Committee
- Active Member of ASME CNF (NOG-1) Engineering Committee
- FEA Analysis
- Extensive design experience, including but not limited to, ASME BTH-1, B30.20, B30.8 and OSHA

Tools & Technology:

- Solidworks 3D Modeling
- Solidworks Simulation FEA, Static and Dynamic
- Working Model – Kinematics Simulation
- MathCad
- Seismic Analysis Partners

ADVANCED CRANE MOTION CONTROL TECHNOLOGY

PAR Systems' **EXPERTOPERATOR™** allows for the operation of crane payloads in a swing-free manner. **EXPERTOPERATOR™** allows both novice and expert crane operators to reduce load swing by over 95%.

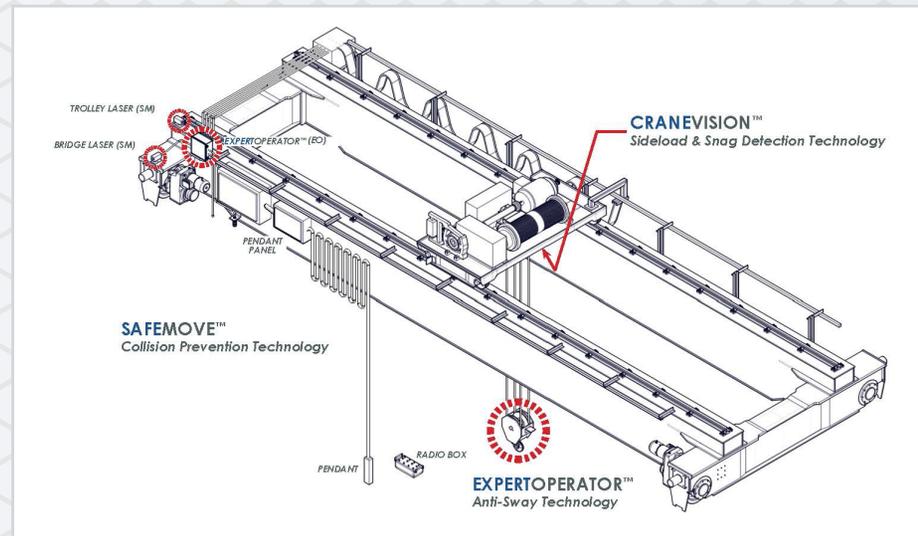


HOW IT WORKS

EXPERTOPERATOR™ works by intercepting operator commands, then modifying those commands into what a seasoned expert would generate. The modified commands are then issued to the crane. This allows novice operators to drive as proficiently as their experienced counterparts, moving loads safely in a swing-free, efficient manner.



NO SENSORS



FEATURES:

- **Sway Elimination** over the entire hoist range - it works with any hook height, any payload and any rigging configuration.
- **Sensorless** technology does not require encoders, cameras, sling length measurements, operator input, load cells, or any other data normally required by other anti-sway technologies.
- **Seamless** integration into existing hardware platform.
- **Compatible** with existing VFDs, radio and tethered pendants with continuous or multi-step functionality.
- **Easy to install. Easy to maintain.**

BENEFITS:

- **Safety** - Load sway prevention reduces risk of equipment damage and personnel injury.
- **Productivity** - Hundreds of operator studies demonstrate that cycle times improved by 10% to 40%.
- **Precision** - Accurate load placement is simple because operators focus on positioning rather than swing correction.
- **Service Life** - Maintenance costs and downtime are reduced by decreasing mechanical and structural stress.
- **Personnel** - Allows novice operators perform as well as their experienced counter parts. Makes cranes safer by making them easier to drive, reducing the need for extensive training time.



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