



DELTA

COMPUTER SYSTEMS, INC.

RMC Family Of Motion Controllers



RMC75
1 or 2-axis



RMC150
up to 8-axis



RMC200
up to 32-axis



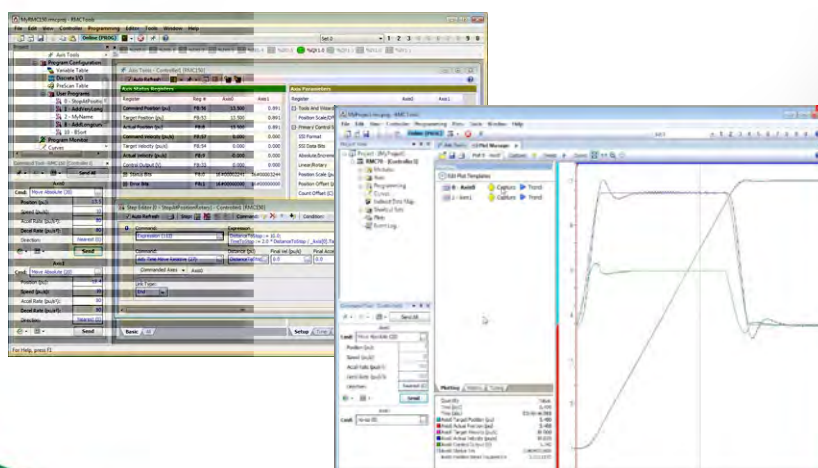
About Delta Computer Systems

Company Profile

Delta Computer Systems, Inc. manufactures motion controllers, accessories, and other industrial controls; providing high-performance automation solutions to a wide range of industries. Look to Delta for innovative technology, great products, responsive service, and lasting value.

Competitive Advantage

- High performance electric hydraulic motion control, including pressure/force control
- Synchronize 2 to 32 axes; electric, hydraulic, or pneumatic
- Communicate with any system, connect to all transducers – integrate into new or retrofit applications
- Powerful and easy-to-use RMCTools Software
- Free software and firmware with unlimited upgrades
- Free 24/7 telephone and email/text support
- Ships within 10 days after receipt of order
- Almost 4 decades of expertise in motion control
- Zero Obsolescence Policy
- Designed and Manufactured in the USA





RMCTools

For the RMC70, RMC150 and RMC200 motion controllers.

RMCTools is a powerful motion control software package for setting up, tuning, troubleshooting, programming and controlling all features of Delta's RMC70, RMC150 and RMC200 motion controllers. Download your free fully functional copy at www.deltamotion.com.

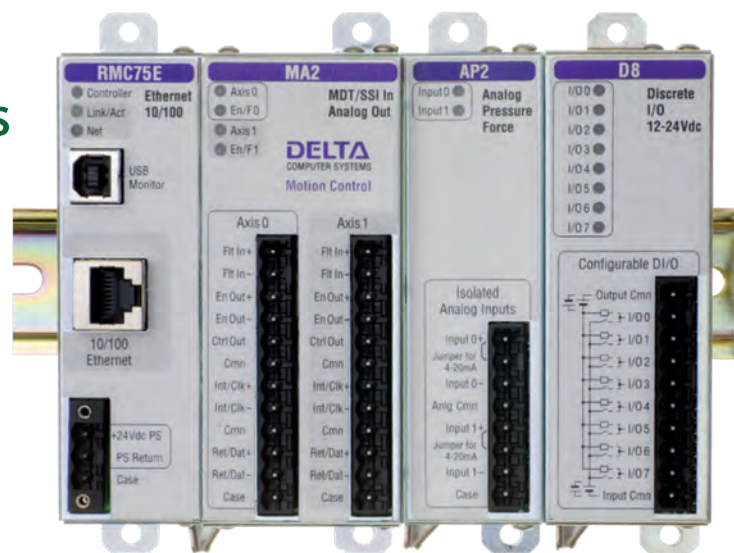
Features

- **Full Parameter Set:** Monitor all axis status registers and modify parameters.
- **Plots:** Plot any register in the RMC, up to 16 registers per plot, sampled down to the control loop resolution!
- **Event Log:** Speeds troubleshooting by recording events such as parameter changes, commands, errors and communications!
- **User Programs:** Easily create programs to issue sequences of commands
- **Curve Tool:** Graphically create custom motion profiles and cam profiles.
- **Variable Table:** Edit and Change User Program execution and variables.
- **Wizards:** Lots of easy-to-use wizards such as Auto-Tuning, New Projects, New Controller, Scale & Offset and programming.
- **Commands:** Issue commands directly from RMCTools. Use Command Shortcut Sets to quickly issue commands to speed the tuning process.
- **Mathematical Expressions:** Expressions provide flexible programming capability for advanced calculations and machine control sequences.
- **Program Triggers:** Use wizards to set up immediate response to internal conditions or external events (discrete I/O, etc.)



RMC70 Series

1 or 2 Axis
Motion Controller



The RMC70 Series motion controllers offer a valuable combination of performance and ease-of-use for one-and two-axis systems. With powerful control modes including dual-loop position-pressure algorithms and multiple feedback types, the RMC70 Series provides optimum control to a wide range of hydraulic, electric, and pneumatic position and position pressure/force applications. Communication with popular PLCs and HMIs is efficient, with support for numerous protocols, easy-to-use address mapping features, and mirroring of PLC addressing. Time-critical sequences can be offloaded from the PLC into the RMC70's flexible User Programs. A full set of motion parameters, including acceleration and velocity feed forwards and separate directional gains, delivers smooth, precise motion to boost throughput, improve quality and extend machine life. Command-based programming speeds development and reduces longterm software maintenance. Advanced graphing and diagnostic capabilities can be used to troubleshoot the entire motion system.

	# Control Axes	Max Dual-Loop Axes	Max Total Axes (Control + Ref)	Ethernet	Serial RS-232/485	PROFIBUS	EtherNet/IP	CSP	Modbus/TCP	DMCP	PROFINET	SSI	MDT, Start/Stop PWM	Analog ±10V 4-20mA	Quadrature	Resolver
RMC70	1-2	2	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RMC150	2-8	8	16	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMC200	4-32	32	32	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	

RMC Family

RMC150 Series

2, 4, 6, or 8 Axis
Motion Controller



The RMC150/151 delivers high-performance motion control to hydraulic, electric servo, and pneumatic industrial applications. With powerful control modes—including dual-loop position-pressure algorithms—and connectivity to many transducer types, the RMC provides optimum control for a wide range of motion applications. The RMC150/151 CPU module comes standard with Ethernet, supporting protocols such as EtherNet/IP, PROFINET, and Modbus/TCP, and is designed to integrate easily with your favorite PLCs, PCs and HMIs. Equipped with excellent graphing features and easy-to-use wizards, the RMCtools software handles setup, programming, tuning and diagnostics for both the RMC150 and RMC70 series controllers. Flexible Multi-axis Modules can be “mixed and matched” to support up to 8 control axes for tightly synchronized motion, and additional reference axes up to a total of 16 controls, reference or virtual axes. The multiple configurations of axes make this an ideal controller for not only motion but also testing and data acquisition requirements.

	# Control Axes	Max Dual-Loop Axes	Max Total Axes (Control + Ref)	Ethernet	Serial RS-232/485	PROFIBUS	EtherNet/IP	CSP	Modbus/TCP	DMCP	PROFINET	SSI	MDT, Start/Stop PWM	Analog ±10V 4-20mA	Quadrature	Resolver
RMC70	1-2	2	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RMC150	2-8	8	16	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMC200	4-32	32	32	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	

RMC200 Series

up to 32 Axis
Motion Controller



The RMC200 is Delta's newest high-performance motion control platform for hydraulic, electric servo, and pneumatic industrial applications up to 32 axes. User-swappable modules provide flexibility and connectivity to many transducer types. The RMC200's dual core CPU module comes standard with Ethernet, supporting protocols such as Ethernet/IP and Modbus/TCP, and is designed to integrate easily with your favorite PLCs, PCs and HMIs. Delta's RMCTools software handles setup, programming, tuning and diagnostics for the RMC200, RMC150 and RMC75 controllers. Excellent graphing features and easy-to-use wizards complement its user programs designed specifically for motion sequences. As Delta's largest and most capable motion controller, modules can be "mixed and matched" to support up to 32 axes for tightly synchronized motion, filling the needs for large scale motion systems, testing and data acquisition applications.

	# Control Axes	Max Dual-Loop Axes	Max Total Axes (Control + Ref)	Ethernet	Serial RS-232/485	PROFIBUS	EtherNet/IP	CSP	Modbus/TCP	DMCP	PROFINET	SSI	MDT, Start/Stop PWM	Analog $\pm 10V$ 4-20mA	Quadrature	Resolver
RMC70	1-2	2	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
RMC150	2-8	8	16	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
RMC200	4-32	32	32	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	



Applications

Phantom - Las Vegas Spectacular relies on Delta Motion Controller

Summary:

Delta motion control adds to the spectacular special effects in Phantom—the Las Vegas Spectacular at the Venetian Resort Hotel Casino in Las Vegas. The nightly show has a stunning new home in an architecturally impressive theatre inspired by the Opera Garnier in Paris.

Challenge:

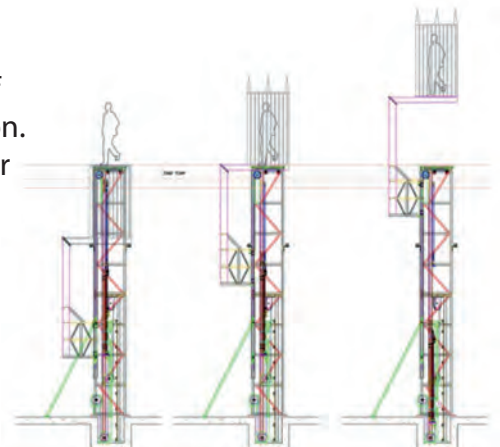
Delta and AIT's challenge was to control the motion of a 1,500 pound cage that suddenly appears to trap the angered Phantom's foe during the stage production. The cage moves 84 inches upward from below the stage floor in just one second. Each night it reliably returns to the exact position at its home underneath the stage following the dramatic scene.

Solution:

AIT applied Delta's RMC75E to control the motion because its extremely fast closed loop motion profile is able to control the heavy cage. AIT's design also monitored key safety parameters of the system. The AIT application used an HMI interface for trouble free operation with the simplicity of only up and down buttons to control.

Benefits:

Typically, theatrical scenery that requires the strength and control of hydraulics has been limited to slow moving lifts and scenery animation. With the use of Delta's RMC75E, Phantom—the Las Vegas Spectacular is able to have never before seen special effects during its unique 95 minute show. After each use, the cage returns to its precise home position beneath the stage floor. Numerous safety provisions in this AIT designed system keep the actors safe and allow the show to go on each night.





Applications

The house of dancing water Controlling the Biggest Water Show on Earth

Summary:

Taking in Franco Dragone's The House of Dancing Water production in Macau, China's City of Dreams, is breathtaking. Sophisticated staging is actually composed of eight different lift sections. The stage sits atop a forest of hydraulic cylinders that lift and lower the sections up to 27 ft. in the world's largest indoor swimming pool. At times the lifts are raised to form a dry stage and at other times, they independently recede to produce a water pool for swimmers, only to emerge again carrying large props such as a pagoda structure and a 26-ton ship.

Challenge:

The stage used in The House of Dancing Water production is composed of 12 sections that can be raised and lowered independently for a wide range of effects. Because the theater is constructed with separate water-holding and dry enclosures, the hydraulic valves and cylinders are located a distance apart, with a large amount of hydraulic oil (on average 70 gal) in each cylinder and in the plumbing between the cylinder and its valve. To keep the platform sections level and avoid deforming the structural frames, motion of each cylinder operating a lift must be tightly synchronized with each other. This requirement is made even more challenging by the compressibility of the volume of hydraulic oil between each valve and cylinder.

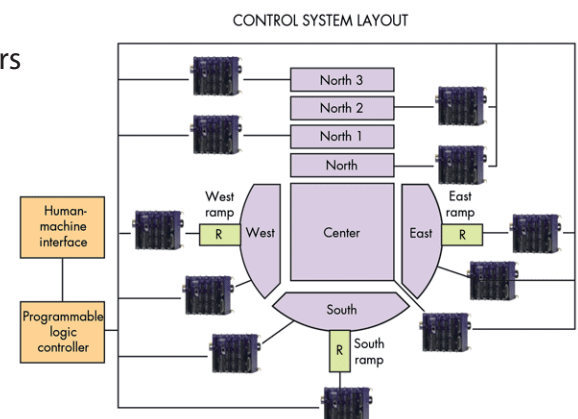
Feedback of linear position:

The Dancing Waters application uses 11 RMC150 motion controllers with Ethernet communications to the PLC.

Another interesting aspect of the magnetostrictive LDTs was pointed out by Mike Wardle of MTS Sensors Division.

He said the maximum length for the standard rigid sensor, in general, is 300 in. (25 ft.). So the 27-ft. requirement for this application demanded an alternative. Wardle said the standard maximum length for a flexible sensor is 10 m—32.8 ft.

This meant a standard flexible sensor could be used and held rigid inside the watertight enclosure. Additionally, these flexible sensors are easily coiled, packaged, and shipped more cost effectively.





Applications

Vehicle Driving Simulator
Uses Synchronized Electro- Hydraulic Controls

Summary:

A standard way of building motion simulators is to start with a Stewart platform. Stewart platforms enable movement with six degrees of freedom (x, y, z axis transitions, plus pitch, yaw and roll rotations).

Challenge:

The nature of a Stewart platform architecture is that achieving the desired motion of the top of the platform in any direction and at any attitude requires moving all of the actuators by a certain amount. Computing the amount to move each axis can be a mathematically-intensive function, and the challenge to system designers is to complete the calculations and affect the motion fast enough to support realistic motion of the platform.

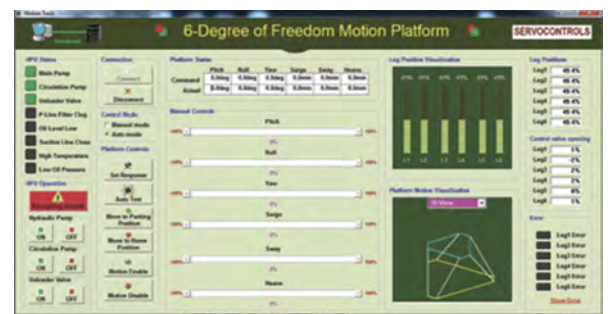
Solution:

The math and synchronization features of the RMC150 helped to achieve all of the design goals. In this type of synchronization, all six axes start and stop moving simultaneously, and at any point during the move, each axis has completed the same percentage distance (or ratio) of its move. The axes do not need to start or stop at the same positions. Because the synchronization function is built into the controller, it is much easier to implement multi-axis control strategies with the RMC than it would have been using a PLC.

Benefits:

The new motion platform generates smooth motion in synch with the projected video frame, simulating realistic driving feel with all the desired dynamic characteristics.

“The Delta controller solves our greatest problem, which was synchronizing the axes.”



About us



tsb-bescom strives to offer more than simply access to well-known sensor and electronic brands. **tsb-bescom's** technical sales and engineering staff work with the customer to develop the best solution that results in a design that exceeds the customer's expectations. Their combined experience and technical knowledge is the extra added value that goes beyond selling parts and equipment. **tsb-bescom** has expertise and product offerings for several specific markets and applications including marine and offshore, renewable energy, food, packaging, metals processing, and rail transportation.

States Delta CEO Steve Nylund, "A key component to Delta's success are distributors who go beyond simply selling components and rather become an important resource to help the customer's project succeed. Having distributors across the globe who can support the customer before, during, and after the sale is critical to Delta's commitment to customer service and value. " Adds Nylund, "The addition of **tsb-bescom** is an example of Delta's long-term commitment to developing new markets in the global marketplace."

DELTA

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