RMC150/151 DATASHEET

Two, Four, Six, and Eight Axis Motion Controllers

The RMC150/151 motion controllers bring the 32-bit software interface and advanced User Programs of RMCTools to the multi-axis RMC100 Series, making them Delta's most powerful motion controllers yet. These controllers combine the new RMC150E CPU with proven RMC100 axis modules. The RMC150E CPU features a built-in 10/100 Mb/s Ethernet port with support for all of the most common industrial protocols, including EtherNet/IP, and is designed to integrate easily with your favorite PLCs and HMIs.

The RMCTools software handles setup, programming, tuning and diagnostics for the RMC150/151 controllers in addition to Delta's 1- and 2-axis RMC70 Series.

The RMC150/151 controllers bring the benefits of modular, high-performance motion control to a wide range of industrial applications. Axis modules can be "mixed and matched" for control of servo hydraulic, electric, and pneumatic systems. Powerful control modes—including dual-loop position-pressure algorithms—provide optimum control for your motion applications. Refer to other RMC100 datasheets or the RMCTools online help for more information. Download datasheets and RMCTools from Delta's web site at **www.deltamotion.com**.

Flexible Multi-axis Capability

The RMC150/151 supports up to 8 control axes for tightly synchronized motion, with additional reference axes up to a total of 16 control, reference or virtual axes. The table below compares the number of axes supported by RMC motion controllers.

Controller	Maximum Control Axes	Maximum Position-Pressure (Dual-Loop) Axes
RMC150/151	8	8
RMC100/101	8	4
RMC75	2	2

All RMC motion controllers are backed by a company legacy of more than 25 years of excellent product support. Responsive 24/7 customer service is just a telephone call away.

Features

Control Algorithms
▲ Position, velocity, acceleration, pressure, force, position–pressure, position–force, velocity-pressure, velocity-force, active damping
▲ Full parameter set supports high performance motion control

Setup and Programming
▲ Command-based—for easy program development and maintenance
▲ Flexible User Programs—advanced step sequencer with user-named variables and mathematical expressions
▲ Extensive, context-sensitive Help

Tuning and Diagnostics
▲ Powerful motion graphing for optimizing motion
▲ Autotuning Wizard
▲ Event Log shows real-time activity

Communications

▲ Ethernet (10/100 Mb/s): EtherNet/IP, Modbus/TCP, CSP, Omron FINS, Procedure Exist (Mitsubishi Q-series)
▲ USB port for RMCTools
▲ PROFIBUS
▲ Discrete I/O

Applications

▲ Presses
▲ Injection/RIM/blow molding
▲ Packaging equipment
▲ Indexing/transfer lines
▲ Edgers/headrigs/veneer lathes
▲ Pinch rollers/winders/wrappers
▲ Casting/forging
▲ Flying cutoff/curve sawing
▲ Cyclic testing
▲ Robotics/animatronics
▲ Tube bending/forming
▲ Oil and gas pipe handling

DELTA
COMPUTER SYSTEMS

RMCTools Software

RMCTools is a powerful motion control software package for setting up, tuning, troubleshooting, programming, and controlling all features of Delta's multi-axis RMC150/151 controllers from a PC. RMCTools also supports the RMC75 controllers. The RMC100/101 controllers require the RMCWin software.

Delta's intuitive and easy-to-use RMCTools software features flexible User Programs with extensive commands and the ability to embed mathematical expressions. Setup and tuning wizards reduce startup times, and the graphical diagnostics tools speed troubleshooting of the entire motion system. Extensive, context-sensitive Help is included in RMCTools, giving you the information you need at your fingertips.

RMCTools connects to the RMC150/151 via the dedicated USB port. RMCTools can also connect via Ethernet.

RMCTools is included on a CD with all RMC150/151 controllers and is also available for download from Delta's website at **www.deltamotion.com**.

Software

| Software	Supported Controllers
RMCTools	RMC75E, RMC75S, RMC75P RMC150E, RMC151E
RMCWin	RMC100, RMC101

PC Requirements:
- ▲ Intel Pentium or AMD equivalent, 200 MHz or higher
- ▲ Windows 2000, XP, Vista
- ▲ RAM: 64MB
- ▲ Hard Disk Space: 20MB

RMCLink ActiveX Control and .NET Assembly

RMCLink enables full monitoring and control of RMC150/151 motion controllers via Ethernet communications from custom applications on Windows-based PCs. RMCLink supports numerous languages, such as LabVIEW, Visual Basic, C++, C#, VBScript, VBA (Microsoft Excel). LabVIEW VIs are included in the RMCLink component.

RMCLink comes with fully-functioning sample projects to help you get up and running quickly. The help includes detailed walk-throughs and numerous code snippets.

RMCLink is available for download from Delta's website at **www.deltamotion.com**.
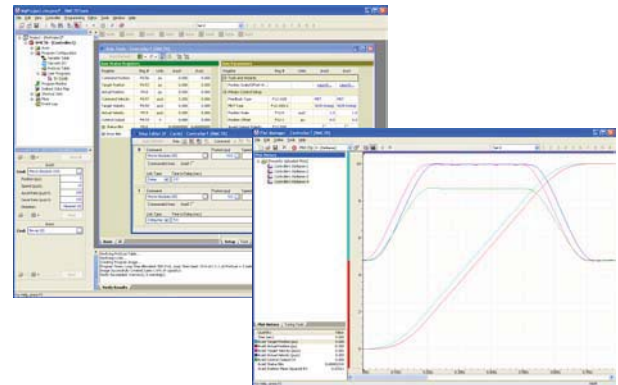
RMCTools Features

Delta's powerful RMCTools for Microsoft Windows makes setup, tuning, and troubleshooting motion systems easier than ever.

Setup
- ▲ **Wizards**
  Easy-to-use wizards include New Project, New Controller, Scale & Offset, and Autotuning.
- ▲ **Full Parameter Set**
  Monitor all axis status registers and modify parameters.

Tuning and Diagnostics
- ▲ **Plots**
  Plot any register in the RMC, up to 16 registers per plot, sampled as fine as the control loop resolution.
- ▲ **Autotuning Wizard**
  Quickly and accurately tune your axes, using a slider bar to choose from a range of gains appropriate for your system.
- ▲ **Event Log**
  Speed troubleshooting by recording events such as parameter changes, commands, errors, and communications.
- ▲ **Program Monitor**
  Monitor User Program execution and variables.

Programming
- ▲ **Commands**
  Issue commands directly from RMCTools. Use Command Shortcut Sets to quickly issue commands to speed the tuning process.
- ▲ **User Programs**
  Easily create programs to issue sequences of commands.
- ▲ **PreScan Table**
  Use wizards to set up immediate response to internal conditions or external events (discrete I/O, etc.)
- ▲ **Mathematical Expressions**
  Expressions provide flexible programming capability for advanced calculations and machine control sequences.

RMC150E CPU Specifications

Motion Control		
Control loop times		User-selectable 1 or 2ms
USB Monitor Port		
Connector		USB "B" Receptacle
Data Rate		Full-speed (12 Mb/s)
Discrete Inputs (2)		
Input type		12-24VDC inputs; polarity independent
Logic polarity		True "High"
Isolation		500VAC RMS optically isolated
Input "High" range		7 to 26.4VDC, 3mA maximum
Input "Low" range		0 to 3.5VDC, <1mA
Maximum propagation delay		100µsec
Discrete Outputs (2)		
Output type		Solid State Relays (SSR)
Isolation		500VAC RMS optically isolated
Rated voltage		12-24V, max ±30V (DC or peak AC voltage)
Maximum current		±50mA
Maximum propagation delay		1.5ms
Logic 1 (True, On)		Low impedance (50Ω maximum)
Logic 0 (False, Off)		High impedance (<1µA leakage current at 250V)
Power		
Voltage		+24VDC ±15%
Current	3 slots	Typical 290mA, max 375mA
	4 slots	Typical 385mA, max 500mA
	5 slots	Typical 485mA, max 625mA
	6 slots	Typical 585mA, max 750mA
DC-DC converter isolation		500VAC, 700VDC, input to controller
Mechanical		
Mounting		Symmetrical DIN 3 or panel-mount
Dimensions	3 slots	4.12 x 5.95 x 4.75 in (WxHxD) (10.5 x 15.0 x 12.1 cm) width increases by 1.0 in for each slot
	6 slots	7.12 x 5.95 x 4.75 in (WxHxD) (18.1 x 15.0 x 12.1 cm)
Weight	3 slots	2lb (0.9kg) max
	6 slots	3lb (1.4kg) max
Environment		
Operating temperature		+32 to +140°F (0 to +60°C)
Storage temperature		-40 to +185°F (-40 to +85°C)
Agency compliance		CE, UL, CUL

Ethernet Interface	
Hardware interface	IEEE 802.3 for 100BASE-T (twisted pair)
Data Rate	10/100 Mb/s
Duplex	Full/Half-Duplex
Features	Auto-negotiation, Auto-crossover (MDI/MDI-X)
Connector	RJ-45
Cable	CAT5, CAT5e or CAT6, UTP or STP
Ethernet Configuration	
Configuration parameters	IP address, subnet mask, gateway address, enable/disable auto-negotiation
Configuration methods	BOOTP, DHCP, or static
Ethernet Protocol Support	
Framing protocol	Ethernet II
Internet protocol	IP (includes ICMP, ARP, and Address Collision Detection)
Transport protocols	TCP, UDP
Application protocols (Call Delta for availability of other protocols)	EtherNet/IP, Modbus/TCP, CSP, Omron FINS, Procedure Exist (Mitsubishi Q-series)

Note to RMC100 Users:

RMC150/151 enhancements include the powerful RMCTools software, and a 32-bit floating point interface versus the 16-bit integer interface of RMC100/101. Upgrading to the RMC150/151 from the RMC100/101 will require reprogramming of both the RMC and application software on any PLCs, HMIs or PCs used with the RMC. As such, the RMC150E CPU is a *design-in upgrade*, requiring more than a simple *drop-in replacement* for existing RMC100 CPUs.

In Ethernet applications, the built-in RMC150E CPU Ethernet port frees the left-most slot for a DI/O module. The RMC150/151 also increases support for discrete I/O modules from 2 to 4.
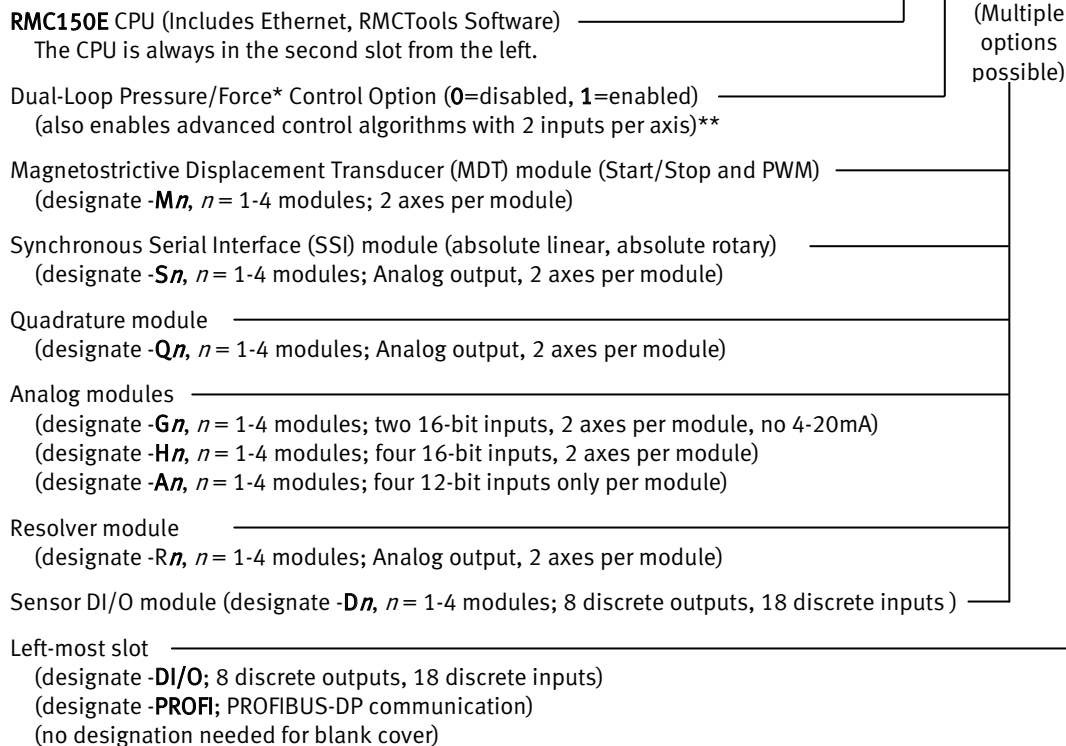
For more details on supported modules, see Delta's website at www.deltamotion.com.

Part Numbers

Backplane sizes are 3, 4, 5, and 6 slots.

RMC150E-M1-H1-DI/O

RMC150E CPU (Includes Ethernet, RMCTools Software)
The CPU is always in the second slot from the left.

(Multiple options possible)

Dual-Loop Pressure/Force* Control Option (**0**=disabled, **1**=enabled)
(also enables advanced control algorithms with 2 inputs per axis)**

Magnetostrictive Displacement Transducer (MDT) module (Start/Stop and PWM)
(designate -**M**n, n = 1-4 modules; 2 axes per module)

Synchronous Serial Interface (SSI) module (absolute linear, absolute rotary)
(designate -**S**n, n = 1-4 modules; Analog output, 2 axes per module)

Quadrature module
(designate -**Q**n, n = 1-4 modules; Analog output, 2 axes per module)

Analog modules
(designate -**G**n, n = 1-4 modules; two 16-bit inputs, 2 axes per module, no 4-20mA)
(designate -**H**n, n = 1-4 modules; four 16-bit inputs, 2 axes per module)
(designate -**A**n, n = 1-4 modules; four 12-bit inputs only per module)

Resolver module
(designate -**R**n, n = 1-4 modules; Analog output, 2 axes per module)

Sensor DI/O module (designate -**D**n, n = 1-4 modules; 8 discrete outputs, 18 discrete inputs)

Left-most slot
(designate -**DI/O**; 8 discrete outputs, 18 discrete inputs)
(designate -**PROFI**; PROFIBUS-DP communication)
(no designation needed for blank cover)

* The Dual-Loop Pressure/Force Control Option is required only for dual-loop control, such as position-pressure, position-force, velocity-pressure, or velocity-force. It is not required for pressure-only control or force-only control.
** Active Damping or Acceleration control using pressure or accelerometer feedback.

Example Part Numbers

RMC150E-S2-Q2
4 axes with SSI feedback, 4 axes with quadrature feedback and a blank cover on the left-most slot

RMC151E-H4-PROFI
8 axes with analog feedback (8 control outputs and 16 analog inputs) and a PROFIBUS module, 8 axes dual-loop enabled

RMC150E-M1-Q1-H1-D1-DI/O
2 axes with MDT feedback, 2 axes with quadrature feedback, 2 axes with analog feedback, 2 discrete I/O modules

Contact Information

Delta Computer Systems, Inc.
11719 NE 95th St. Suite D
Vancouver, WA 98682-2444

Tel 360.254.8688
Fax 360.254.5435
sales@deltamotion.com
deltamotion.com

Accessories

Part Number	Description	Power Supply
VC2124	2-channel voltage-to-current converter	24VDC
VC2100	2-channel voltage-to-current converter	±15VDC
VC2100-HS	2-channel voltage-to-current converter – high speed	±15VDC

VC2124   **VC2100**   **VC2100-HS**

Printed in USA 7/9/09