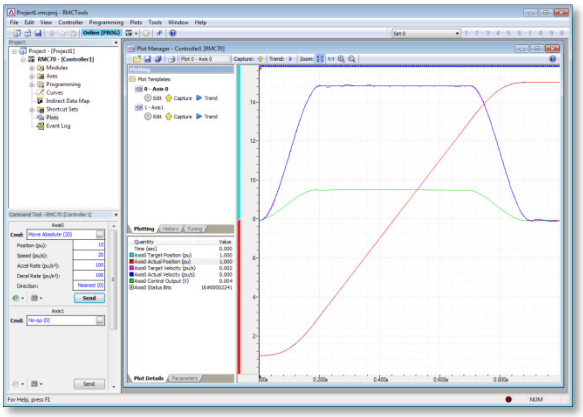
RMC70 MOTION CONTROLLER

STARTUP GUIDE

With wiring diagrams





DELTA
COMPUTER SYSTEMS

Motion Control and More

Where to Get Help

Video Tutorials



In RMCTools, on the **Help** menu, click **Video Tutorials**.

RMCTools Help



In RMCTools, on the **Help** menu, click **Help Topics**.

Forum



forum.deltamotion.com

Delta Technical Support



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Email: support@deltamotion.com

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Version 4.00, June 1, 2017
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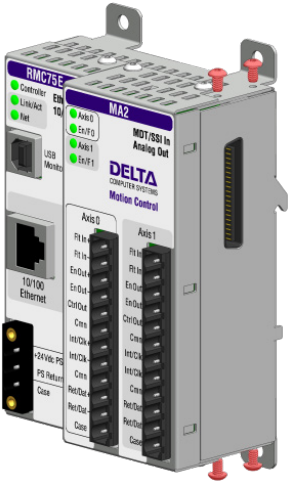
Step 1: Add Expansion Modules

Remove power from the RMC before adding expansion modules. Instructions are also included with each module.

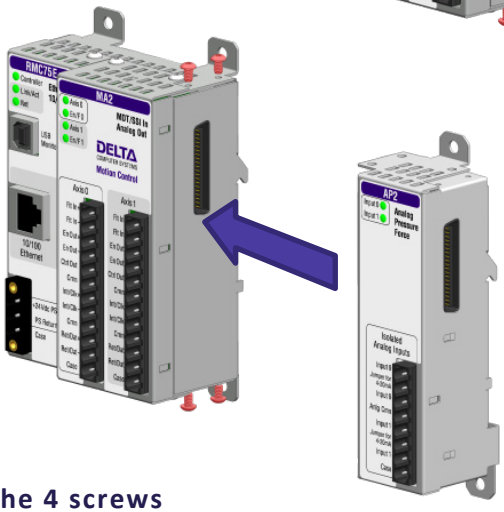
Expansion modules can be added in any order. Do not add more than 4 expansion modules. No more than two Q2 modules can be installed per RMC75.

1. Remove 4 screws

Remove the 4 phillips-head screws on the right side of the top and bottom of the RMC70.



2. Install Expansion Module



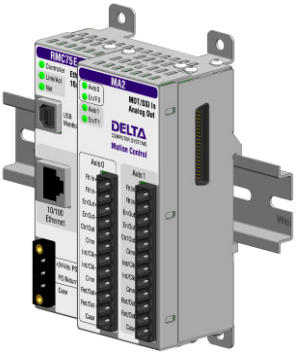
3. Reinstall the 4 screws

Step 2: Mounting

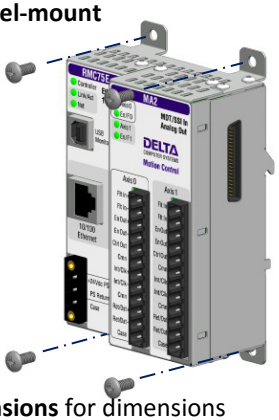
The RMC should be mounted upright on a vertical surface, such that the ventilation holes are on the top and bottom.

Mounting Options

Symmetrical DIN 3



Panel-mount



See **Appendix B: Mounting Dimensions** for dimensions

Clearance

The amount of clearance above and below depends on the maximum ambient temperature:

Ambient Temperature	Clearance
122 - 140°F (50 - 60°C)	3 in. (7.6 cm)
86 - 122°F (30 - 50°C)	2 in. (5.1 cm)
Less than 86°F (30°C)	1 in. (2.5 cm)

Grounding

Make sure to properly ground the RMC. If mounted on a DIN rail, the RMC will conduct to the DIN rail. The RMC shell is electrically connected to its Case pins.

Step 3: Wiring

Wire the RMC, actuators and feedback devices according to the instructions in **Appendix A: Wiring**.

For expansion module wiring, consult the wiring diagram you received with it, or use the RMCTools help. For communications wiring, consult the RMCTools help.

Note: Remove power from the RMC before connecting any wires.

Wiring Topic		Page
General Wiring Information		29
Power		30
MA Modules	Control Output, Enable Output, Fault Input	31
	SSI Transducer	32
	Start/Stop or PWM Transducer	34
AA Modules	Control Output, Enable Output, Fault Input	31
	Voltage Feedback Transducer	37
	Potentiometer	38
	Current Feedback Transducer	38
QA Modules	Control Output, Enable Output, Fault Input	31
	Quadrature Encoder (A, B, Z)	40

Step 4: Install RMCTools

Download

1. Go to http://www.deltamotion.com/dloads/
2. Choose the **RMC70** or **RMC150** category, then choose the **Software** category.
3. Choose the RMCTools 32-bit or 64-bit version as required for your computer.
4. Run the rmctoolsinstall32.exe or rmctoolsinstall64.exe file and follow the instructions.

Start RMCTools

On the Windows **Start** menu, choose **All Programs** and then **RMCTools**.

PC Requirements	
Operating System*	Windows® XP/Vista/7/8/10

*Windows XP requires Service Pack 2 or newer.

Step 5: Connect RMC to PC

RMC75E

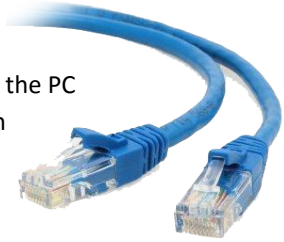
USB Cable

Connect a standard A to B USB cable to the PC and to the RMC75E port labeled **USB Monitor**.



This type of USB cable is used for PC peripherals such as printers, and is available at any store that sells electronics.

Or, use Ethernet Cable



Connect an Ethernet cable to the RMC75E and the PC or Ethernet switch. The RMC75E supports both straight through and crossover cables.

RMC75S or RMC75P

Connect Serial Cable

Connect a null-modem, DB-9, female-to-female cable to the RMC75 **RS-232 Monitor** port, and to a serial port on the PC.

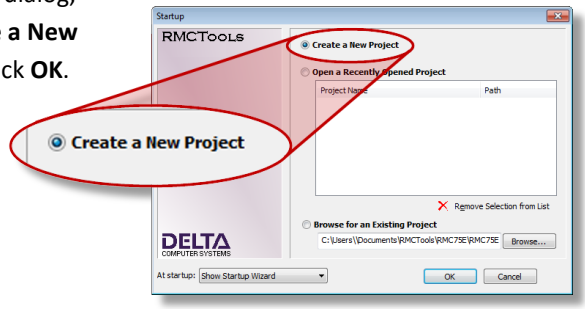


If you make your own cable, pins 2 and 3 must be crossed over, and pin 5 must be straight-through.

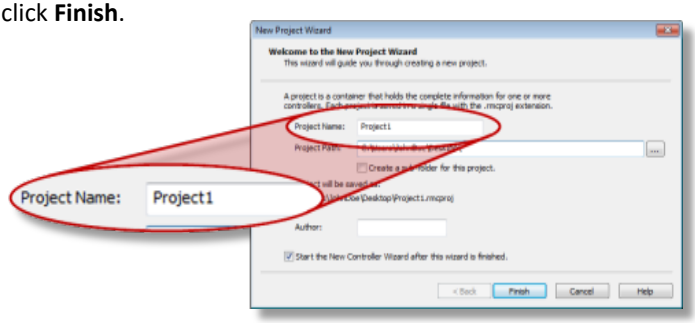
Step 6: Start a New Project

1. Start RMCTools.

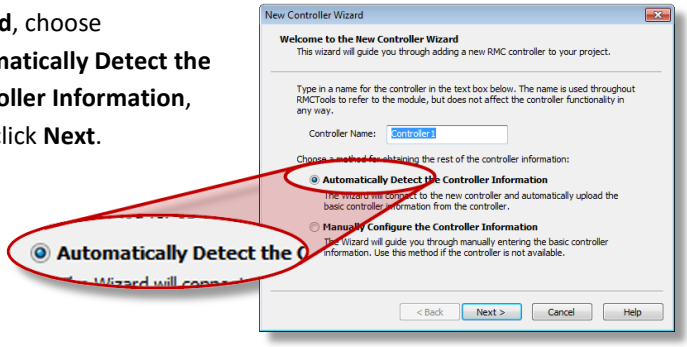
2. In the **Startup** dialog, choose **Create a New Project** and click **OK**.



3. Enter the **Project Name**, then click **Finish**.

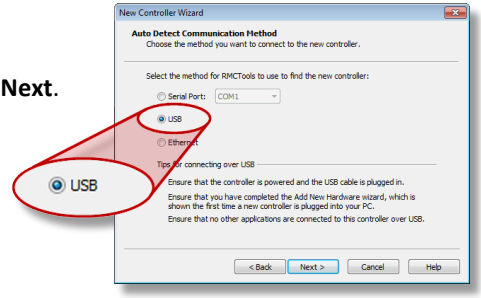


4. In the **New Controller Wizard**, choose **Automatically Detect the Controller Information**, then click **Next**.

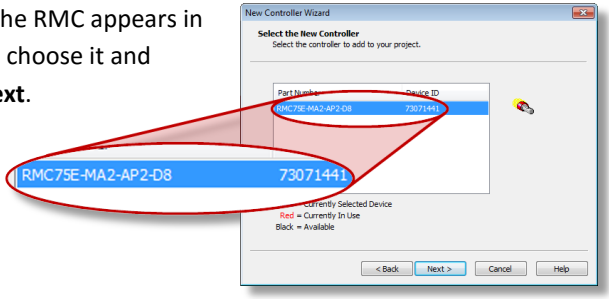


5. **RMC75E via USB:**

A. Click **USB** and click **Next**.

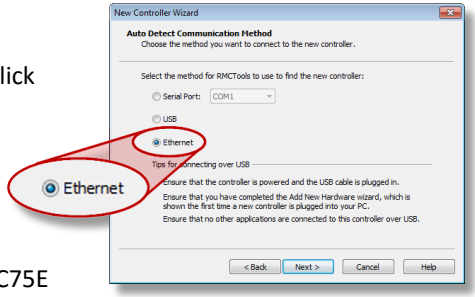


B. When the RMC appears in the list, choose it and click **Next**.



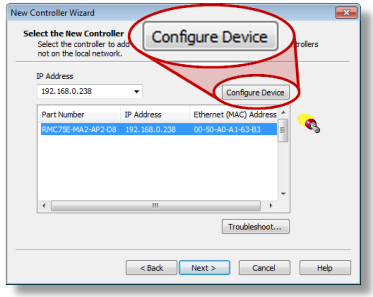
RMC75E via Ethernet:

A. Click **Ethernet** and click **Next**.



B. Use the MAC address (on the RMC75E label) to identify the RMC in the list, then click the RMC.

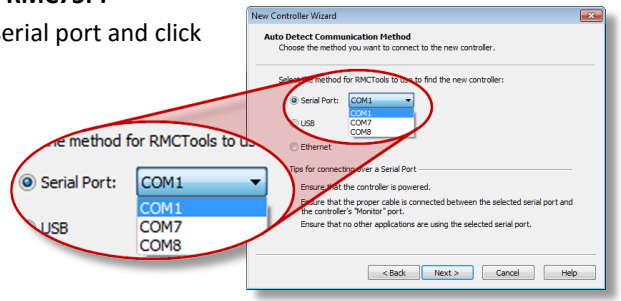
C. If the RMC does not have an IP address (0.0.0.0), click **Configure Device**, choose **Use the following IP address**, set the **IP Address** and **Subnet Mask**, then click **OK**.



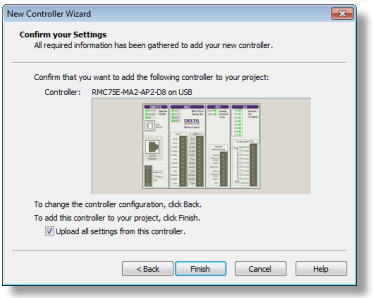
D. Click **Next**.

RMC75S or RMC75P:

Select the serial port and click **Next**.



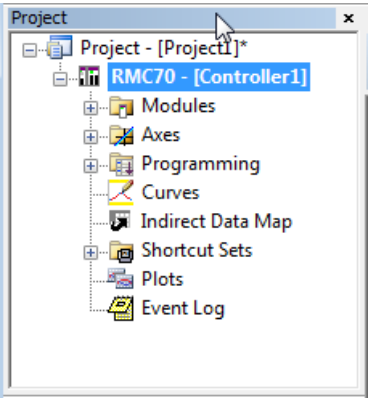
6. RMCTools will connect to the RMC and display it.
   Verify it is correct, then click **Finish**.



7. The toolbar now displays **Online (PROG)**. This means RMCTools is communicating with the controller.

Project Pane

The project pane contains all the items in the project. Use the Project pane to navigate through the entire project.



Saving Settings



Throughout the startup procedure, make sure to save the configuration changes you make or they may be lost!

1. Save RMCTools Project

On the **File** menu, click **Save**.

2. Update Flash

On the **Controller** menu, click **Update Flash**.



IF YOU DO NOT UPDATE FLASH, CHANGES TO THE RMC WILL BE LOST WHEN POWER IS REMOVED!

3. Repeat Often

Make sure to save and update flash often to prevent loss of data.

Tip: On the **File** menu, click **Save and Update Flash** to perform both operations at once.

Step 7: Define the Axes

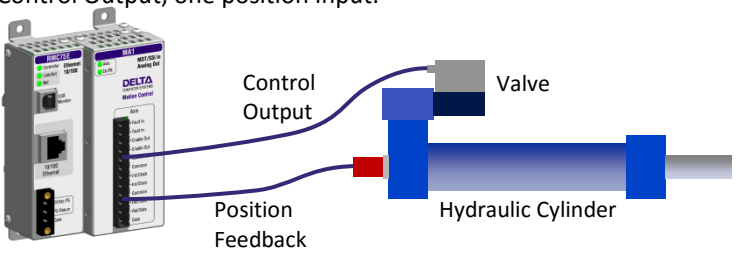
To use a physical input or output, it must be assigned to an internal software axis. The RMC starts with default axis assignments which you will likely need to change.

Note: It is important to define the axes at the start of the project. Major changes to axes later may result in lost axis parameters.

Example Axis Definitions

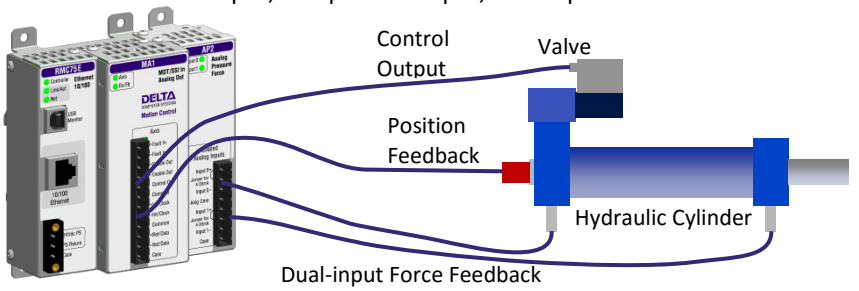
Position Control Axis

One Control Output, one position input.



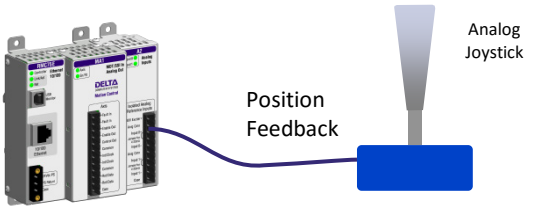
Position-Force Control Axis (all part of a single axis)

One Control Output, one position input, dual-input force



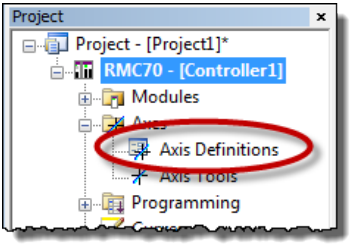
Reference Axis

One position input.



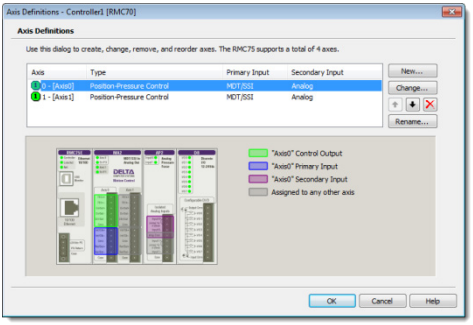
View Axis Definitions

1. In the Project tree, expand the **Axes** folder and double-click **Axis Definitions**.



2. The **Axis Definitions** dialog opens:

   The list displays the software axes. To see the assigned hardware, click an axis in the list.
   The hardware assigned to that axis will be highlighted in the image.



Edit Axis Definitions

Use the Axis Definitions dialog to change the axis definitions:

- Click **New** to add an axis**.**
- Click **Change** to edit the selected axis.
- Click ✕ to remove an axis.

If you need to make significant changes to the axis definitions, first delete all the axes, then create new ones.

For more details, click the **Help** button.

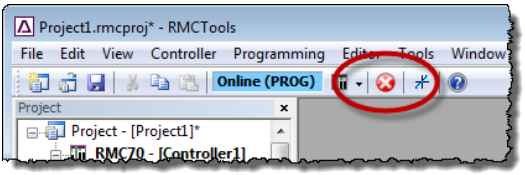
Step 8: Test an Actuator

You will now test an actuator such as a hydraulic valve or a motor. You will use the Direct Output command to send a voltage to the actuator. The actuator must already have been wired to the RMC.

USE THE DIRECT OUTPUT COMMAND WITH CAUTION! IT DISABLES THE SAFETY FEATURES OF THE RMC!

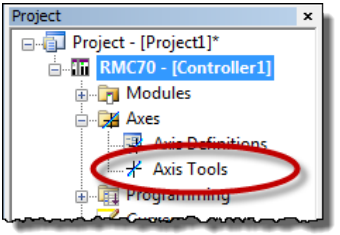
Fault Controller Button

If the motion causes problems, be prepared to quickly stop the axis by clicking the **Fault Controller** button on the toolbar, or pressing Ctrl + K on the keyboard.



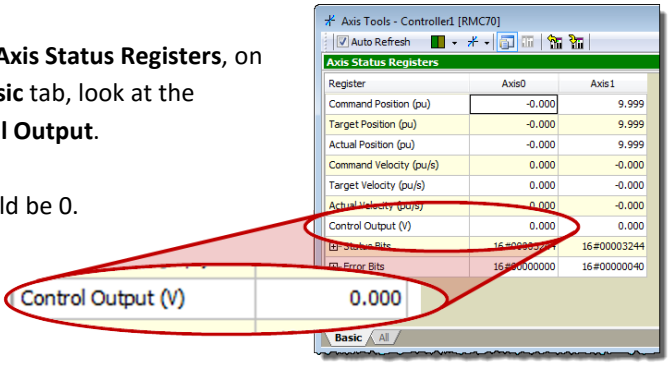
1. Check the machine and make sure that the axis may safely move in both directions.

2. In the Project tree, double-click **Axis Tools.**

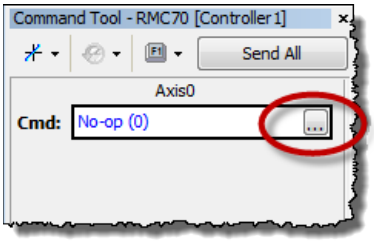


3. In the **Axis Status Registers**, on the **Basic** tab, look at the **Control Output**.

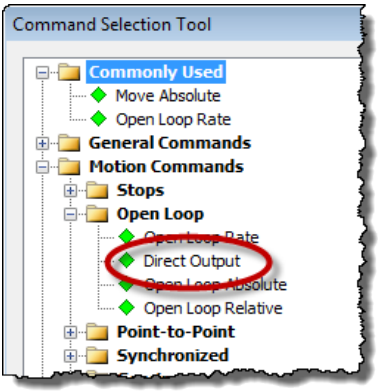
   It should be 0.



5. In the Command Tool, in the axis the actuator is connected to, click the ... button.



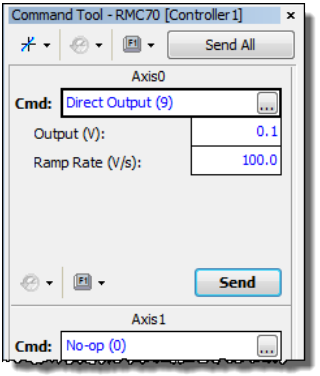
6. Browse to **Motion Commands**, then **Open Loop**.
Choose the **Direct Output** command and click **OK**.



7. For the Direct Output command parameters, enter the following:

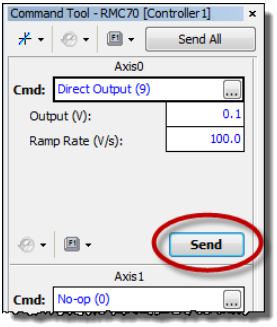
   - **Output**: 0.1
   - **Ramp Rate**: 100

   When you send the command in the next step, the Control Output voltage will ramp to 0.1 V at a rate of 100 V/sec.



8. In the Command Tool, click **Send**.

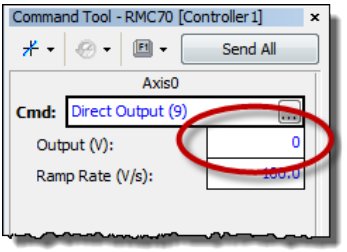
   The axis should move, and the **Control Output** (in the **Axis Status Registers**) should be 0.100.



9. If the axis did not move, resend the command with a larger Output until the axis moves.

> **Note:** If you are using the Enable Output for enabling the actuator, such as a motor drive, then you first need to set the Enable Output before trying to move the actuator. For details, see the **Set Enable Output (67) Command** topic in the RMCTools help.

10. Now stop the axis:
    In the Command tool, enter 0 in the **Output** box and click **Send**.



11. Repeat these steps to move the axis in the other direction. In the Direct Output command, use a negative **Output**.
    Move the axis back and forth through the entire travel range to make sure the machine is operating properly.

Step 9: Test Feedback Device

Now that you have connected and tested an actuator, you will connect and verify a feedback device. The device must already have been wired to the RMC.

Configure Feedback

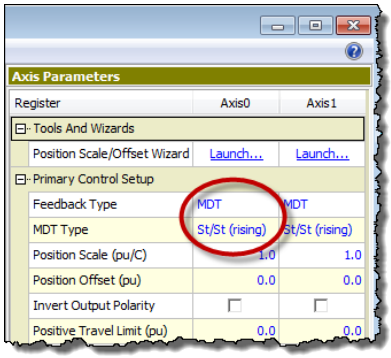
In **Axis Tools**, in the **Axis Parameters** pane, on the **Setup** tab, you will configure certain parameters depending on the type of input you are using.

Refer to the procedure for your module and transducer type:

Module	Transducer Type	Page
MA1 or MA2	MDT (Start/Stop or PWM)	17
	SSI	17
AA1 or AA2	Analog (±10 V or 4-20 mA)	18
QA1 or QA2	Quadrature (Encoder A, B, Z)	18
AP2 or A2	Analog (±10 V or 4-20 mA)	18
Q1	Quadrature (Encoder A, B, Z)	18

MA Module–Start/Stop or PWM

1. In the **Axis Parameters**, on the **Setup** tab, set the **Feedback Type** to **MDT**.



2. Set the **MDT Type** register to the type of MDT transducer you have. This information is available on the transducer datasheet.

3. Click the **Download** button to apply the changes to the RMC.

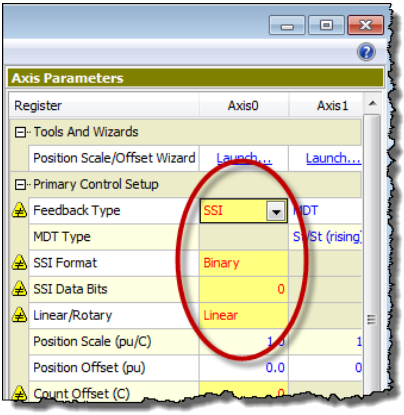
4. Continue to the **Verify Feedback** section on page 19.

MA Module–SSI

1. In the **Axis Parameters** pane, on the **Setup** tab, set the **Feedback Type** to **SSI**.

2. From the information in your SSI data sheet, set the following parameters:

   - **SSI Format**
   - **SSI Data bits** (e.g. 24)
   - **Linear/Rotary**



Note: For help on a parameter, click the cell and press F1.

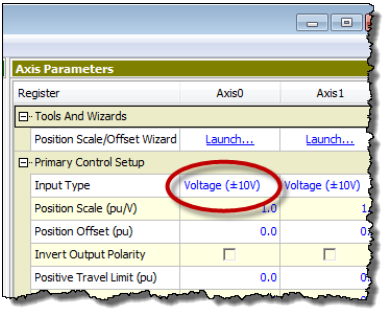
3. Click the **Download** button to apply the changes to the RMC.

4. Continue to the **Verify Feedback** section on page 19.

AA Module

1. In the **Axis Parameters** pane, on the **Setup** tab, set the **Input Type** to **Voltage** or **Current**.

2. Click the **Download** button to apply the changes to the RMC.



3. Continue to the **Verify Feedback** section on page 19.

A2 or AP2 Module

1. In the **Axis Parameters** pane, on the **Setup** tab, set the **Input Type** to **Voltage** or **Current**.

   If the input is the primary input of the axis, the **Input Type** is under the **Primary Control Setup** section in the Axis Parameters.

   For secondary pressure or force inputs on a dual-loop axis, the **Input Type** is under the **Secondary Control Setup** section in the Axis Parameters.

2. Click the **Download** button to apply the changes to the RMC.

3. Continue to the **Verify Feedback** section on page 19.

QA or Q1 Module

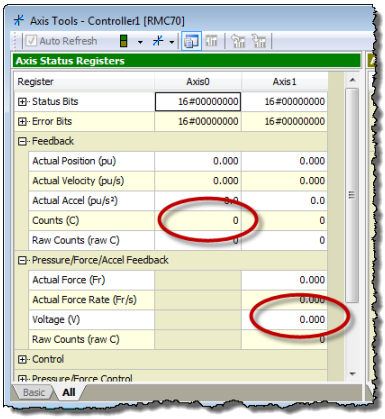
The QA and Q1 module do not require any configuration.

1. Continue to the **Verify Feedback** section on page 19.

Verify Feedback

1. In the **Axis Status Registers** pane, on the **All** tab, expand the **Feedback** section.

   For secondary inputs, expand the **Pressure/Force/Accel Feedback** section.



2. Depending on your feedback type, look at the **Counts**, **Volts** or **Current** register. It may be changing slightly.

3. Use the Direct Output command to move the axis back and forth (as described in the **Test an Actuator** section).

4. As the axis moves, look for a corresponding change in the **Counts**, **Volts** or **Current**. If it does not change smoothly, recheck the wiring, verify that the parameters on the **Setup** tab are correct, and check for smoothly changing **Counts**, **Volts** or **Current** again.

5. Save the project and update Flash.

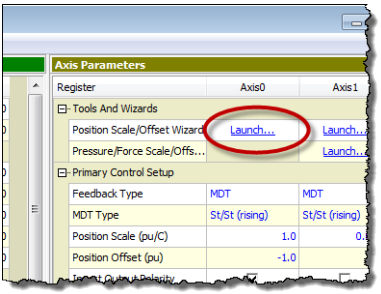
Step 10: Scale and Offset

The Scale and Offset parameters convert the Counts, Volts or Current from the transducer into meaningful measurement units.

First, determine the approximate positions at either end of travel. This will help you verify later that you performed the procedure correctly.

To set the Scale and Offset:

1. Go to the **Axes Parameters** pane, **Setup** tab, **Tools and Wizards** section.

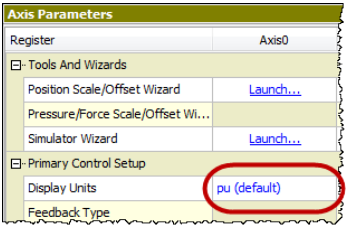


2. Click **Launch** in the desired axis.

3. In the wizard, follow the directions. For help, press the **Help** button.

Tip: If the wizard does not work for your system, you can manually determine the Scale and Offset parameters. See the Scaling topic in the RMCTools help for details.

4. After completing the wizard, in the **Axis Parameters**, locate the **Display Units** parameter.



   Select the desired display units. If you wish to use units that are not listed, choose **Custom**, then type up to 4 characters in the **Custom Units** parameter.

5. Click the **Download** button to apply the changes to the RMC. Remember to save your project and update Flash.

Step 11: Set the Output Polarity

The Actual Position, Pressure, Force or Velocity *must increase* when the RMC applies a *positive* output voltage. If this condition is not met, you will not be able to perform closed-loop control.

1. Send the Direct Output command with a positive **Output** value that is large enough to move the axis.

2. On the **Basic** tab of the **Axis Status Registers** pane, observe the **Actual Position** and note whether it is increasing or decreasing:

   Increasing
   The Output Polarity is correct. Go to **Enable the Axes** below.

   Decreasing
   You must invert the Output Polarity:

   A. In the **Axis Parameters** pane, on the **Setup** tab, double-click the **Invert Output Polarity** parameter to set it.

   B. Click the **Download** button to apply the change to the RMC.

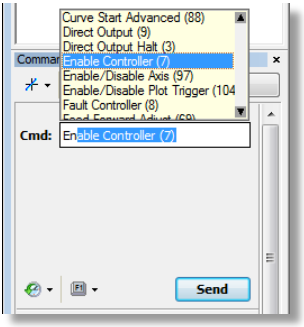
Enable the Axes

In order to send motion commands other than Direct Output, the axes must be enabled after the RMC starts up.

1. In the Command Tool, in the **Cmd** box, type **Enable**, and choose **Enable Controller (7)** from the list.

2. Click **Send**. All axes will be enabled.

Entering RUN Mode will also enable the axes.



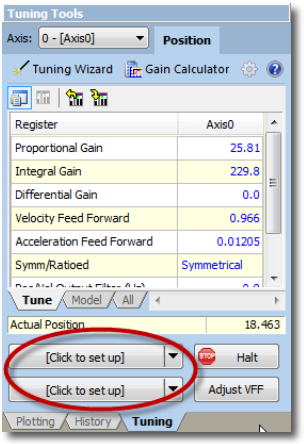
Step 12: Tuning

In order to control an axis in closed-loop, it must first be tuned. You can use autotuning or manually tune the axis.

Autotuning – Position Axes Only

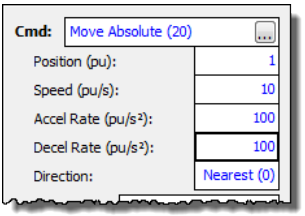
Autotuning can be used for most position control axes.

1. **Open Tuning Tools**
   On the **Tools** menu, click **Tuning Tools**.

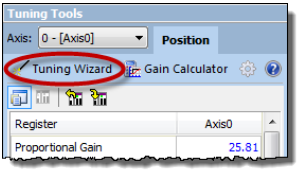


2. **Set Up Tuning Tools**
   Set up the buttons that you will use to move the axis back and forth after autotuning is complete.

   - Click the first button labeled **[Click to set up]**.
   - Enter a **Move Absolute** command with position, speeds, and acceleration values that will work for your system.
   - Repeat for the other button, with a different position.

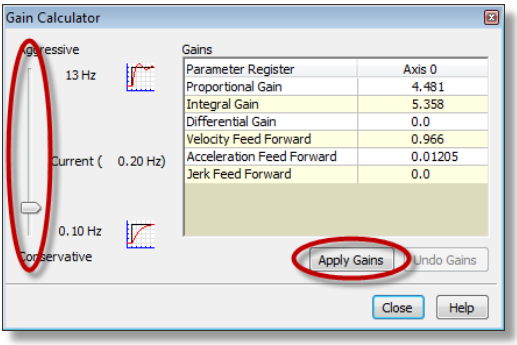


3. **Start the Tuning Wizard**
   In the Tuning Tools, click **Tuning Wizard**.



4. **Complete the Tuning Wizard**
   During the autotuning, the wizard will move the axis a short distance when you prompt it to.

5. When the wizard is complete, the **Gain Calculator** will open. Use the slider bar to choose gains. Begin by pulling the slider close to the bottom, then click **Apply Gains**.



6. Use the buttons you previously set up to move the axis back and forth. The plot will automatically be displayed.

> **Tip:** To halt the axis, click the **Fault Controller** button on the toolbar, or press Ctrl+K.

7. If the Actual Position is not following the Target Position very well, pull the slider bar up, apply gains, and move the axis again. Repeat until the Actual Position tracks the Target Position very well.

Tuning With an Existing Plot

If the autotuning does not work for your system, you can use the Tuning Wizard with an existing plot.

1. In the Tuning Tools, use the move buttons to make moves and adjust the Proportional Gain until the axis has some control.
2. Start the Tuning Wizard and choose **Use Existing Plot**. The Wizard will prompt you to choose one of the plots of the moves you made.
3. When the wizard completes, use the Gain Calculator as described above.

Manual Tuning–Position, Pressure, or Force Axes

You can manually tune systems for which autotuning does not work. For instructions:

4. On the help menu, choose **Help Topics**.
5. On the **Index** tab, type **tuning** and double-click **about**.
6. The **Tuning Overview** topic describes tuning.
   In the **Manual Tuning** section, choose a procedure. For most position control applications, choose **Tuning a Hydraulic Position Axis or Motor in Velocity Mode**. For pressure or force, choose the procedure that applies to your axis.

After tuning, save the project and update Flash.

Continuing the Motion Application

After setting up and tuning the RMC, it is ready to perform motion and be integrated into the rest of your application. The RMC has numerous features to assist you. The major components are listed here to guide you when continuing your motion application.

Commands

The RMC has a rich set of pre-programmed commands that perform anything from simple moves to complex motion to system control. For a list of all the commands, see the **Command List** topic in the RMCTools help.

User Programs

A User Program carries out simple or advanced sequences of commands on the RMC. This allows the RMC to respond to events within its control-loop time rather than the scan rate of a PLC or other host controller. It also reduces the PLC programming required.

A User Program consists of multiple steps linked together in sequences. Each step can issue any RMC command to one or several axes. The link types allow branching and looping, waiting for conditions and many other features. Simple and complex mathematical operations are also possible in the user program.

A User Program runs on a *task*. Each task can run one user program at a time. The RMC70 has four tasks. Therefore, an RMC70 controller may run up to four User Programs simultaneously.

For details on creating and running User Programs, see the **User Programs** topic in the help.

Communications

Most PLCs or other host controllers can communicate with the RMC, which includes reading status, writing values, and sending commands. The RMC70 supports Ethernet, PROFIBUS-DP, or serial RS-232/485.

See the **Communications** section of the RMCTools help for more detailed information.

Discrete I/O

Discrete I/O augments the communications of the RMC. Discrete I/O is often faster than the communications, and is therefore well-suited for starting a sequence in the RMC at a specific time. Up to 32 discrete I/O can be added to the RMC70. Each I/O point is individually configurable in software as inputs or outputs. See the **Discrete I/O** topic in the RMCTools help for details.

Variables

Variables make the User Programs very flexible and easy to maintain. Variables can be used to effortlessly change programs and easily modify User Program parameters via a PLC. Variables can also be used to store data. For more details see the **Variables** topic in the help.

Program Triggers

Use the Program Triggers to start User Programs based on conditions defined by the user. For example,

- Start a User Program by writing to an RMC variable from a PLC.
- Start a User Program when a discrete input turns on.
- Automatically start a User Program when the RMC starts up.
- When an error condition occurs, automatically start a User Program to handle it.

See the **Program Triggers** topic in the RMCTools help for details.

Diagnostic Tools

This section describes the main diagnostic tools of RMCTools that will aid you in monitoring and troubleshooting your system.

Plots

The RMC provides very flexible plotting capabilities. Virtually any register in the RMC can be plotted, and multiple registers may be plotted simultaneously. You can easily capture events with the plot trigger. For details on using plots, see the **Plots** topics in the help.

Event Log

The Event Log Monitor displays all events that have occurred in the controller, such as issued commands, changed parameters and errors. The Event Log Monitor is an important aid in troubleshooting.

The Event Log can help you:

- Determine if a command was successfully issued. The entire command, with parameters, is displayed.
- Find out which, if any, error occurred.
- See where a command was issued from, for example, from a PLC, from a User Program or from the Command Tool.

To open the Event Log:

- In the Project Pane, expand the controller, and double-click **Event Log** .

Note: The Event Log is very useful! When you don't know what happened, or why something did not happen, look at the Event Log.

Appendix A: Wiring

This appendix describes how to wire the RMC. Use the table below to find the wiring diagram you need. For expansion module wiring, consult the wiring diagram you received with it, or use the RMCTools help. For communications wiring, consult the RMCTools help.

Note: Remove power from the RMC before connecting any wires.

Wiring Topic		Page
General Wiring Information		29
Power		30
MA Modules	Control Output, Enable Output, Fault Input	31
	SSI Transducer	32
	Start/Stop or PWM Transducer	34
AA Modules	Control Output, Enable Output, Fault Input	31
	Voltage Feedback Transducer	37
	Potentiometer	38
	Current Feedback Transducer	38
QA Modules	Control Output, Enable Output, Fault Input	31
	Quadrature Encoder (A, B, Z)	40

General Wiring Information

For CE compliance and to minimize electrical interference:

- Use twisted pairs for all wiring where possible.
- Use shielded cables for all wiring.
- Keep RMC wiring separate from AC mains or conductors carrying high currents, especially high frequency switching power such as conductors between servo drives and motors or amplifiers and proportional valves.

For UL and CUL compliance:

- Power supply must be Class 2.
- All RMC inputs and outputs must be connected to Class 2 circuits only.

Terminal Block Wire Clamp Screw Torque

Tighten the wire clamp screws on the terminal blocks to 7 lb-in (0.8 Nm).

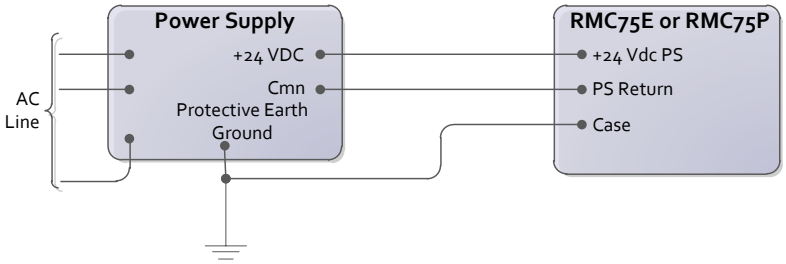
Wiring Power

Voltage: +24VDC (21.6 – 26.4VDC)
Current rating: Minimum 500 mA

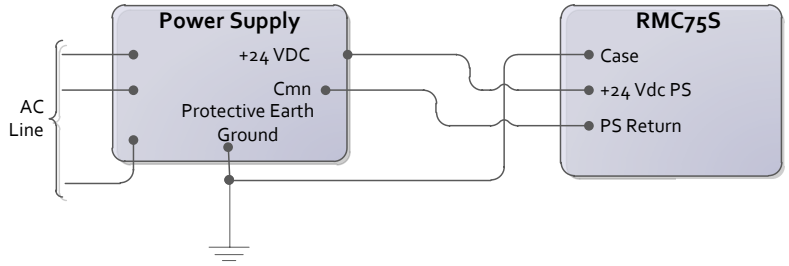
UL and CUL Requirements

For UL and C-UL compliance, the power supply must be Class 2. Class 2 power supplies are limited to 100W output. No additional fusing is required if a class 2 power supply is used.

RMC75E and RMC75P



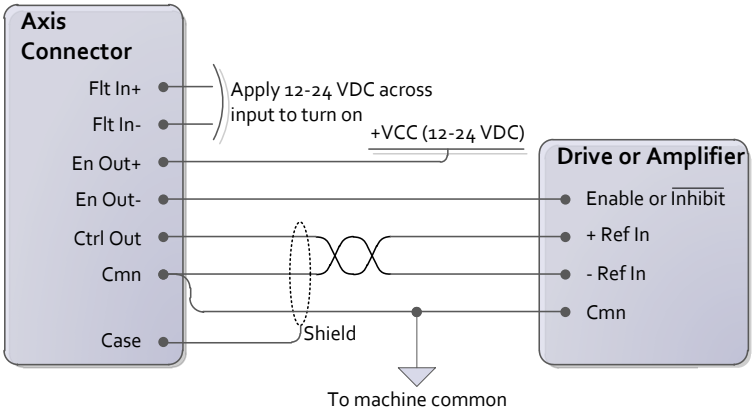
RMC75S



Tighten the wire clamp screws on the terminal blocks to 7 lb-in (0.8 Nm).

Wiring for all Axis Modules

Control Output, Enable Output, and Fault Input



Fault Input:

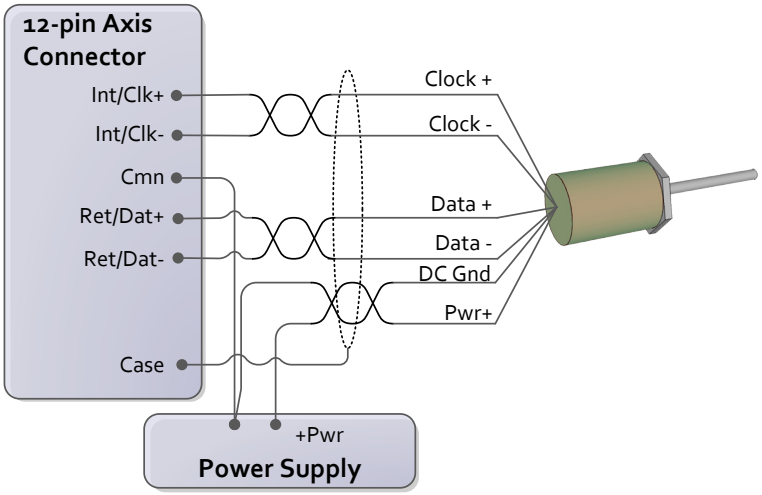
- The Fault Input is optional.
- The Fault Input turns on when a current flows. The polarity is unimportant.
- The behavior can be set to Active High or Active Low via RMCTools.

Enable Output:

- The Enable Output is optional. It can be wired to the enable input of the drive or amplifier.
- The Enable Output is a Solid State Relay (SSR) rated for a maximum of 100 mA and 30V. Both + and - must be connected. The polarity is unimportant.
- The behavior can be set to Active Open or Active Closed via RMCTools.

MA Module SSI Transducer Wiring

For Synchronous Serial Interface (SSI) transducers and encoders. For linear SSI transducers, make sure to choose the synchronized type.



Tip: See next page for manufacturer-specific wiring diagrams.

Notes:

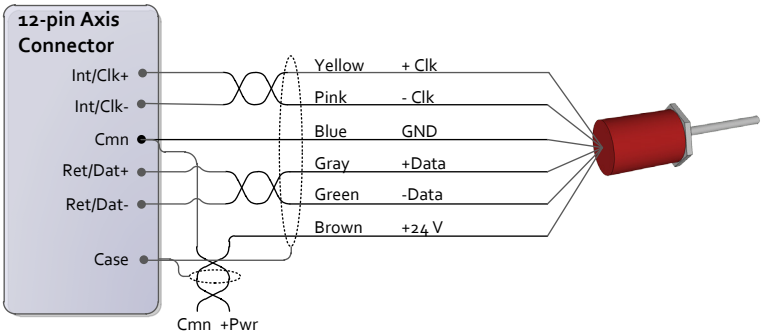
- The Cmn pins on the 12-pin connector are electrically identical.
- The user must supply power to the transducer.
- Do NOT connect the transducer ground or common to the shield, case, or protective earth ground.

Manufacturer-Specific Wiring Labels and Colors

These diagrams provide only transducer manufacturer labels and colors. Follow all wiring instructions on p.32

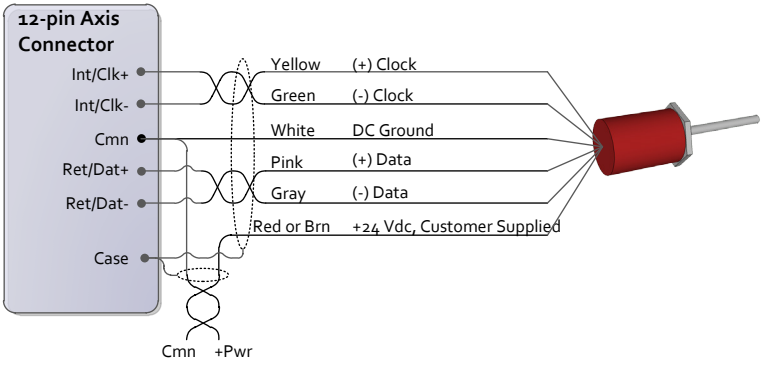
Balluff Micropulse BTL-5 with SSI output

Styles: Z, W, K, P



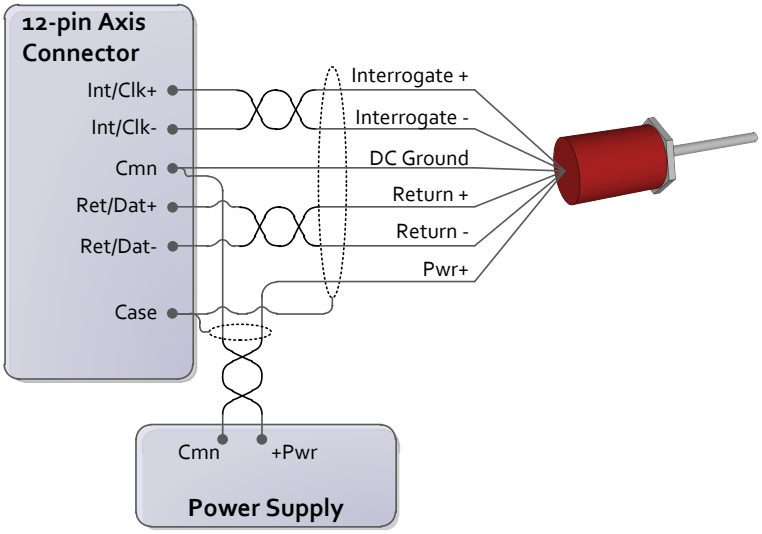
MTS Temposonics with SSI output

Models: R, RP, RH



MA Module Start/Stop or PWM Transducer Wiring

For magnetostrictive transducers with Start/Stop or PWM outputs.



Tip: See next page for manufacturer-specific wiring diagrams.

Notes:

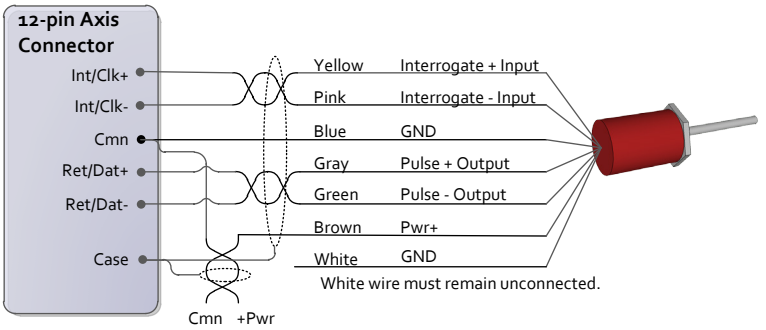
- The MA module interfaces to 5V differential (RS-422) signals. Single-ended (TTL) transducers are not supported.
- The Cmn pins on the 12-pin connector are electrically identical.
- The user must supply power to the transducer.
- Do NOT connect the transducer ground or common to the shield, case, or protective earth ground.

Manufacturer-Specific Wiring Labels and Colors

Follow all wiring instructions on p.34.

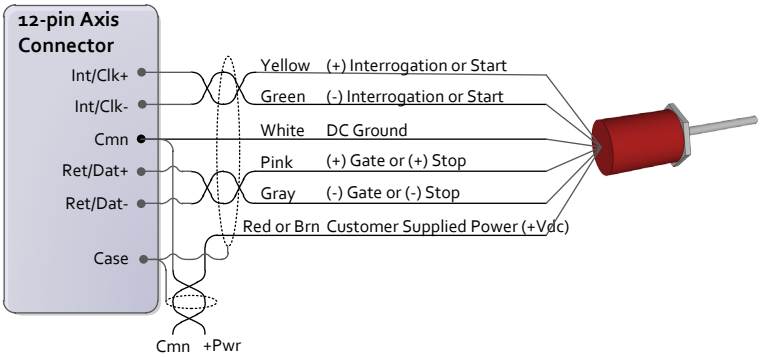
Balluff Micropulse BTL-5, digital RS-485 output

Styles: Z, W, K, E, P, R, AT



MTS Temposonics with digital output (Start/Stop or PWM)

Models: LH, LS, LD, LF, LPS, LPR, G, EP2, ER



MTS Temposonics II with DPM or RPM personality module



MA Module Pin-out

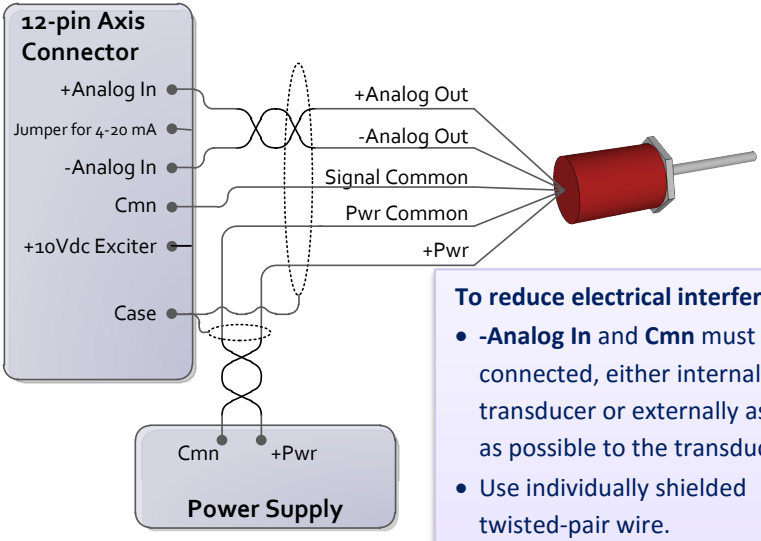
Pin	Function	
Flt In +	Fault Input	
Flt In -	Fault Input	
En Out +	Enable Output	
En Out -	Enable Output	
Ctrl Out	Control Output, ± 10 V 16-bit Analog	
Cmn	Common	
	MDT Transducer	**SSI Transducer**
Int/Clk +	+ Interrogation	+ Clock
Int/Clk -	- Interrogation	- Clock
Ret/Dat +	+ Return	+ Data
Ret/Dat -	- Return	- Data
Cmn	Common	
Case	RMC Chassis	

Notes:

- The two Cmn pins are electrically the same.
- The user must supply power for the transducer.

AA Module Voltage Transducer Wiring

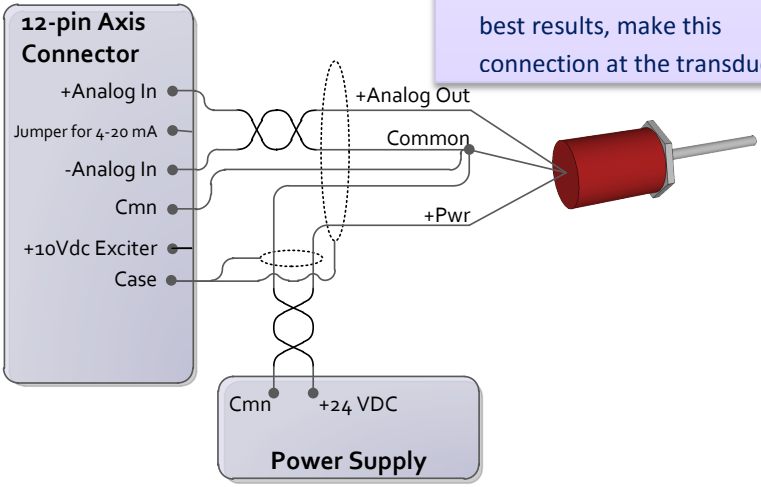
Voltage Transducer, 4- or 5-Wire



To reduce electrical interference:

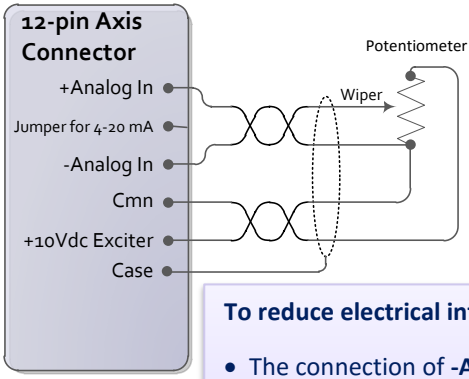
- **-Analog In** and **Cmn** must be connected, either internal to the transducer or externally as close as possible to the transducer.
- Use individually shielded twisted-pair wire.
- Connect cable shield to earth ground on one end only.
- If transducer has only one common, connect Pwr Supply Common and RMC Cmn to it. For best results, make this connection at the transducer.

Voltage Transducer, 3-Wire



AA Module Potentiometer with Exciter Pin

Note: When using a potentiometer, use the **Exciter** pin to increase the accuracy of the analog to digital conversion.



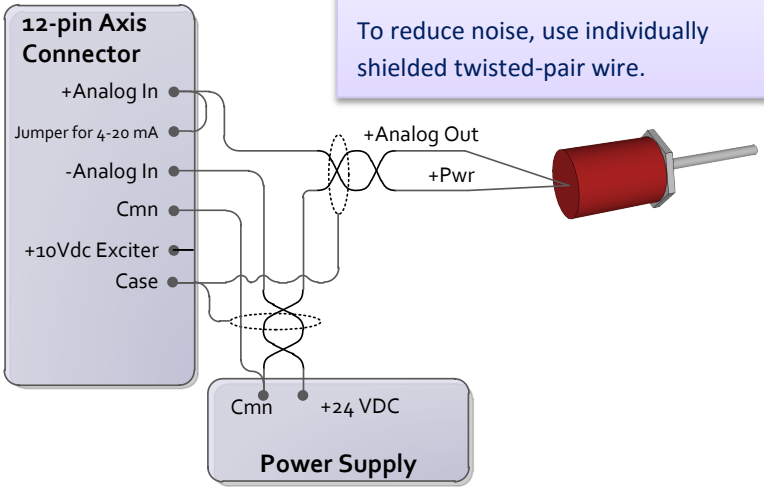
To reduce electrical interference:

- The connection of **-Analog In** to **Cmn** should be made as close as possible to the transducer.
- Use individually shielded twisted-pair wire.
- Connect cable shield to ground on one end only.

AA Module 4-20 mA

The **Jmpr** and **-In** pins are internally connected via a 250 Ω resistor.

To reduce noise, use individually shielded twisted-pair wire.



AA Module Pin-out

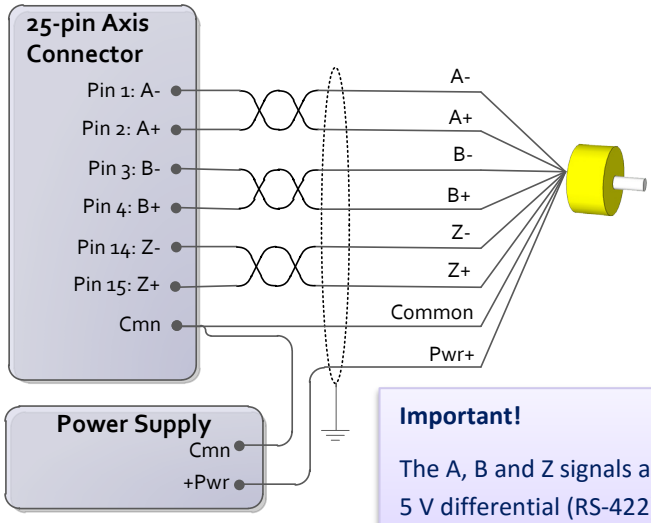
Pin	Function
Flt In +	Fault Input
Flt In -	Fault Input
En Out +	Enable Output
En Out -	Enable Output
Ctrl Out	Control Output, ±10 V 16-bit Analog
Cmn	Common
Analog In +	Signal +
Jumper for 4-20 mA	Jumper for Current Transducer
Analog In -	Signal -
Cmn	Common
+10Vdc Exciter	10 Volt source for potentiometer
Case	RMC Chassis

Notes:

- The two Cmn pins are electrically the same.
- The user must supply power for the transducer.

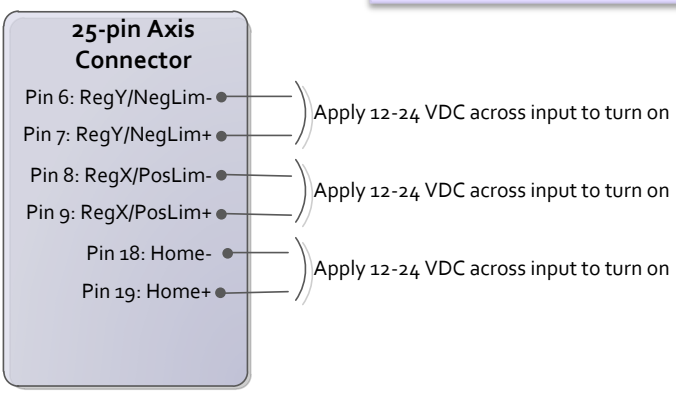
QA Module Wiring

See page 41 for the QA module pin-out.



Important!

The A, B and Z signals accept 5 V differential (RS-422) signals only!



Reg/Lim and Home Inputs:

- Compatible with 12-24 VDC.
- Max current draw is 2.7 mA max.
- Turn on when the voltage is greater than 6 V. The polarity is unimportant.

QA Module Pin-out

Pin	Label	Function
1	**A-**	A- from encoder
2	**A+**	A+ from encoder
3	**B-**	B- from encoder
4	**B+**	B+ from encoder
5	**n/c**	No connection
6	**Reg Y/NegLim-**	Registration Y or Negative Limit
7	**Reg Y/NegLim+**	
8	**Reg X/PosLim-**	Registration X or Positive Limit
9	**Reg X/PosLim+**	
10	**n/c**	No connection
11	**n/c**	No connection
12	**Control Out**	Control Output
13	**Cmn**	Common
14	**Z-**	Index pulse from encoder
15	**Z+**	
16	**Cmn**	Common
17	**n/c**	No connection
18	**Home-**	Home Input
19	**Home+**	
20	**FltIn-**	Fault Input
21	**FltIn+**	
22	**n/c**	No connection
23	**n/c**	No connection
24	**EnOut-**	Enable Output
25	**EnOut+**	

Notes:

- The two Cmn pins are electrically the same.
- The user must supply power for the transducer.

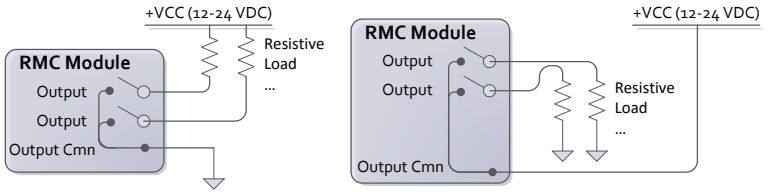
D8 Module Discrete I/O Wiring

The eight I/O on the D8 expansion module are individually configurable via software to be inputs or outputs.

Discrete Outputs

The discrete outputs are solid state relays. When off, they have high impedance, and when on, they have low impedance (50 Ω max, 25 Ω typical). The maximum current is 75 mA, and the maximum voltage is 30 V.

Outputs can be wired in either a high-side or low-side configuration. Because all the outputs share a common, all outputs on the same module must be wired the same.

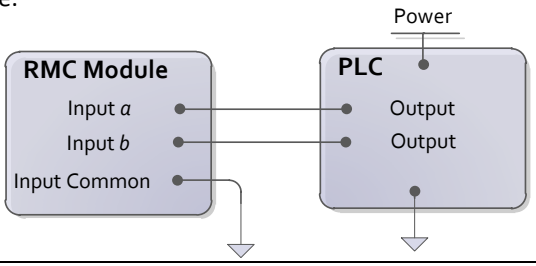


When switching *inductive* loads, place a diode or tranzorb across the load to protect the switch when it turns off. Otherwise, a voltage spike in excess of the 30 V rating of the SSR may occur. See the **D8 Wiring** topic in the RMCTools help for more details.

Discrete Inputs

The discrete inputs are compatible with 12-24 VDC signals. Because all the inputs share a common, all inputs on the same module must be wired the same.

Example

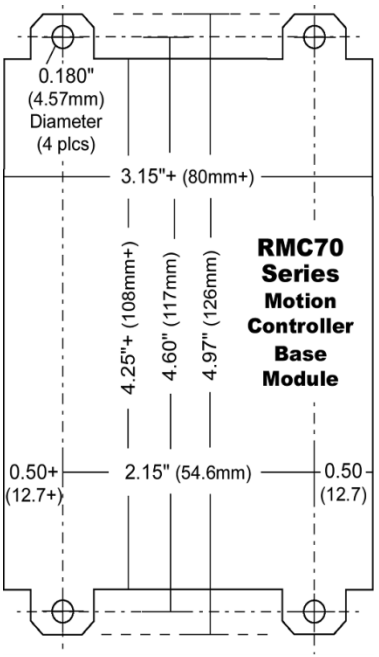


Appendix B: Mounting Dimensions

This sections contains mounting hole dimensions for the RMC75 series motion controller and expansion modules. Up to four expansion modules may be added to the right side of the RMC75 base module.

Base Module

RMC75S, RMC75P, RMC75E

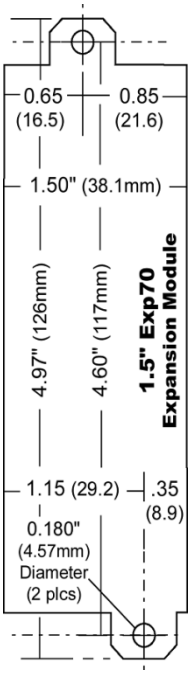


Note: Drawing is not 1:1 scale.

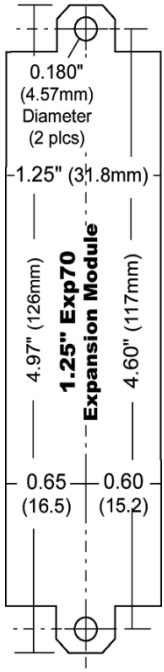
Expansion Modules

There are two different expansion module widths.

D8



AP2, A2, Q1



Note: Drawings are not 1:1 scale.

Appendix C: Agency Compliance

CE

For CE compliance and to minimize electrical interference:

- Use twisted pairs for all wiring where possible.
- Use shielded cables for all wiring.
- Keep RMC wiring separate from AC mains or conductors carrying high currents, especially high frequency switching power such as conductors between servo drives and motors or amplifiers and proportional valves.

UL and CUL

For UL and CUL compliance:

- Power supply must be Class 2.
- All RMC inputs and outputs must be connected to Class 2 circuits only.

The RMC Family of Motion Control



Connect. Control. Optimize.