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Find the *Newport MM4005* at our website: *Click HERE*

Multi-Axis Motion Controller/Driver



Key Features

- *Ergonomic, modular controller is easy to operate and upgrade*
- *1–4 axes of open- or closed-loop DC and stepper motor control*
- *Multi-axis linear and circular interpolation*
- *Dynamic high-precision plane contouring*
- *Front panel and remote programmability using RS-232-C and IEEE-488 interfaces*
- *High stability motion using PID control with feed forward compensation*
- *Master-slave electronic gearing for precise multi-axis synchronization*
- *External function synchronization to executed motions*

The MotionMaster 4005's advanced design and user-friendly interface make it a simple and useful tool for any researcher, scientist, engineer, or technician for whom precision micro-positioning is not the goal but simply a means to an end, whether it's making a repeatable critical measurement or automating a production process.

Users are not required to be experts in multi-axis command programming. Complex 2D trajectories can be broken down into simple straight and curved segments that are effortlessly executed using the MM4005's contouring capability. The controller automatically "seams" together simple elements like arcs, circles and lines while maintaining constant velocity along the path by precisely monitoring the speed and acceleration at every point along the trajectory. This capability is critical for applications like laser scribing, micro-ablation, or X-ray measurement inspection.

Coordinating motion with events internal and external to the controller is easy with the built-in synchronization capabilities in the MM4005. This powerful feature can automatically generate equidistant pulses along a complex path independent of changing velocities and accelerations and is extremely useful in applications like laser writing and laser machining.

Electronic gearing enables any motorized axis to be slaved to another master axis, even when they have different motor/gearhead ratios or stage leadscrew pitches. The MM4005 can drive up to four synchronized axes while constantly minimizing their relative positioning error, an essential feature when multiple stages are required to move large or over-sized loads.

The MM4005's user friendly interface has an intuitive menu system on the front panel from which you can execute motion programs, initiate manual moves, and configure

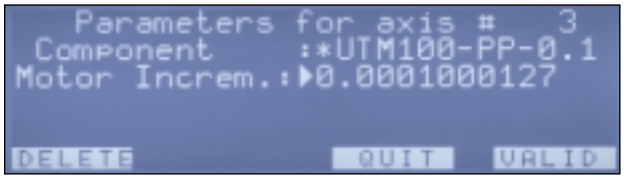
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operating parameters. The display screen brightness and contrast are adjustable directly from the front panel, allowing perfect readability in a variety of lighting conditions. Parameters and measurements are displayed in the displacement units of your choosing, eliminating the cumbersome need to calculate information based on encoder counts, and units can be easily changed on the fly.

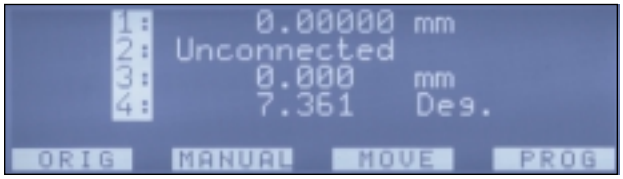
With the MM4005, all Newport motorized stages are plug and play. All of the stage configuration information and nominal PID parameter values are preset in the controller's non-volatile memory. For further optimization of your positioning application with its unique load and speed requirements, utility software to aid in PID servo tuning is included. Additionally, free LabVIEW™ software drivers for automated control and coordination with hundreds of popular laboratory instruments are available via our website at **www.newport.com**

Programming complex motion is easy using the MM4005's powerful programming language with over 200 commands. Windows compatible communications and programming utilities are included with the MM4005. And the large backlit LCD display has four user- configurable softkeys and a programmable status display making custom application development possible.

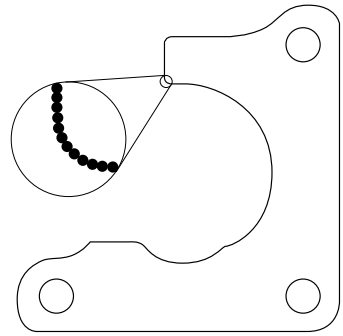
Upgradeability is built into the MM4005. Modular driver configuration allows you to add more axes in the future as your needs expand. The controller's system firmware resides in flash memory and can be updated by simple downloading, so users can always operate with the most current version of the system software and benefit from continually added improvements without need for factory return, board replacement, or even removing the cover.



The MotionMaster's large, backlit LCD display presents entire menus at once for faster configuration, setup and operation. Software-definable function keys below the display aid in fast, intuitive navigation of the menu tree and single-key execution of stored programs.



During program execution, the true displacement of all axes is displayed simultaneously. Choose from nine linear and angular displacement units, independently user-selectable for each axis.



Traversing complex paths is simple using the MM4005's built-in contouring capabilities. Additionally, synchronizing motion with external instruments such as a laser is automatic. The MM4005 can command the laser to generate equal distant pulses (see enlarged area) regardless of how the position, velocity, and acceleration are changing.

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Driver Module Option Codes

Motorized Translation Stages

MFN Series
page 2-42



	Option Code
MFNPP	01
MFNCC	61

UTM Series
page 2-38



	Option Code
UTMPP	12
UTMPE	05
UTMCC.1	71
UTMCC1HL	7G
UTMCC.5HA	7G
UTMCCDD	64

MTM Series
page 2-34



	Option Code
MTMPP1	1A
MTMPP.1	12
MTMPE	1H
MTMCC	7H
MTMCC.1	7G

UZM Series
page 2-46



	Option Code
UZMPP	12
UZMPE.1	05
UZMPE.05	1H
UZMCC.1	64
UZMCC.05	7G

TSx Series
pages 2-16 thru 2-33



	Option Code
TS, TSW, TST, TSV Series	1M

Specifications

Number of motion axes	One to four for any combination of stepper and DC motors.
Trajectory types	Non-synchronized motion Synchronized motion Linear interpolation (4-axis) Circular interpolation (2-axis) Contouring (2-axis)
Velocity profiles	Trapezoidal “S”-curve
Motion device compatibility	All Newport motion devices with either stepper motors or encoder-equipped DC motors (except PM500) (3A max per axis)
DC motor control	16-bit DAC resolution 10 MHz maximum encoder input frequency Digital PID servo loop with velocity and acceleration feed forward compensation 0.3 ms servo cycle
Stepper motor control	1 MHz maximum pulse rate Full-, half-, and mini-step (full/10) capable Open- or closed-loop operation
Computer interfaces	IEEE-488-1 RS-232-C up to 115200 baud; addressable for several MM4005 controllers connected to the same PC serial port
Utility interfaces	8 TTL opto-isolated inputs 8 TTL open-collector outputs Four 12-bit analog inputs with programmable calibrations of ±5 V, ±10 V, 0–5 V, or 0–10 V Four 12-bit analog outputs ±10 V (optional)
Program memory	32 kB non-volatile RAM
Operating modes	Stand-alone execution of stored programs Real-time command execution via computer interface Front panel manual motion command execution
Front panel display	Backlit LCD, 6 lines x 30 characters, 40 mm x 130 mm Adjustable brightness and contrast
Power requirements	110/220 V (auto selecting) 50/60 Hz, 50–600 W max. Complies with CE and low power regulations
Processor	Cyrix 586 @ 133 MHz
Dimensions (HxWxD)	134 (3U) x 482 x 395 mm (5.28 x 19 x 15.6 in)
Weight	8 kg

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Ordering Information

The MM4005 part number is configured as follows:

Example:

MM4005-OPT 12 15 1A NN 11 N 1

- 12 – Axis 1 Driver
- 15 – Axis 2 Driver
- 1A – Axis 3 Driver
- NN – Axis 4 Driver
- 11 – Power supply configuration:
  - 11 – 110 V
  - 12 – 220 V
- N – Analog Output:
  - 1 – Four 12-bit Outputs
  - N – No Analog Outputs
- 1 – Joystick Option:
  - 1 – 4-Axis Joystick
  - N – No Joystick

Driver options are listed in the margins. Specify NN for all unused axes.

How to Order

The MM4005 is configured by first specifying the driver module for each axis. Next the controller configuration for your application is defined.

In the above example, the controller is configured to drive a BGM80PP and BGM120PP on axes 1 and 2 respectively, with an MTM150PP1 on axis 3. Axis 4 is unused. The controller is configured for a maximum of 4 axes for use in a facility with 110 V power. Finally, the controller includes a joystick and has no analog outputs.

Accessory



An optional 4-axis joystick with 6 ft cable length provides manual speed and direction control.

Driver Module Option Codes (cont'd)

Motorized Rotation Stages

URM Series
page 3-14



	Option Code
URMPP	12
URMPE	05
URMCCHL	7G
URMCC	64

RV Series
page 3-6



	Option Code
RV80PP	12
RV120PP	15
RV160 to 350PP	1A
RV80PE	05
RV120 to 350 PE	1H
RV80CCHL	7G
RV120 to 350CC	7H
RV80CC	64

SR Series
page 3-22



	Option Code
SRPP	06
SRCC	61

BGM Series
page 3-24



	Option Code
BGM50 & 80PP	12
BGM120PP	15
BGM160 & 200PP	1A
BGM50 & 80PE	05
BGM120 to 200PE	1H
BGM50 & 80CC	64
BGM120 to 200CC	7H

Actuators

CMA
page 5-10



	Option Code
CMACCL	XX

850G
page 5-8



	Option Code
850G	7D
850G-LS	7E
850G-HS	7F

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