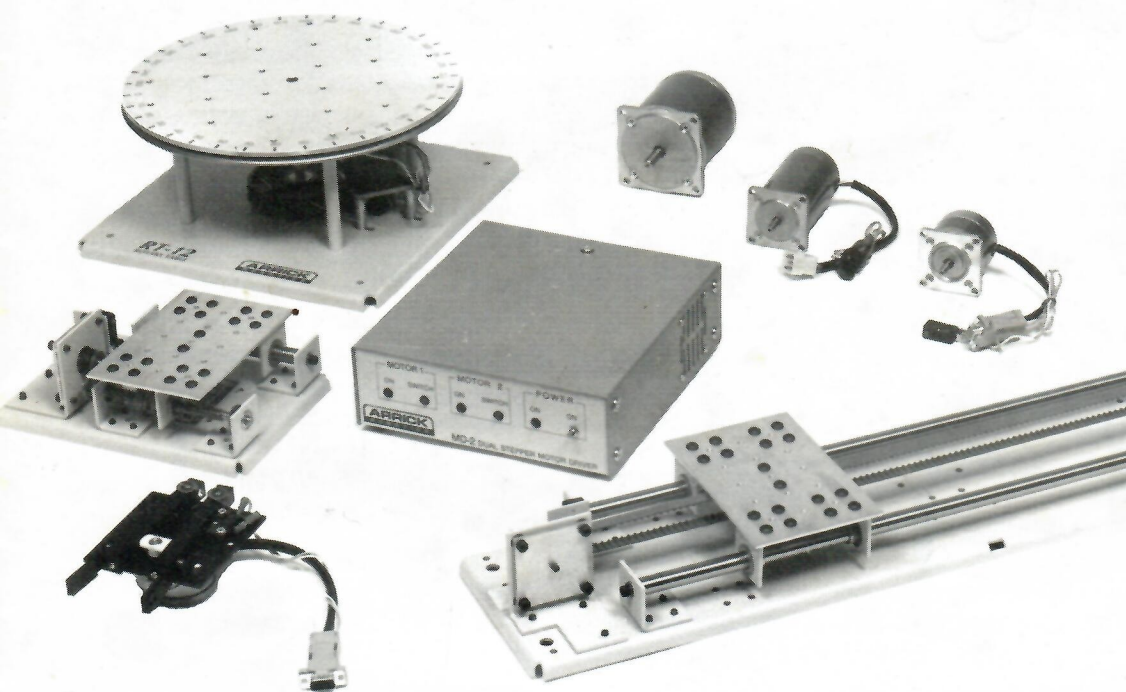


1994

\$2.00

AUTOMATION

Made simple and affordable



-
- Stepper Motor Systems
 - Positioning Tables
 - Robotic Workcells
-

ARRICK
ROBOTICS

PHONE: (817) 571-4528 FAX: (817) 571-2317

We're building the future, *Automatically*

At Arrick Robotics we have a unique philosophy, create automation and motion control products utilizing state-of-the-art technologies that are practical, easy to use, and cost effective.

The result is a unique line of inexpensive automation products that are packaged complete, with a plug-and-go design.

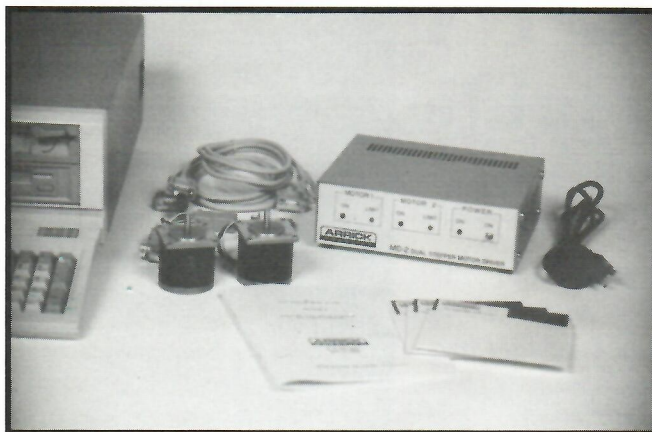
Now small manufacturers, laboratories, and universities can automate quickly with minimal investment.



MD-2

Dual Stepper Motor System

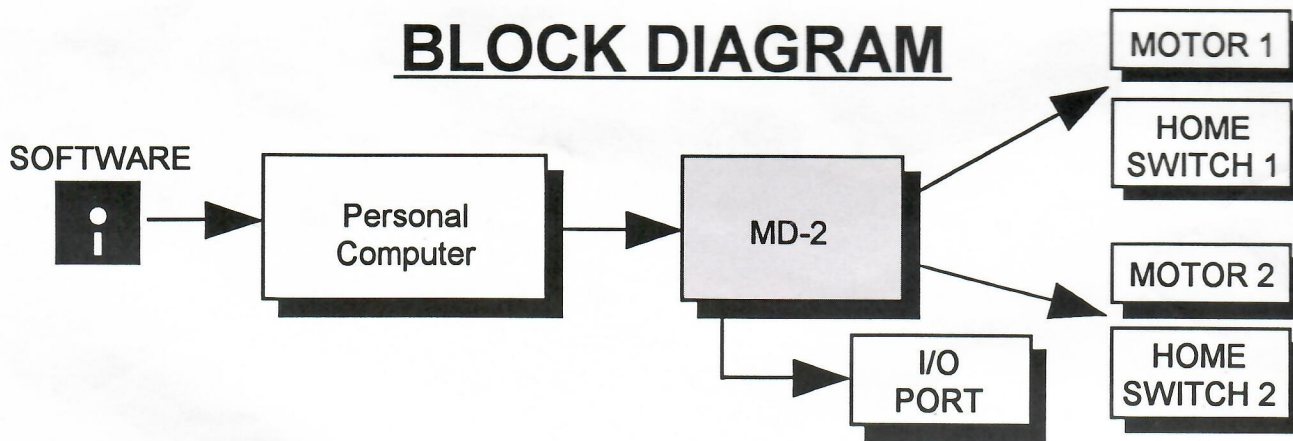
The Complete Motion Control Package



Would you like to automate a task but don't know how? Have you looked through some motion control catalogs and been shocked by the complexity? Most vendors expect you to select and match motors, drivers, power supplies, and cables, then write your own software. We've cut through the confusion and created the complete motion control solution for those who don't want to design their own. The MD-2 Dual Stepper Motor System contains everything you need to accomplish motion control with an IBM style personal computer. No cards to install, no cables to build and no components to match. Simply connect to the parallel port just like a printer, load the software, and GO! Within minutes you'll have complete control over the direction, position, and speed of each motor. Up to 6 motors (3 MD-2's) can be connected to your computer for those multi-axis projects. Programming is simple with our interactive motion control

programs and DOS command-line interpreter. Custom programs are easy to create using our subroutine libraries. There are 5 MD-2 models to choose from to fill a variety of torque and resolution requirements. Each MD-2 system includes 2 stepper motors, 2 10' motor cables, printer port cable, 2 home switches, drive/power supply box, software and extensive documentation. The MD-2 system can be operated from an AC outlet or from a battery. You must have an IBM compatible personal computer with a parallel printer port. Need assistance? - give us a call, we'll be glad to help. Detailed data sheets are available upon request.

BLOCK DIAGRAM



SOFTWARE

Each MD-2 system includes a wealth of software providing a variety of motion control solutions. The 'MD-2MOVE' program makes it a snap to change parameters, move the motors, save motion sequences and recall them. Intuitive operation and on-line help eliminates the need for a manual. The 'MD-2NAME' program lets the user associate names with motor positions and recall them instantly. The MD-2 can also be controlled from DOS or from batch files using our command-line interpreter. Complete subroutine libraries written in Quick-BASIC, Visual-Basic, Pascal and Quick-C are provided for specialized application programs. Integration with data-acquisition and other PC-based control products can also be accomplished.

ARRICK ROBOTICS MD-2MOVE PROGRAM VERSION 2.00

MOTOR INFORMATION						
MOTOR	STEP TYPE	STEP BACKLASH	INCR	SPEED	SWITCH STATUS	CURRENT POSITION
1	HALF	0	100	1200	YES	0
2	HALF	3	20	1200	YES	0
3	HALF	0	100	1200	YES	100
4	HALF	10	100	1200	YES	0
5	HALF	0	100	1200	YES	0
6	HALF	0	100	1200	YES	0

MOTOR MOVE KEYS				COMMANDS			
F1 #1 REVERSE	F2 #1 FORWARD	T STEP TYPE	C CONTROL	I STEP INCR	A ADJUST	F FILE	R RUN
F3 #2 REVERSE	F4 #2 FORWARD	S SPEED	F FILE	K KEY CHECK	R RUN	M MOVE	D SPEED?
F5 #3 REVERSE	F6 #3 FORWARD	L SWITCH CHECK	M MOVE	P POWER DOWN	D SPEED?	H HELP	
F7 #4 REVERSE	F8 #4 FORWARD	B BACKLASH					
F9 #5 REVERSE	F10 #5 FORWARD						
F11 #6 REVERSE	F12 #6 FORWARD						
SPACE BAR - STOP MOTION							

5 MD-2 models to choose from

There are 5 MD-2 models to choose from providing a variety of torque and resolution combinations. Each MD-2 system contains 2 stepper motors, 2 home switches, 2 10' motor cables, printer port cable, drive/power supply box, software and extensive documentation. All models except the basic MD-2 also have an input/output port which gives the user 2 digital outputs and 3 digital inputs.

MD-2

\$459.95, 50 in/oz torque, .9 degree steps

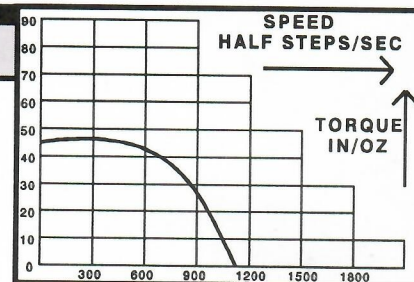
Motors: size #23, 2.25" body diameter, 2.25" long, .25" shaft diameter, .75" shaft length.

Resolution: .9 degree steps (400 steps per revolution) in half-step mode.

Speed: 1000 half-steps per second in start/stop mode under no load, 1,200 with ramping.

Torque: 50 in/oz holding torque.

The MD-2 is our basic system and can be used to drive any of our linear or rotary positioning tables. Shipping weight: 11 lbs.



MD-2a

\$699.95, 50 in/oz torque, .9 degree steps, Input/Output port

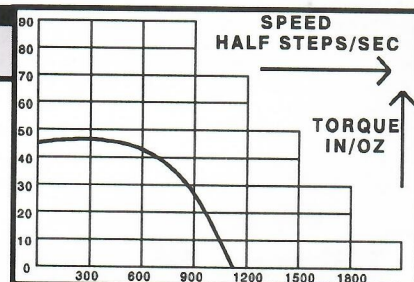
Motors: size #23, 2.25" body diameter, 2.25" long, .25" shaft diameter, .75" shaft length.

Resolution: .9 degrees (400 steps per revolution) in half-step mode.

Speed: 1000 half-steps per second in start/stop mode under no load, 10,000 with ramping.

Torque: 50 in/oz holding torque.

The MD-2a is similar to our MD-2 but incorporates our high performance 'chopper' technology resulting in faster operation. A software controlled digital input/output port is also provided which can be used to read switches and sensors or used to drive relays. Compatible with all of our positioning tables. Shipping weight: 12 lbs.



MD-2ah

\$1,199.95, 25 in/oz torque, .225 degree steps, Input/Output port

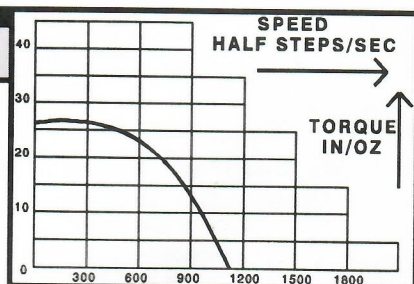
Motors: size #23, 2.25" body diameter, 2.25" long, .25" shaft diameter, .75" shaft length.

Resolution: .225 degrees (1600 steps per revolution) in half-step mode.

Speed: 1000 half-steps per second in start/stop mode under no load, 10,000 with ramping.

Torque: 25 in/oz holding torque.

Similar to the MD-2a but uses our high-resolution motors achieving 4 times the number of steps per revolution. Select the MD-2ah when smooth operation and small steps are required. Not compatible with our positioning tables due to motor torque. Shipping weight: 12 lbs.



MD-2b

\$999.95, 150 in/oz torque, .9 degree steps, Input/Output port

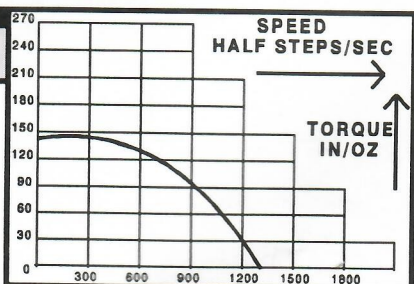
Motors: size #23, 2.25" body diameter, 4" long, .25" shaft diameter, .75" shaft length.

Resolution: .9 degrees (400 steps per revolution) in half-step mode.

Speed: 1000 half-steps per second in start/stop mode under no load, 10,000 with ramping.

Torque: 150 in/oz holding torque.

Having 3 times the torque of the MD-2a system, the MD-2b can be used with our X and XY positioning tables and robotic workcells to move larger payloads faster. Not compatible with our RT-12 rotary positioning table or BR-2 due to the motor length. Shipping weight: 15 lbs.



MD-2c

\$1,199.95, 300 in/oz torque, .9 degree steps, Input/Output port

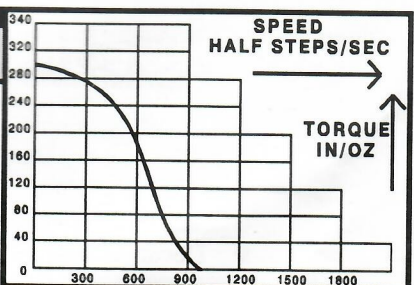
Motors: size #34, 3.4" body diameter, 3.75" long, .375" shaft diameter, 1.25" shaft length.

Resolution: .9 degrees (400 steps per revolution) in half-step mode.

Speed: 1000 half-steps per second in start/stop mode under no load, 10,000 with ramping.

Torque: 300 in/oz holding torque.

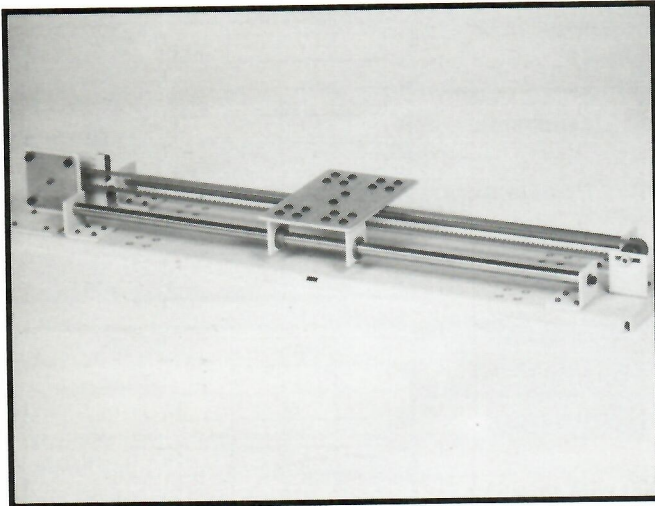
The MD-2c is our biggest system and can be used to position very large payloads. The size #34 motors can not be used with our positioning tables. Shipping weight: 22 lbs.





Single Axis Positioning Tables

Linear Positioning at an Affordable Price



Now it's easy to position sensors, automate pick and place operations or perform light-duty machining. Our 'X' series belt-driven positioning tables are the perfect alternative to traditional lead-screw driven tables. The low-stretch timing belt provides an incredible 1/100" accuracy (twice the thickness of a sheet of paper) at speeds rivaling lead-screw models. All 'X' series tables can be controlled easily with our MD-2 stepper motor system - just attach the motor, connect the home switch, and you're ready! Nothing else to buy, even the tools are included. The 4" x 6" top plate has 15 mounting holes to attach your instrument, tool, or whatever. An aluminum frame, polished steel shafts and bronze bearings make the 'X' series positioning tables lightweight, accurate and affordable. Finally, an easy way to implement those automation tasks. Have any questions? Give us a call, we'll be glad to help. Detailed data sheets are available for all models.

3 Sizes to Choose From

X-9	Single axis positioning table, 9" total linear travel.	\$349.95
X-18	Single axis positioning table, 18" total linear travel.	\$399.95
X-30	Single axis positioning table, 30" total linear travel.	\$749.95

SPECIFICATIONS

When used with the MD-2 stepper motor system
and a 2 pound payload -

Accuracy: $\pm .010$ " per foot
Resolution: .005" per .9 degree step
Repeatability: .005"
Maximum speed: 4" per second

Note: Payloads up to 15 pounds can be used
with decreased speed and accuracy.

PACKAGE INCLUDES

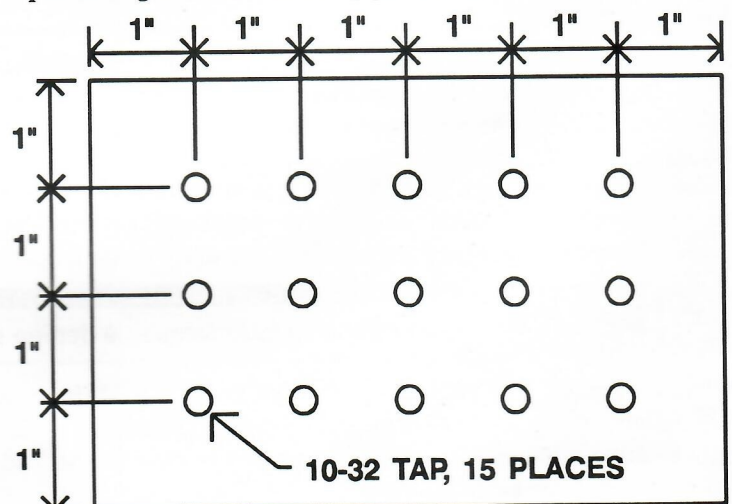
- Linear Positioning Table
- All necessary Hardware
- Home Switch
- Tools for Setup
- Documentation

APPLICATIONS

- Sensor Positioning
- Laboratory Automation
- Pick and Place Operations
- Dispensing
- Training
- Automated Testing
- Light-duty Machining

TOP PLATE

The top plate provides the surface to attach instruments, tools or other devices to be positioned. All of our X, XY and Z positioning tables have this top plate configuration.

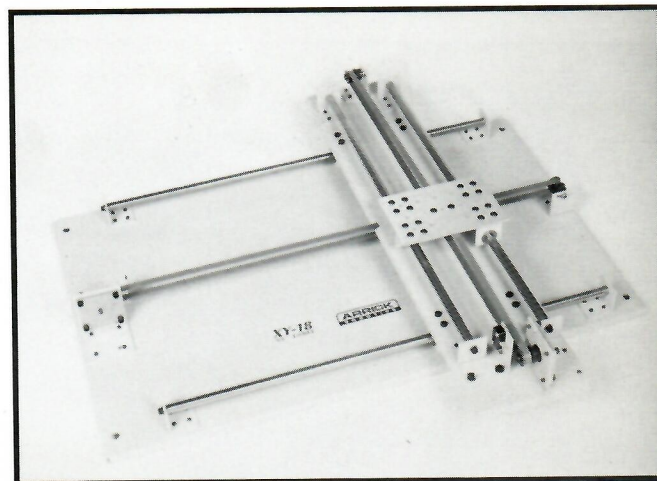


Dual Axis Positioning Tables

XY

Lightweight, Easy-to-Use, Accurate

As with our 'X' series positioning tables, the 'XY' series can be used for a variety of automation applications. Two degrees of freedom allow more complex tasks to be performed such as working with a rack of test tubes or drilling small holes in a circuit board. The aluminum frame makes the table strong and lightweight while the solid steel shafts and bronze bearings provide accuracy and long life with a minimum of flexure. The 'XY' series tables can be controlled using size 23 motors such as our MD-2, MD-2a or MD-2b. The MD-2 software will automatically compensate for any belt stretch resulting in increased accuracy. A home switch attached to each axis provides feedback to the controller and gives the software a reference point for all positioning commands. Use the 'XY' series tables with our Z-2 table for 3-axis positioning tasks or with our steel stands for gantry (upside down) operation. Detailed data sheets available.



SPECIFICATIONS

When used with the MD-2 stepper motor system
and a 2 pound payload -

Accuracy: $\pm .010$ " per foot
Resolution: $.005$ " per $.9$ degree step
Repeatability: $.005$ "
Maximum X speed: 2" per second
Maximum Y speed: 4" per second

Note: Payloads up to 15 pounds can be used
with decreased speed and accuracy.

POSSIBLE TOOLS

- Test Probe
- Miniature Drill
- Pneumatic Gripper
- Adhesive Dispenser
- Sensor
- Engraver
- Camera

PACKAGE INCLUDES

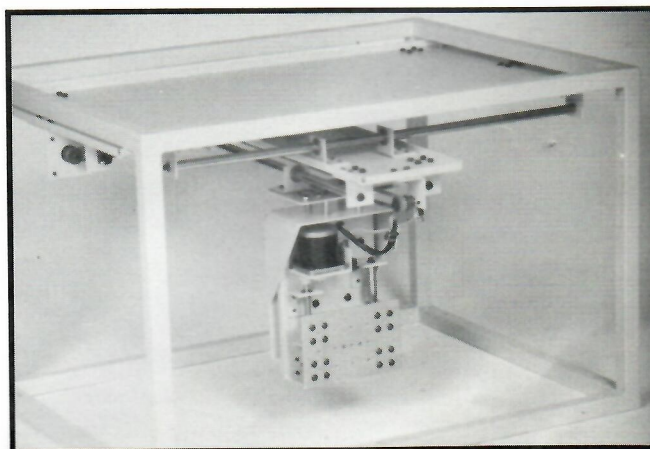
- Linear Positioning Table
- All necessary Hardware
- Home Switches
- Tools for Setup
- Documentation

3 Sizes to Choose From

XY-9	Dual axis positioning table, 9" of travel on each axis.	\$699.95
XY-18	Dual axis positioning table, 18" of travel on each axis.	\$799.95
XY-30	Dual axis positioning table, 30" of travel on each axis.	\$1,499.95

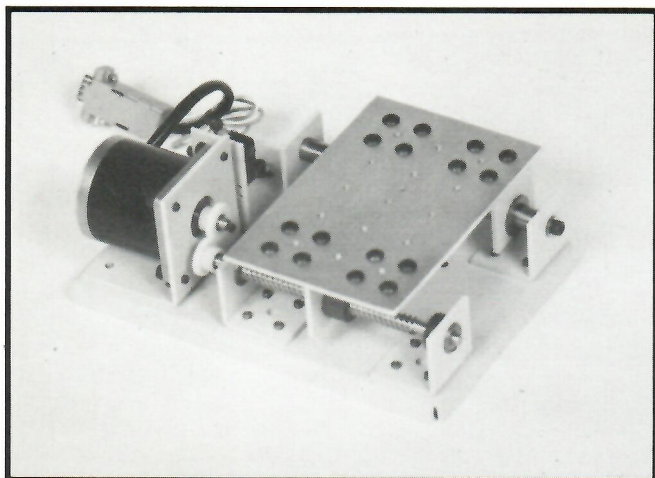
COMPLETE WORKCELLS

A complete multi-axis automation workcell can be created by connecting our Z axis to an XY table. In many cases, an XYZ configuration can replace a very elaborate robotic system at a fraction of the cost. Gantry operation of the positioning table is possible using our ST series stands.



Z-2 Single Axis Positioning Table

Precision Lead-Screw



PRICING

Z-2	Single axis positioning table, lead-screw, 2" total travel.	\$399.95
BR-2	Right angle bracket w/hardware, for vertical mounting of Z-2.	\$74.95
SK-4	Spacer kit, for horizontal mounting of Z-2.	\$24.95

Need the precision of a lead-screw? Need short travel against gravity? Our Z-2 table can solve the problem. Constructed with an aluminum frame, precision ground lead-screw, and a low-backlash acme nut, the Z-2 is perfect for short X, XY and XYZ applications. The Z-2 can easily be attached to our X and XY tables using the SK-4 spacer kit (horizontal) or the BR-2 bracket kit (vertical). Connect the Z-2 to an X-9 to make an XY table with 9 inches of travel in one direction and 2 inches in the other. Connect 3 Z-2 tables together and create a 3-axis workcell. The possibilities are unlimited! Easily controlled using our MD-2 or MD-2a motor systems. A detailed data sheet is available - we'll be glad to fax it to you.

SPECIFICATIONS

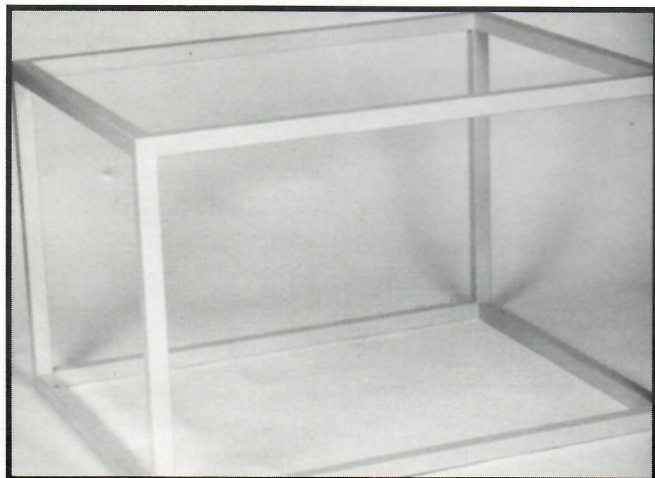
When used with the MD-2 stepper motor system and a 2 pound payload -

Accuracy: $\pm .005$ " per foot
Resolution: .00125" per .9 degree step
Repeatability: .002"
Maximum speed: .5" per second

Note: Payloads up to 15 pounds can be used with decreased speed and accuracy.

ST Stands for Positioning Tables

Gantry Use of Positioning Tables



Many applications require gantry (upside down) operation of positioning systems. Our 'ST' series stands are made to fill this need. Constructed to minimize vibration and flex. Perfect for using our XY tables with the Z-2 for 3-axis workcells. Detailed data sheets available.

2 Sizes to Choose From

ST-9	Gantry stand for XY-9.	\$299.95
ST-18	Gantry stand for XY-18.	\$299.95

All hardware included.

Rotary Positioning Table

RT

Lightweight, Easy-to-Use, Accurate

We've designed a rotary positioning table using our unique, cost-effective philosophy. The RT-12 can be used to position a variety of payloads such as cameras or lasers. The 12" diameter aluminum top plate has 24 tapped holes to attach your application. An endless variety of configurations can be created by attaching a linear positioning table such as our Z-2 or X-9 to the RT-12. The RT-12 can be driven with the MD-2 or MD-2a motor system. A detailed data sheet is available.

SPECIFICATIONS

When used with the MD-2 stepper motor system and a 2 pound payload -

Accuracy: .1 degree
Resolution: .15 degrees per .9 degree step
Repeatability: .1 degree
Maximum speed: 45 degrees per second

Note: Payloads up to 15 pounds can be used with decreased speed and accuracy.



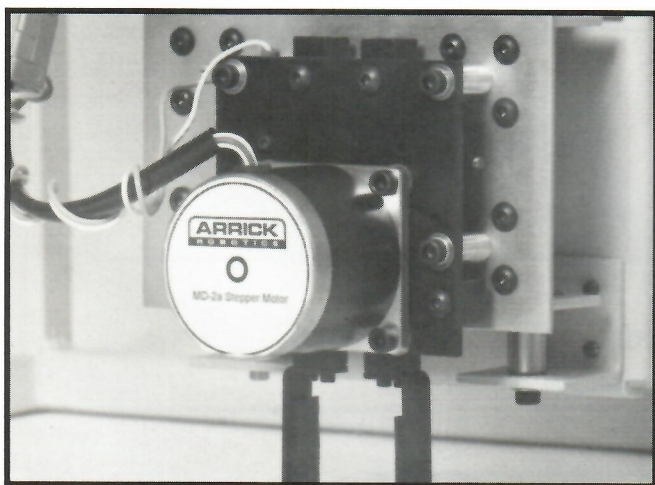
RT-12 12" Rotary positioning table,
Continuous rotational travel.

\$299.95

GR-2

Dual Finger Gripper

Internal and External Robotic Gripping



Shown attached to the Z-2 positioning table

Need to pick up test tubes in a laboratory or manipulate small parts on an assembly line? The GR-2 gripper is easier to use than conventional pneumatic units and doesn't require an air supply. Simply attach a size 23 stepper motor such as our MD-2a system and mount the gripper to the top plate of our positioning table using the supplied hardware. A home switch provides open status to the computer. The cam & spring design provides individual finger compliance and is capable of gripping the inside or outside of an object. Finger extensions are reversible for small or large payloads and can be replaced with your own for custom applications. Add the GR-2 to our positioning tables to create a complete robotic workcell.

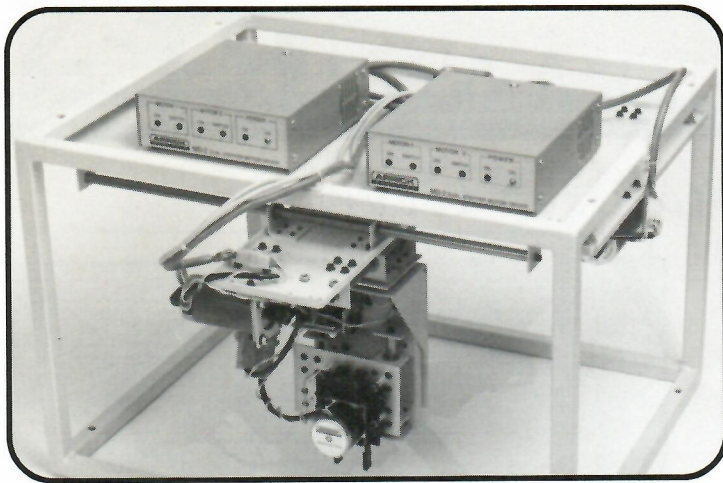
SPECIFICATIONS

When used with the MD-2a stepper motor system and the supplied finger extensions.

Grip Range: .5" Closed, .88" Open
Grip Force: 1/2 Pound.
Resolution: .019" per .9 degree motor step.
Repeatability: .02"
Maximum open speed: .1 second.

GR-2 Dual Finger Gripper.

\$249.95



Robotic WorkCell

Now's the time to automate those tasks currently being performed manually. By combining our MD-2 stepper motor systems with our XY positioning table and a gantry stand, a complete robotic workcell can be created. Our Z stage can be added to create 3-axis motion. In many cases, an XYZ workcell can replace a very elaborate robotic system at a fraction of the cost. Just connect to your personal computer, attach a tool and your system is complete. Add our GR-2 Gripper for even more capability. Robotic workcell packages come

complete with motor control systems, positioning tables, hardware and an accessory kit which includes a parallel printer port, cables, cable mounting hardware, and a T-handle hex wrench. To add a GR-2 gripper to a robotic workcell, add "g" to the end of a part number and add \$249.95 to the price.

Low Speed Models (1" per second)

RW-9a	9"x9"x2" Robotic Workcell, XY-9, (2) MD-2a, ST-9, Z-2, BR-2, Accessory kit.	\$2,874.95
RW-18a	18"x18"x2" Robotic Workcell, XY-18, (2) MD-2a, ST-18, Z-2, BR-2, Accessory kit.	\$2,974.95

High Speed Models (6" per second)

RW-9b	9"x9"x2" Robotic Workcell, XY-9, MD-2a, MD-2b, ST-9, Z-2, BR-2, Accessory kit.	\$3,174.95
RW-18b	18"x18"x2" Robotic Workcell, XY-18, MD-2a, MD-2b, ST-18, Z-2, BR-2, Accy kit.	\$3,274.95

*Simple, Inexpensive, PC Based Automation
for Factories, Laboratories, Classrooms, etc.*



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Send to:

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