Motion control is used where conventional motor control, using discrete inputs and outputs, cannot achieve the accuracy needed to produce a product. This applies to a wide range of industries that need to meet market demands for greater system throughput and improved output quality and precision. Some of these industries include automotive, energy, medical, petroleum, printing, and packaging. A good example of motion control is an offset printing press that uses four motors to print four separate colors on a page and another motor to turn the feed roll. A motion controller sends acceleration and velocity commands to each motor to control its speed, torque, and rotor position. At the same time the motion controller monitors these parameters and adjusts the output as needed to create a legible color image on the page.

Amatrol’s 890-MCSE2 teaches the skills required to understand and maintain the sophisticated applications so commonly found in modern industry. The motion control action may be as simple as opening and closing a valve or as complex as controlling multiple axes on a CNC machine. Amatrol’s motion control learning system is self-contained and teaches students to control both single and multiple axes. It allows students to learn industry-relevant skills including how to create, navigate, configure, operate, maintain, and apply motion control systems.

The 890-MCSE2 system provides instruction in motion control for a multiple axis system, including set-up, operation, programming, and multi-axis synchronization and control. It includes a tabletop workstation, multiple single axis drives, motion controller with control programming software, tensioning kit, synchronization kit, registration kit, timing kit, communication cables, lockout/tagout kit, student curriculum, and instructor’s assessment guide.
Reliable, Industry Standard Components and Features

Amatrol’s motion control solution contains two single-axis drives and a controller that are common in industry. The 890-MCSE2 includes fast control loop response time, five modes of motion – point-to-point, current regulation, speed regulation, electronic gearing, and manual mode, and communication via CANopen automation where new references are updated in one millisecond.

Teaches Applications of Motion Control In Industry

Motion control is found in almost every major industry in the world. Amatrol’s 890-MCSE2 teaches industry-relevant common applications such as rotary knife, grouping & ungrouping, camming, positioning, flying shear, clamping, etc. Common functions required in packaging, such as synchronizing disks, rotary knife registration, tensioning, and linear slides are shown below.

Students Learn Skills In Motion Control Programming

The 890-MCSE2 Motion Control Learning System includes integrated software that allows students to develop solid programming knowledge. This is essential for controlling and setting up applications. The programming software has strong development capabilities, including configuration, servo drive adjustment and diagnostics, controller adjustment and diagnostics, position registry data learning, axis operating modes, manual control management, positioning tasks, cam profiles, backup and recovery of profiles, IEC 61131 compliant programming editor, machine signature recording, and program code protection.

TECHNICAL DATA

Table-Top Workstation

- Tubular steel frame workstation, 37½ in H x 38 in W x 30 in L
- Mounted: drive panel, operator panel, power supplies
- Circuit breaker, 15 amp
- Safety lookout
- Master power switch
- Emergency stop pushbutton
- Guard doors (2)
- Contactor cover
- Pulley, 30 tooth
- 24VDC Power Supply
- NEMA enclosure

Multiple Single-Axis Servo Drives, 2

- Power range of 0.4 kW to 6 kW
- Voltage range of 115V to 480V
- 110/120 V single phase power
- Regulator assembly, 24 V to 5 V
- Full Operation without up to 50°C
- Integrated EMC filter
- Power removal safety function
- Compliance with international standards: EN 50178, IEC 61800-3, UL, eUL, CE
- Servo motor with absolute encoder (torque – 1.3Nm, speed – 300rpm)
- Combined servo drive and motor loop time – 82.5µs
- Five modes of control
- CANopen field bus
- Analog inputs (2)
- Hiperface absolute encoder
- Auto tuning capability
- Oscilloscope function
- Integrated 7-segment display terminal
- Remote terminal
- Software: all parameters of the application, axis diagnostics

Motion Controller and Programming Software

- Ergonomic interface
- Synchronization for 8 axes
- Communicates via CANopen automation, Modbus, or Ethernet TCP/IP
- Virtual axes
- Speed control
- Relative and absolute positioning
- Cam profiles for slave axes and logic switch control
- Electronic gearing function for speed and position
- 2 ½ D linear and circular interpolation
- Master axis via external encoder
- Fast digital input (30 µs)
- Blended motion sequencing
- RJ 45 daisy chain
- Memory: 1 MB RAM, 1 MB flash EPROM, 60 kB non-volatile RAM
- Programming via PLCopen single axis library, PLCopen multi axis library, 2D interpolation, Application functions block (AFB)

Digital I/O Block

- 24 VDC sinking inputs (12)
- 24 VDC sourcing outputs (8)

Linear Motion Module

- Lead screw assembly
- Linear bearing assemblies (2)
- Inductive homeing limit switches (3)
- Absolute distance measurement indicator

I/O Simulator

- Input simulator momentary pushbuttons (4)
- Input simulator maintained pushbuttons (4)
- Output simulator lights (8)

Tensioning Kit

- Synchronization Kit
- Registration Kit

Timing Kit

- Communication Cables

Lockout/Tagout Kit

- Safety lockout hasp
- Safety lockout tag
- Padlock

Student Curriculum Learning Activity Packets, B40832

Instructor’s Assessment Guide, C40832

Install Guide, D40832

Additional Requirements:

- PC – Windows XP or higher, see http://www.amatrol.com/service/computer_requirements.htm
- Recommended table 82-610 Mobile Technology Workstation or equivalent