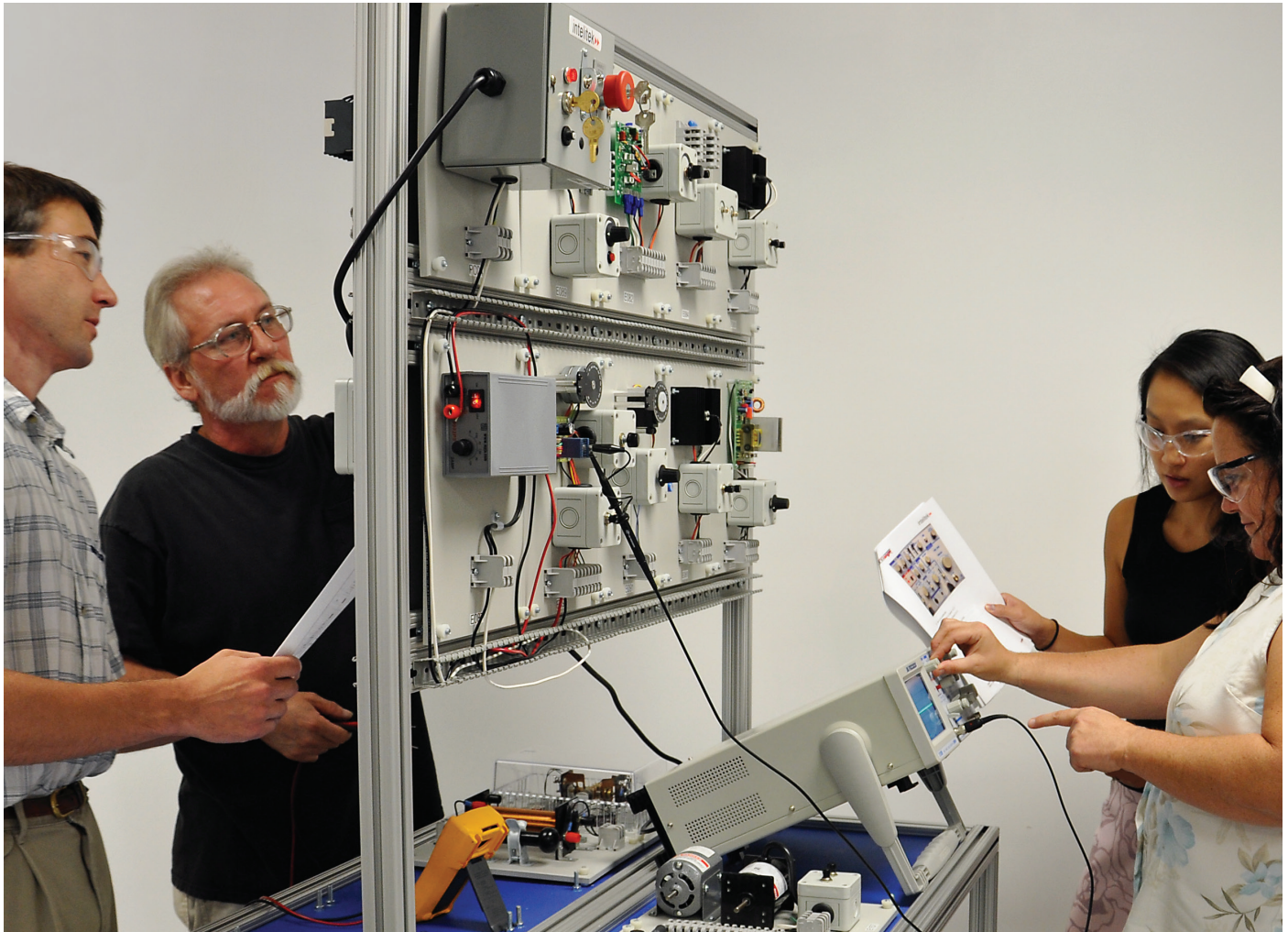


JobMaster® Training Program

Mechatronics and Industrial Maintenance



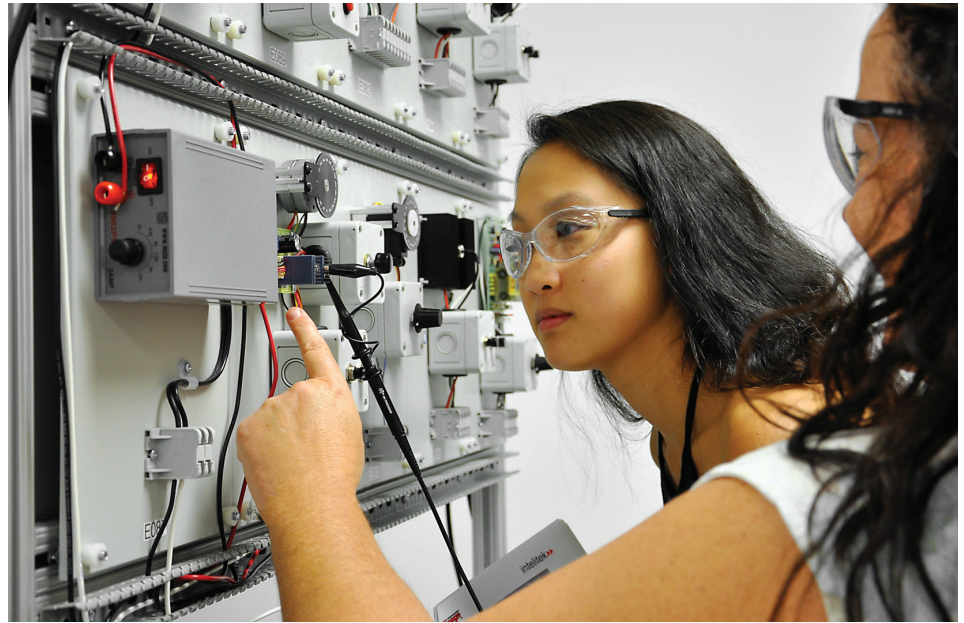
JobMaster provides a superior blended learning solution for mechatronics and industrial maintenance training by combining industrial-grade components with engaging e-learning content.

Comprehensive Industrial Maintenance & Mechatronics Training!

Employers in all sectors, from traditional manufacturing to emerging industries, need qualified workers to meet the increasing demands of a changing world. Advancing technologies and global competition put new demands on the workforce. The shortage of qualified workers is felt whether searching for highly-skilled candidates or entry-level candidates with basic skills.

The JobMaster Training program provides an effective solution to this critical need. JobMaster training delivers the critical skills needed by industries of all sectors, and for trainees of all types.

Whether implemented in high school and community college programs, or in industrial training programs to equip existing employees with new skills, JobMaster provides a scalable training program custom-fit to your needs.



Quality Hardware

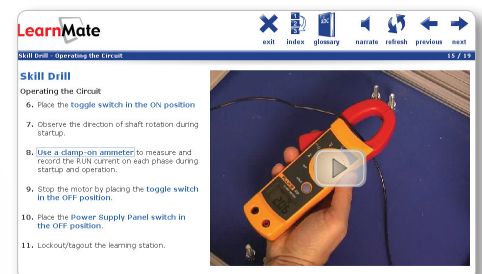
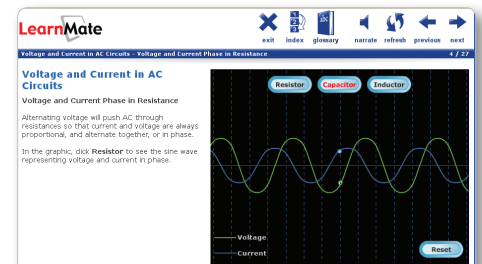
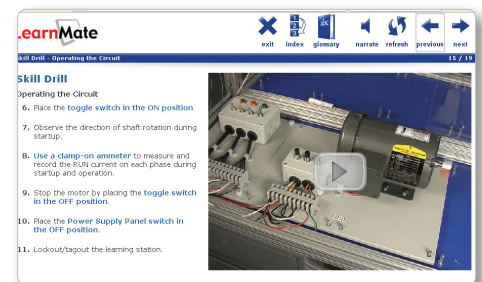
No other training system provides exposure to industry-standard practices like JobMaster, with hardware platforms consisting of industry-standard components.

From VFDs to solar-voltaic cells, all components are sourced from the same suppliers used by industry.

- All wiring includes frame-mounted industry-standard conduit and is terminated with crimped ferrules, like those found in industry. This allows students to learn the wiring techniques and skills critically needed by industry.

Skill-Based E-learning Content

- JobMaster curriculum is skill-based, developed by industry experts from Fortune 1000 companies across a wide range of sectors.
- Self-paced e-learning curriculum reinforces concepts by guiding students through skill-based activities using the hardware.



JobMaster® Course Library

Electrical Series ¹

JobMaster Electrical Series skills-based curriculum presents hands-on activities using industrial-grade electrical components mounted on Flexponent™ panels which attach to the JobMaster Learning Station. Each individual course focuses on the specific skills by topic, and supplies the relevant Flexponent panels. This flexible, modular approach allows you to build a custom program for your needs. Powered by LearnMate®, Electrical courses follow three main pathways:

- Basic Power Electricity
- Electrical Control Systems
- Industrial Power Electronics

Basic Power Electricity

■ Electrical Circuits	EA01A
■ Resistors & Conductors	EA01B
■ LCR Circuits	EA01C
■ Motors & Generators	EA01D

Electrical Control Systems

■ Electric Circuit Protection & Monitoring	EA02
■ Transformers	EA03
■ Electric Motors	EA04
■ Electromagnetic Motor Starters	EA07
■ Relays, Timers, & Time Delay Relays	EA08
■ Pilot Devices	EA09
■ Solid-State Reduced Voltage Starters	EA11
■ Variable Frequency Drives (VFDs)	EA12
■ Solid-State Drive & DC Motor Control	EA16

Industrial Power Electronics

■ Oscilloscope	EB01A
■ Digital Multimeter	EB01B
■ Hand Held Digital Oscilloscope	EB01C
■ DC Power Supplies	EB02A
■ Single-phase & 3-phase Power Supplies	EB02B
■ Thyristor Electric Motor Drives	EB03
■ Electronic Timers	EB04
■ Stepper Motor Drives	EB05
■ Servo Motor Drives	EB06

Mechanical Systems ²

JobMaster Mechanical Systems features the Mechanical Training Bench, a stand-alone mobile training station providing comprehensive training in mechanical power transmission. This all-in-one solution for mechanical systems training includes ten courses plus three optional add-on packages, all featuring industrial level hardware and skills based LearnMate e-learning curriculum.

■ Mechanical Training Bench ME10 Includes:

- ◇ Basic Mechanical Drive Components ME01
- ◇ Machine Statics & Dynamics ME02
- ◇ Machine Shafts & Keys ME03
- ◇ Bearings ME04
- ◇ Belt Drives ME05
- ◇ Chain Drives ME06
- ◇ Machine Shaft Couplings ME07
- ◇ Machine Gear Drives ME08
- ◇ Machine Speed Reducers ME09
- ◇ Electric Brakes ME10

- Laser Alignment ME11
- Vibration Analysis ME12
- Bearing Maintenance ME13

Electromechanical Maintenance Cell ³

The JobMaster Electromechanical Maintenance Cell is the capstone project for an industrial maintenance mechatronics program. An all-in-one solution, the Electromechanical Maintenance Cell simulates all the common electromechanical systems found in any industrial plant. Seven included web-based courses guide trainees through the complete assembly and troubleshooting of the cell.

■ Electromechanical Maintenance Cell 1600 Includes:

- ◇ Basic Maintenance Cell ZA01
- ◇ Conveyor, Drive & Controls ZA02
- ◇ Part Manipulation ZA03
- ◇ Industrial Lighting Circuits ZA04
- ◇ Variable Frequency Drive ZA05
- ◇ DC Motor & Drive ZA06
- ◇ Fault Insertion System ZA07



¹ For more information about hardware specifications and curriculum see the Basic Power Electricity, Industrial Power Electronics and Electrical Control Systems data sheets.

² For more information about hardware specifications and curriculum see Mechanical Systems Series data sheet.

³ For more information about hardware specifications and curriculum see Electromechanical Maintenance Cell (1600) data sheet.

Electrical Series Training Program

With the versatile JobMaster® learning station, the appropriate power control panels and your choice of JobMaster technology training courses, you can be sure your industrial maintenance and automated manufacturing programs are fully equipped for success!

How to Build Your Electrical Series Training Program:

1 Select Learning Station(s) to accommodate the number of students in your program.

JobMaster Learning Station

The JobMaster Two-Sided Mobile Learning Station is the hardware foundation of the JobMaster Electrical Training Courses. This sturdy anodized aluminum learning station provides the mounting points for the Flexponent™ panels provided with the JobMaster courses.

Each side of the learning station can hold 15 standard Flexponent™ panels and accommodates two students. Students can quickly and easily mount and remove panels to configure their work area for each individual skill.

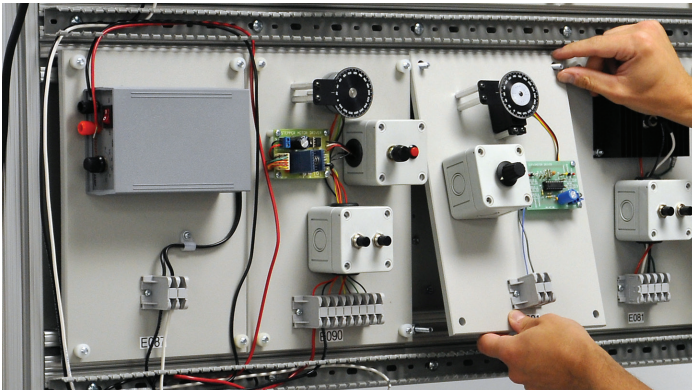
The versatile learning station facilitates classroom organization. Lockable swiveling casters and the 32" [81 cm] depth enables easy mobility through standard facility doorways.

Simply choose the number of Learning Stations necessary for the scope and size of your program!



2 Select the JobMaster Electrical Series course(s) you need.

Electrical Series Courses



Once you have equipped your program with the appropriate learning stations to accommodate your students, simply choose the courses that cover the skills and concepts needed in your training program.

In addition to content, each JobMaster series of courses includes all the necessary FlexPonent™ panels for use on the learning station, along with any additional tools and hardware used in the skill-based activities, such as meters and scopes.

Panels are easily added and exchanged allowing the workspace to be re-configured as multiple students progress through the course. This flexible modular approach allows you to build a custom program for your needs.

3 Select Power Control Panel based on individual course requirements.

JobMaster Power Control (PC) panels

An essential element of the JobMaster Training System, JobMaster PC panels serve three vital purposes:

- Providing the necessary electrical connection from the learning station to your facility power.
- Assuring a safe environment in the classroom.
- Exposing trainees to the same environment they will encounter in industrial settings.

PC panels feature industrial-level safety controls, including the lockout/tagout point, emergency stop, and the on/off switch for all the learning station components. Each power control panel provides three forms of lockout: one for the instructor, one for the student, one for emergency stop conditions.

Power controllers are available for both 120V single-phase and 220V three-phase power supplies. Each JobMaster technology training course specifies the model power controller needed.



Electrical Series Hardware

JobMaster provides a superior blended learning solution for mechatronics and industrial maintenance training by combining industrial-grade components with engaging e-learning content.

Learning Station

Frame Construction

- Material: Anodized aluminum U-shaped frame with 1-1/2" (38 mm) square t-slot table
- Size: Overall: 76"h x 44.25"w x 32"d (1930 mm x 1120 mm x 813 mm Bench height: 34" (864 mm) Vertical rack : 42" (107 cm)
- Wireway: 1" (2.54 cm) wiring conduit mounted along frame allows for industry-standard wiring practices
- Casters : 4" (10 cm) swiveling and locking
- Drawers (1/side) Full-suspension ball bearing slides interior dimensions: 6"H x 12"W x 16"D (15.25 cm x 30.5 cm x 40.5 cm)

Table surface

- Material: 3/8" (9.5 mm) thick high density polyethylene
- Properties: Environmentally stabilized, chemically resistant, non-conductive

Weight

- Assembled weight: 150 lbs (68 kg)
- Shipping weight: 245 lbs (112 kg)

Included Materials

- Safety shield (2 included) 8.5"H x 18"W x 14.75"D (216 mm x 457 mm x 375 mm)
- Nylon panel mounting nuts kit
- Hook-up lead wire kit :
 - ◇ Various lengths of color-coded 16-gauge insulated and stranded lead wires
 - ◇ Leads terminated on each end with industry-standard uninsulated crimped metal ferrules, no banana jacks
- Installation guide
- Hex key for assembly



Power Controllers



All PC panels include:

- Two keys enabling instructors to control access to the learning station
- The Power lock switch key power lock switch must be activated using the key before power will flow through the panel. Once the power lock switch is engaged, indicated by the power indicator light, the on/off toggle switch serves as the power switch to any components wired to the panel
 - ◇ The Emergency stop key is required to reset the e-stop once activated
- Overload protection via 5 amp breakers. If tripped because of a circuit overload, the breakers and power lock switch must be reset
- Emergency stop which disconnects power to the entire system when activated. Once engaged, both the e-stop and the power lock switch must be reset using the respective keys
- Beacon warning light atop the panel that flashes when the e-stop is activated and continues flashing until the emergency stop button is reset
- Industry-standard terminal strips for safe electrical connections

Power Control Panels (required component)

- Each Learning station requires one power control panel for each side in use
- Each JobMaster Module specifies which power controller is needed

Power Control Panels available

- 120V single-phase* Order #10-PC04-0000
- 220V three-phase* Order #10-PC06-0000

International step-down transformer package

- Order #10-PC09-0000

* International step-down transformer package required for international applications.

Power Control (PC) panels provide the necessary connection from the learning station to your facility power, as well as the lockout/tagout point, emergency stop, and the on/off switch for all the learning station components.

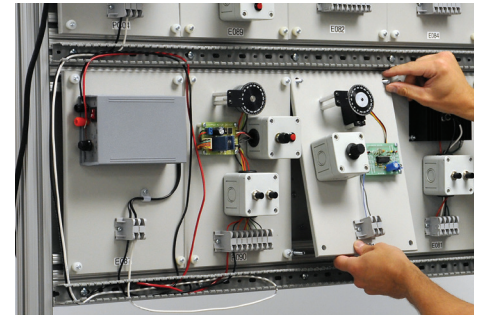
Panel Specifications

- Mounting board
 - ◇ Material: 3/8" (9.5 mm) thick high density polyethylene
 - ◇ Properties: Environmentally stabilized, chemically resistant, non-conductive
 - ◇ Dimensions: 8"W x 11.5"H x 0.375"D (203 mm x 292 mm x 9.525 mm)
- Terminal strips
 - ◇ Industry-standard, field serviceable fasteners for electrical connections
 - ◇ Rated for 50-amps at 600 volts
 - ◇ Recessed and insulated for safety

FlexPonent™ Panels

All Flexponent panels are constructed of non-conductive, high density polyethylene with industry-standard recessed and insulated terminal strip connections.

Flexponent panels are a component of JobMaster courses. Each course specifies what materials are included. Flexponent panels require a JobMaster Learning Station with the appropriate Power Control Panel.



All Flexponent panels meet the following specifications:

- Construction: 3/8" (9.5 mm) thick environmentally stabilized, chemically resistant, non-conductive, high density polyethylene
- Terminal strips: Industry-standard, field serviceable fasteners for electrical connections Rated for 50-amps at 600 volts Recessed and insulated for safety
- Dimensions: Single panel: 8"W x 11.5"H x 0.375"D (203 mm x 292 mm x 9.525 mm) Double panel: 16"W x 11.5"H x 0.375"D (406 mm x 292 mm x 9.525 mm)

Portable Panel Storage Unit (PPSU) (optional add-on)

The Portable Panel Storage Unit stores up to 50 Flexponent panels.

Materials Included

Order #10-PPSU-0200

- Portable panel storage unit

Hardware Specifications

- Frame Construction:
 - ◇ Material: Anodized aluminum U-shaped frame
 - ◇ Overall size: 76"H X 44.25"W X 32" 1930mm x 1120mm x 813mm
 - ◇ Casters: 4" (102 mm) swiveling and locking



Mechanical Training Bench

The JobMaster Mechanical Training Bench is a robust stand-alone mobile training station providing comprehensive training in mechanical power transmission.

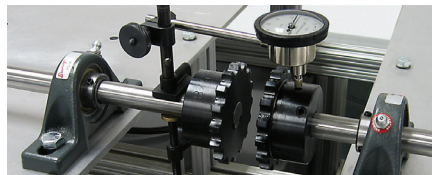
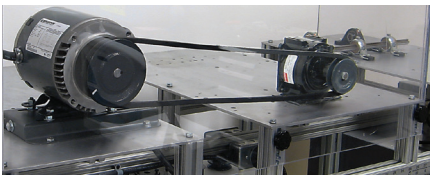


Optional two-student add-on makes a complete double-sided work station for four students!

A true all-in-one trainer, Mechanical Training Bench features industrial-strength components housed in a heavy duty mobile framework with a customized modular drawer storage system. Designed for two students per side, the trainer features bearings, belt drives, chain drives, gear drives and more.

The JobMaster Mechanical Training Bench presents the principles of power transmission using the same industrial-strength components used in factory environments.

Through ten courses covering 63 skills, students work with basic machines, machine statics and dynamics, shafts and keys, bearings, belt drives, chain drives, speed reducers, electric brakes and gear drives.



Optional

Laser Alignment

The Laser Alignment Tools (ME11) package is an optional supplement to the JobMaster® Mechanical Training Bench (ME10) trainer. This option adds Laser tools for both shaft and belt alignment along with all the hardware needed to deliver comprehensive instruction in all aspects of Laser Alignment.

Vibration Analysis

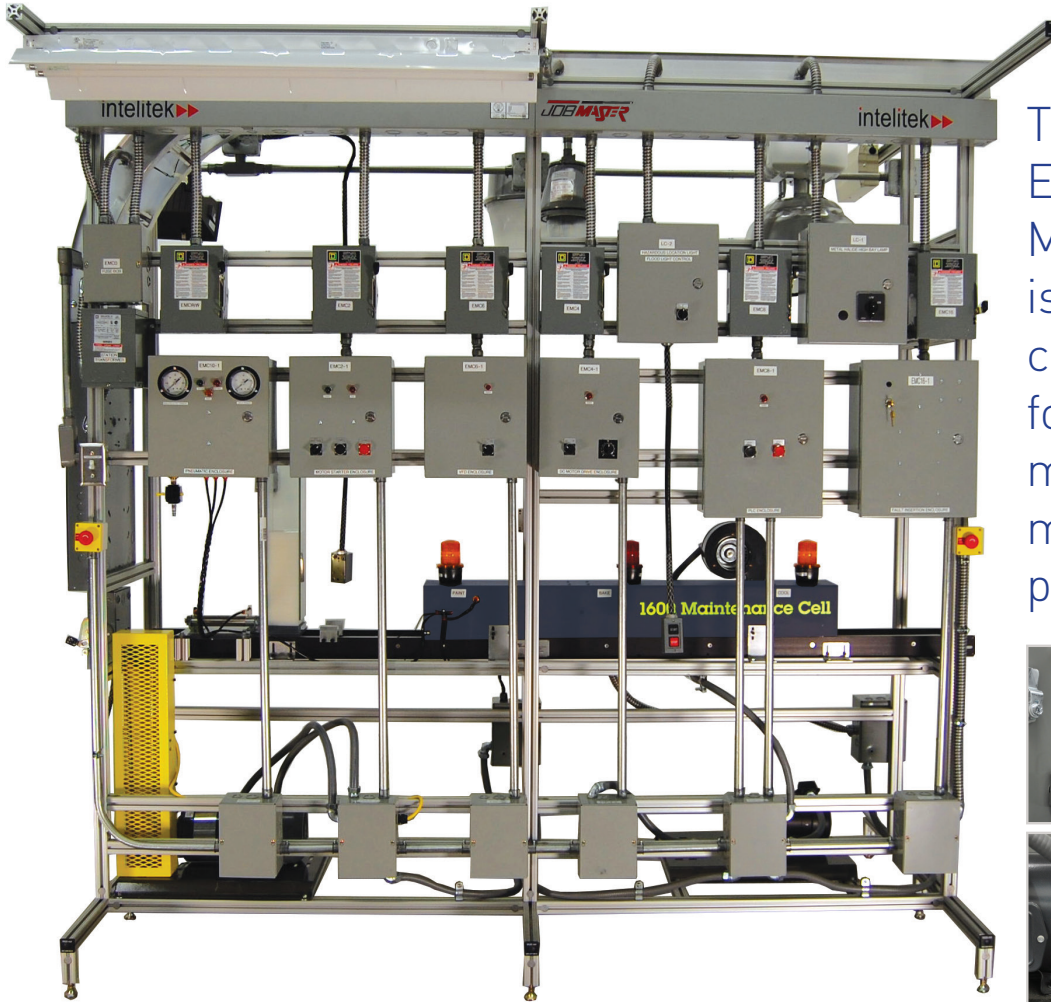
The Vibration Analysis Tools package is an optional supplement to the JobMaster Mechanical Training Bench (ME10). This option adds a digital vibration analyzer, shafts, rotors and other industrial-grade components to deliver comprehensive instruction in all aspects of vibration analysis.

Bearing Service Cart

The Bearing Service Cart is a stand-alone mobile training station for installing, removing and servicing plain and roller bearings. Students learn the principles of proper bearing service and work with a bearing packer, bearing pullers, an arbor press, grease gun and various bearing types.



Electromechanical Maintenance Cell



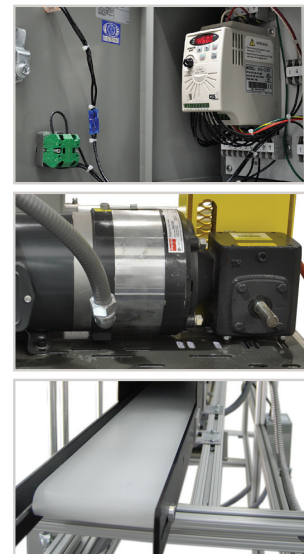
The JobMaster Electromechanical Maintenance Cell is the ultimate capstone project for an industrial maintenance mechatronics program.

In a footprint of 5.6 square meters (60 square feet), the JobMaster 1600 Electromechanical Maintenance Cell simulates an automated manufacturing operation in an industrial plant. This platform delivers relevant skills in the installation, operation, troubleshooting and maintenance of industrial equipment. The basic cell includes electrical power distribution and controls, wire and cable tray, wireways, conduit and equipment housings.

Students gain enhanced understanding of industrial processes by installing, operating and troubleshooting sub-systems onto the cell including:

- Conveyor drive and control
- Part manipulator and controls with paint bake & cool process tunnel
- Industrial lighting
- Three-phase motor controls and variable frequency drive
- DC motor controls and drive
- Lubrication components
- Pneumatic system and controls
- Instructor fault insertion system

The construction of the cell can be performed entirely by the trainees. Using industry-standard work orders, standard operating procedures, schematic diagrams and technical manuals as resources, students assemble the frame and install the electrical wiring for the cell and add-on components.



Once assembled, instructors can remotely insert faults in the electromechanical systems. Trainees can thus develop troubleshooting skills in a relevant, engaging manner. Each task includes validated industry standards providing measurable criteria for assessing students' performance. This authentic assessment ensures a more valid delivery of career skills.



Ordering Information

Electrical Series

Hardware

Learning Station	10-LS00-0200
Power Supply	10-PC04-0000
Power Supply	10-PC06-0000
Panel Storage Rack	10-PPSU-0001

Basic Power Electricity

Electrical Circuits	JM-BASE-EA01A
Resistors & Conductors	JM-BASE-EA01B
LCR Circuits	JM-BASE-EA01C
Motors & Generators	JM-BASE-EA01D
Complete Basic Electrical 2-Sided Bench	JM-BASE-ELEC

Electrical Control Systems

Electric Circuit Protection & Monitoring	JM-CTRL-EA02
Three-Phase Transformers	JM-CTRL-EA03
Electric Motors	JM-CTRL-EA04
Electromagnetic Motor Starters	JM-CTRL-EA07
Timers & Time - Delay Relays	JM-CTRL-EA08
Pilot Devices	JM-CTRL-EA09
Solid-State Reduced Voltage Starter	JM-CTRL-EA11
Variable Frequency Drives	JM-CTRL-EA12
DC Motor Control	JM-CTRL-EA16
Complete Electrical Control Systems 2-Sided Bench	JM-CTRL-SYSM

Industrial Power Electronics

Oscilloscope	JM-POWR-EB01A
Digital Multimeter	JM-POWR-EB01B
Hand Held Digital Oscilloscope	JM-POWR-EB01C
DC Power Supplies	JM-POWR-EB02A
Single Phase & Three Phase Power Supplies	JM-POWR-EB02B
Thyristor Electric Motor Drives	JM-POWR-EB03
Electronic Timers & Triggers	JM-POWR-EB04
Stepper Motors & Drivers	JM-POWR-EB05
Servo Motor Drives	JM-POWR-EB06
Complete Industrial Electronics Program	JM-CMPL-ELEC
Complete Industrial Power Electronics 2-Sided Bench	JM-POWR-ELEC

[Complete Electronics Program](#) **JM-CMPL-ELEC**

Mechanical Series

Mechanical Training Bench

Mechanical Bench Double-sided; 110V/220V	JM-MBLM-00X2
Mechanical Bench Single-sided; 110V/220V	JM-MBLM-ME10
Laser Alignment Add-on	JM-MBLM-ME11
Vibration Analysis Add-on	JM-MBLM-ME12
Bearing Service; 110V / 220V	JM-MBLM-ME13
Complete Mechanical Bench 2-Sided: 110V/220V	JM-MBLM-0000

Electro-mechanical Maintenance Cell

Electro-mechanical Maintenance Cell KIT	JM-EMMC-1600
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*Factory only option.



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