



TASKMASTER™



Authentic Skills-Based Training in Industrial Controls, Automation, and Maintenance

A product of **TECH**SKILLS INTERNATIONAL

SUPPORT TEAM

SALES & TECH SUPPORT

JBH TECHNOLOGIES INC.

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Georgia

Kentucky

North Carolina

South Carolina

Tennessee

ENGINEERING & MANUFACTURING

BERTELKAMP AUTOMATION INC

2021



TASKMASTER™



The SYSTEMS Training Solution for Industrial Controls & Automation



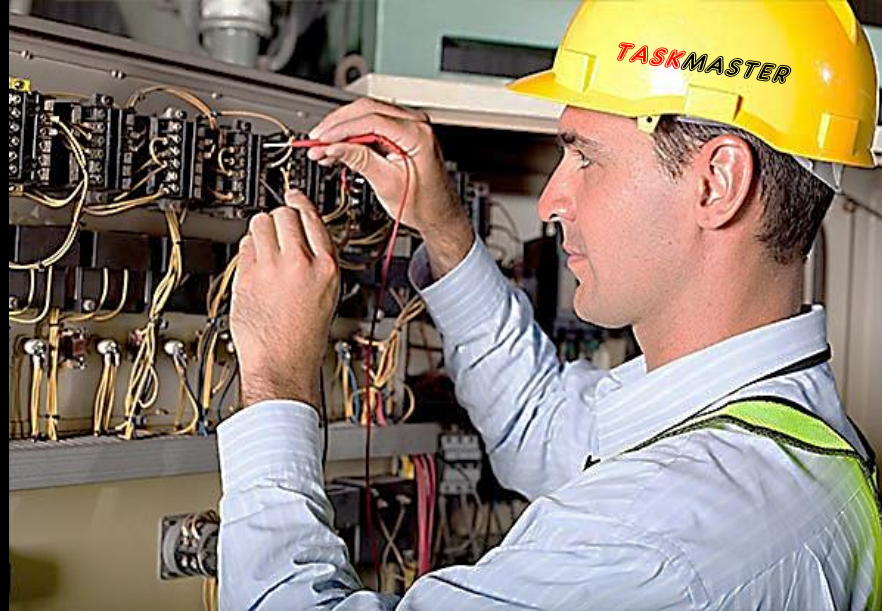
CERTIFICATIONS

Plant Automation Specialist
Industrial Controls Specialist
Industrial Controls and Automation Apprentice

TASKMASTER™ TRAINING

OUR MISSION – Authentic Skills-Based Training for a 21st Century Workforce in Industrial Controls, Automation & Maintenance.

OUR PRODUCT – Plant technicians with hands-on skill sets to keep the plant up and running. Our technicians meet the standards directed by the NEC, UL, NFPA and OSHA.



OUR TRAINING MODEL

We bring the plant into the school. Training hardware is authentic and duplicates the plant-floor equipment the technician sees the first day on-the-job. Training curriculum is authentic WORK ORDER driven. Trainees gain competent skills faster on real plant equipment versus traditional “lab” simulations.

TASKMASTER trained technicians are “plant-floor ready” and require only local plant orientation.

OUR CURRICULUM & COURSEWARE

TASKMASTER TRAINING courseware follows the Competency-Based Training Model (CBT) and the Adaptive Training Technology Model (ATT) accepted by many corporations and the US Military.

Our training content is presented in an e-learning format on CD-ROM or USB-DRIVE and compatible with most computer-based systems and tablets.



CD-ROM

TASKMASTER TRAINING



INDUSTRIAL CONTROL SYSTEMS
Basic Electric Motor Control - 1
Relays, Contactors, and Motor Starters



USB-DRIVE

TASKMASTER TRAINING HARDWARE

UL Listed and manufactured in Tennessee to UL508A and NEC409 specifications.

TASKMASTER™ PRODUCT INDEX

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Industrial Fluid Power -----	12-14
Basic Industrial Mechanical Drives -----	15-16
Industrial Automation and Controls -----	17-18
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TASKMASTER™



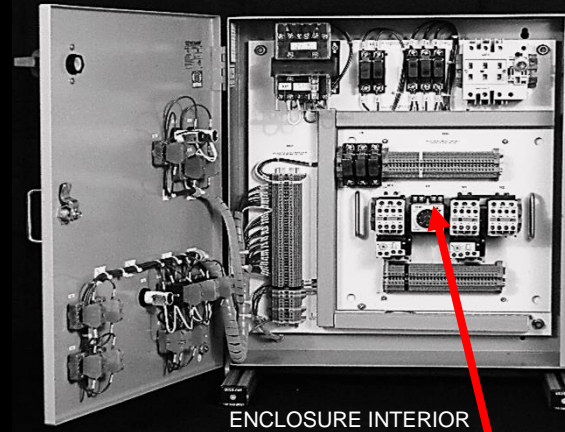
INDUSTRIAL ELECTRIC MOTOR CONTROLS

TASKMASTER™

INDUSTRIAL ELECTRIC MOTOR CONTROL



BASIC AND ADVANCED
INDUSTRIAL MOTOR CONTROL
ENCLOSURE



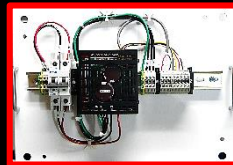
ENCLOSURE INTERIOR
REMOVABLE DRAW-OUT PANEL

AVAILABLE DRAW-OUT PANELS

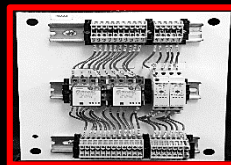
PLC'S & I/O SIMULATOR



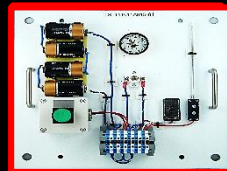
MOTOR DRIVES



MOTOR STARTERS



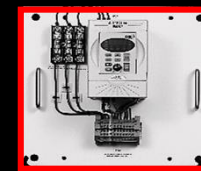
BASIC ELECTRICITY



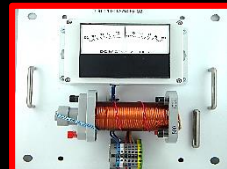
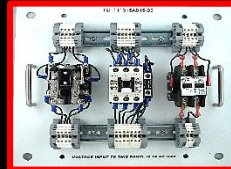
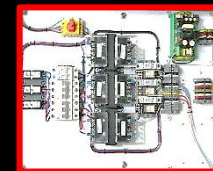
SENSORS



PROGRAMABLE VFD



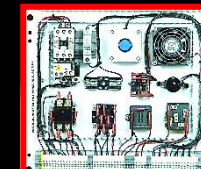
3-PHASE TRANSFORMERS



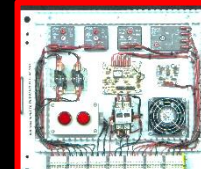
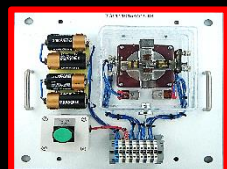
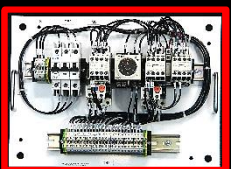
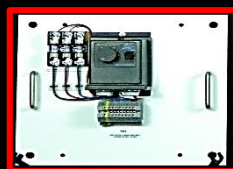
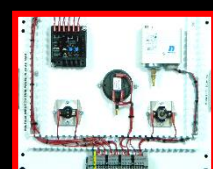
LOGIC MODULES



TIMERS/STARTERS



PRESSURE SWITCHES

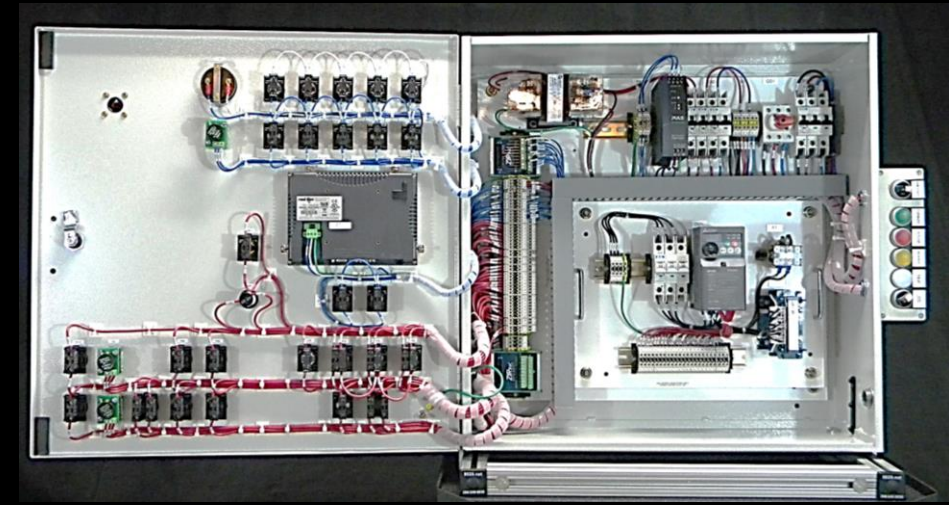


THERMOSTATS



TASKMASTER™

AUTOMATION AND CONTROL ENCLOSURE



SKILL SETS

- Introduction to Electric Motor Control
- Introduction to Electric Motor Control Training Hardware
- Introduction to Motor Control Stations
- Relays and Contactors
- Pre-wire and Bench-test Draw-out Units
- Connect and Test Across-the-Line Magnetic Starter
- Connect and Test Multiple Start-Stop Stations
- Connect Start-Stop Station to Control Two Magnetic Starters
- Circuit Indicators (Pilot Lamps)
- Connect and Operate a Magnetic Starter and Motor Run Status Lamps
- Connect and Operate Start-Stop Station and a Push-to-Test Pilot lamp
- Connect a Load Control Circuit and Load Status Indicating Lamps
- Timing Relays
- Connect and Operate On-delay Timer Circuits
- Connect and Operate for Sequential Starting of Two Motors
- Motor Reversing Circuits
- Connect and Operate a 3-Phase Motor in Forward and Reverse
- Connect and Operate 3-Phase Reversing Motor Control with Jogging
- Connect and Operate 3-Phase Motor Control for HAND and AUTO operation.

The Logic Devices (PLCs and Logic Modules) shown on draw-out panels below can be installed in the Automation and Control enclosure for hands-on systems integration training or when connected to the TASKMASTER Automated Manufacturing Work Cell (or an equivalent).



ALLEN BRADLEY



SIEMENS



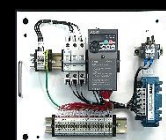
MITSUBISHI



MOTOR STARTERS

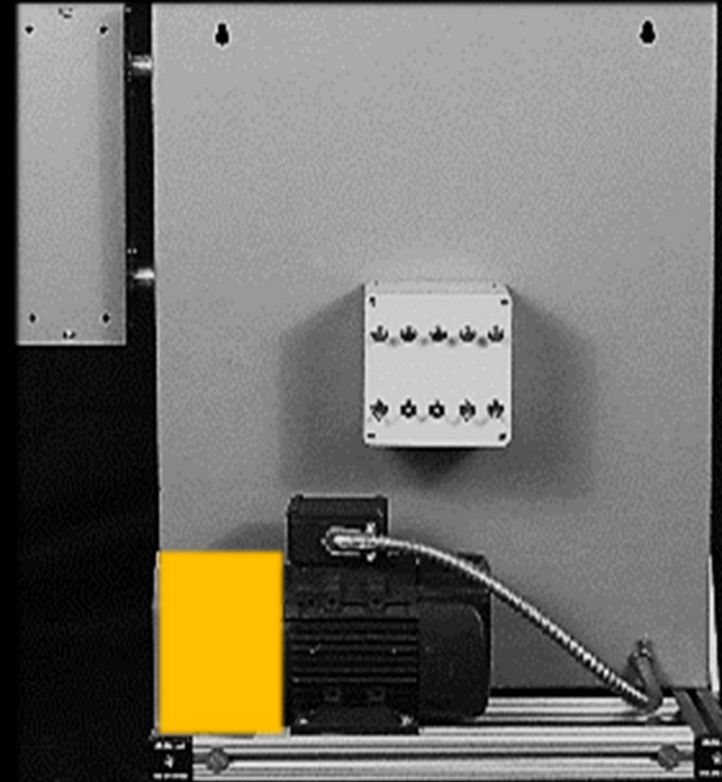


DC DRIVES



VECTOR DRIVES

TROUBLESHOOT MOTOR CONTROL CIRCUITS



The training system duplicates a typical industrial motor control application. This consists of NEMA 1 equipment enclosure and an installed reversing three-phase motor starter. Included are illuminated local and remote Forward-Stop-Reverse stations.

Troubleshooting skills include:

- read wiring NEMA, IEC, & DIN diagrams and schematics
- trace circuits using wire numbering and color codes
- test and measure with DMM & MEGGER - (not supplied)
- identify faults on: control circuit, power circuit, multiple control stations, motor, contactor, O.L. relay, control switches, fuses, and transformer.

INDUSTRIAL CONTROLS WIRING & TESTING

COURSE CONTENT

- NEC 409 & UL508S WIRING STANDARDS
- NEMA, IEC, & DIN SCHEMATIC READING & CONVERSION
- WIRE & CABLING BUNDLING, LAYOUT AND ROUTING
- WIRE & CABLE NUMBERING AND TAGGING
- WIRE CUTTING, STRIPPING AND PREPARATION
- COVERED WIREWAYS
- WIRE TERMINALS & TERMINAL STRIPS
- GROUNDING & BONDING
- CIRCUIT TRACING
- TESTING AND COMMISSIONING

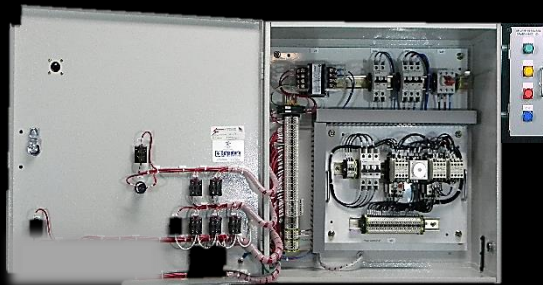


REQUIRED TOOLS AND EQUIPMENT NOT SUPPLIED

- DIGITAL MULTIMETER
- MEGOHMMETER (MEGGER)
- PHOTOTACHOMMETER
- THERMAL IMAGING OR INFRARED THEMOMETER
- INSULATED TERMINAL STRIP SCREWDRIVER
- WIRE CUTTER/STRIPPERS

ADD-ON TOOL & TEST INSTRUMENT PKG

- ALL ABOVE TOOLS & INSTRUMENTS IN ONE PKG.
- SUPPORTING E-LEARNING COURSEWARE



Industrial Controls Wiring Enclosure
WIRED BY STUDENT

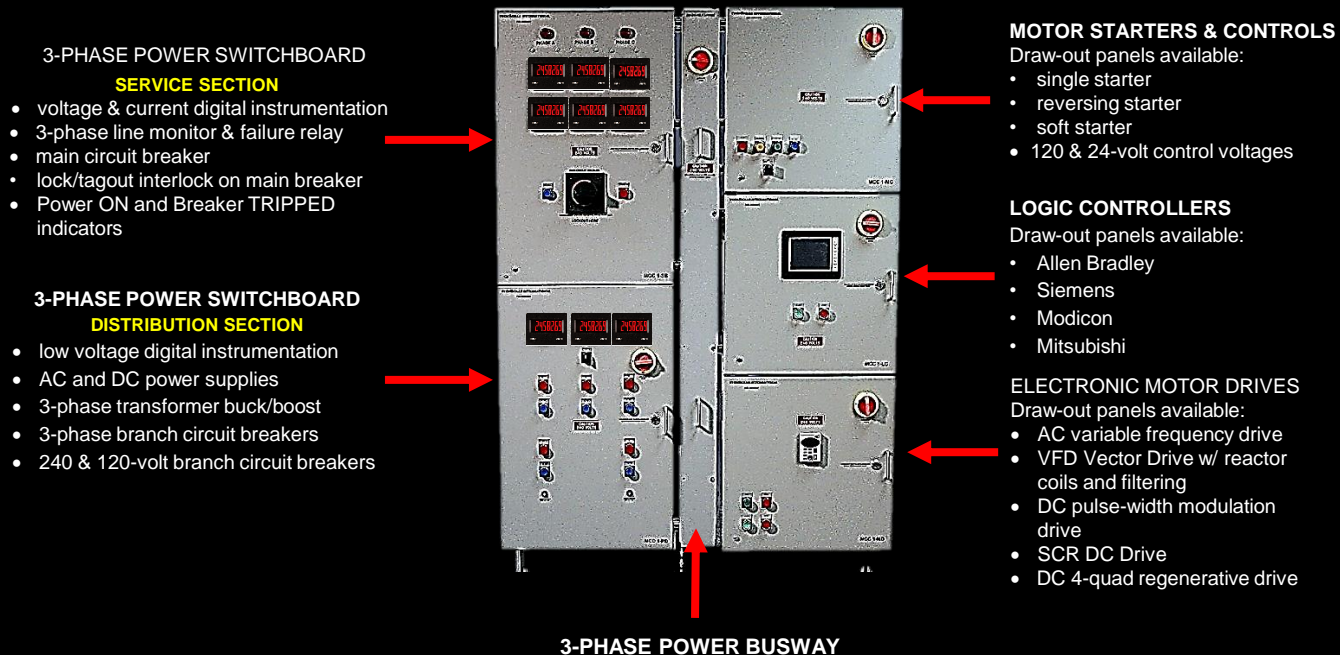


Industrial Controls Wiring Enclosure (Rear)
3-PHASE MOTOR AND GUARD

TASKMASTER™

POWER DISTRIBUTION & MOTOR CONTROL CENTER

The **TASKMASTER™** Motor Control Center is a simplified design replicating a full-size industrial MCC. It is an advanced system serving as a capstone project for advanced trainees. It provides a platform for a systems approach to applying skills previously developed in connecting, operating, monitoring, and troubleshooting all types of motor control systems.



TASKMASTER™

The **TASKMASTER™ FLEX-PANEL CUSTOMIZED TRAINING SYSTEM** provides low-cost alternatives for technical skill development by pairing existing hardware and courseware into modular, mobile, desk-top units of instruction.

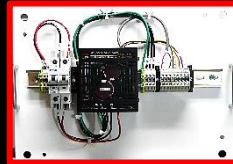


AVAILABLE DRAW-OUT PANELS

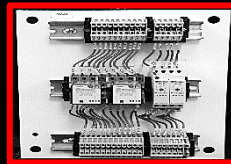
PLC'S & I/O SIMULATOR



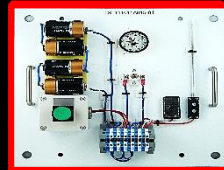
MOTOR DRIVES



MOTOR STARTERS



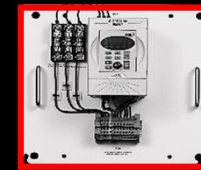
BASIC ELECTRICITY



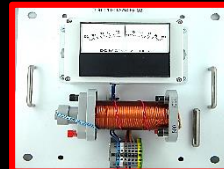
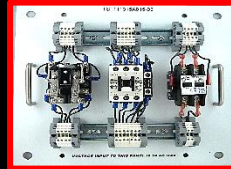
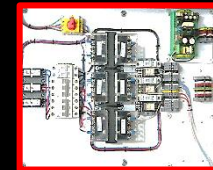
SENSORS



PROGRAMMABLE VFD



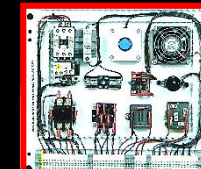
3-PHASE TRANSFORMERS



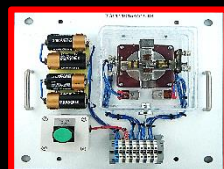
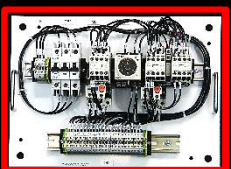
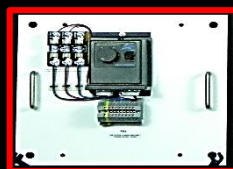
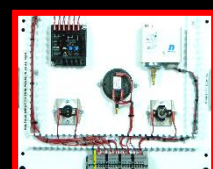
LOGIC MODULES



TIMERS/STARTERS



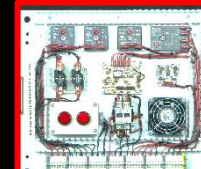
PRESSURE SWITCHES



LOGIC MODULES



TIMERS/STARTERS



PRESSURE SWITCHES



THERMOSTATS

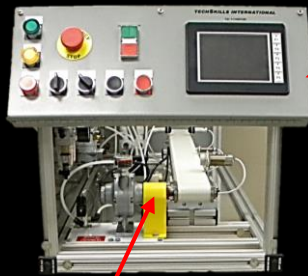
TASKMASTER™



FLUID POWER CONTROLS

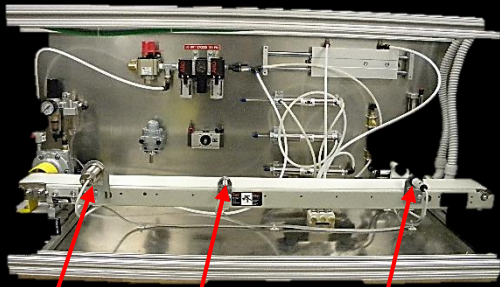
TASKMASTER™ ELECTRO-PNEUMATICS

OPERATOR'S CONSOLE



AIR MOTOR CONVEYOR DRIVE

AIR-MOTOR DRIVEN 40-INCH CONVEYOR



CAPACITIVE SENSOR INDUCTIVE SENSOR PHOTOELECTRIC SENSOR



PLC CONTROL ENCLOSURE



Pneumatic and Control Components

Air Motor drive, pneumatic thruster, double acting cylinders, single-acting cylinders, rotary actuator, FRL with shut-off and lockout, 3-way solenoid valves, 4-way solenoid valves, valve manifold, air motor, belt conveyor, capacitive proximity switch, magnetic proximity switch, photo electric switch, shuttle valve, quick exhaust valve, needle valves, flow control valves, check valves, filter-regulator, and a programmable logic controller.

SKILL SETS

1. Intro to Pneumatic Fluid Power
2. Air Compressors
3. Compressor Maintenance
4. Compressor Troubleshooting
5. Plumbing the System
6. Measure Pressure and Flow
7. Conditioning Compressed Air
8. Cylinders and Rotary Actuators
9. 2-way Control Valves
10. 3, 4, 5-way Direction Control Valves
11. Valve Actuators
12. Air Motors
13. Electro-Pneumatic Circuits
14. Electronic Control Components (photoelectric, inductive, capacitive)

TASKMASTER™ ELECTRO-HYDRAULICS

OPERATOR'S CONSOLE

- Illuminated pushbutton controls
- Selector for JOG and RUN
- Selector for HAND-OFF-AUTO
- HPU Overload trip indicator
- HPU START-STOP control
- Emergency STOP control

CONTROL ENCLOSURE

- 24-volt DC circuit control voltage
- 12-volt DC solenoid valve control
- HPU motor control starter
- Industrial wiring terminal strips
- 120-volt AC operating voltage
- Lockout/tagout disconnect switch

HYDRAULIC POWER UNIT **HYDRAULIC VALVES, CYLINDERS ETC**

OPTIONAL MOBILE BENCH

SKILL SETS

Electro-hydraulics replicates a hydraulic manufacturing process with electrical controls. Students install, connect, test, troubleshoot, and operate directed by plant work orders. Skill Assessment and Technician Certification is based on NEC, NFPA, standards. Twenty work orders on maintenance tasks for assessment and certification. Tasks are performed on; hydraulic power unit, directional control valves, pressure and flow valves, cylinders, hydraulic motor, electrical control stations, AC and DC power supplies. OSHA lockout and tagout procedures are required and assessed. 120-volt single-phase power is required. Troubleshooting skills include testing and measuring with standard industry test equipment (DMM fluid flow meter, and pressure gauge– not supplied. Standard electrician hand tools are required – not supplied. Training follows the standard competency-based model and requires 100-percent performance on task standards.

TASKMASTER™

MECHANICAL DRIVES



TASKMASTER™

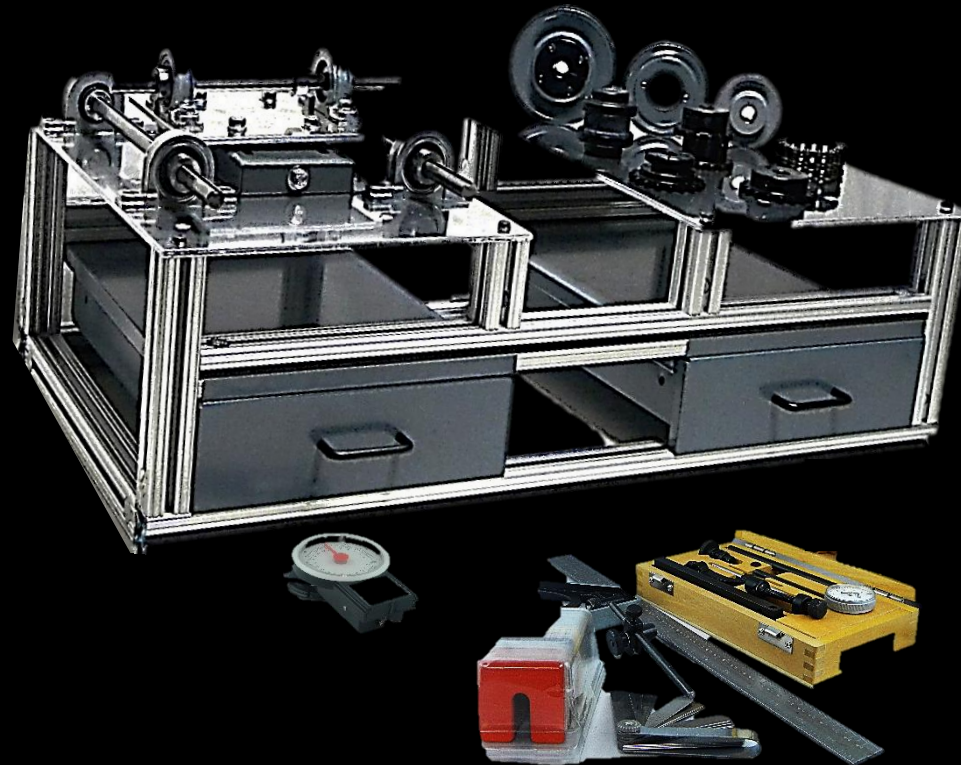
BASIC MECHANICAL DRIVES & ALIGNMENT

Preventive Maintenance
Machine Lubrication
Rim & Face Dial Indicator Method
Feeler gage/Straight Edge Method
Shaft Alignment
Calculate & Adjust Chain Drive
Speed
Calculate & Adjust V-Belt Drive
Speed

Assemble Coupled Drive
Coupled Drives
Assemble And Test Chain Drive
Chain Drives
Assemble and Test Belt Drive
Belt Drives
Inspect and Identify Bearings
Bearings
Assemble Shaft Using Keyway and
Keys
Shafts, Keyways, & KEYS
Mechanical Advantage
Assemble 6 Simple Machines
Six Simple Machines

Basic Mechanical Systems

ENTER



TASKMASTER™

A worker wearing a yellow hard hat with the 'TASKMASTER' logo, safety glasses, and large red earplugs is operating a laptop. The worker is in a factory environment, with a white robotic arm visible on the left and a control panel with a screen and buttons on the right. The scene is illuminated by overhead lights, creating a professional industrial atmosphere.

AUTOMATION AND DIGITAL CONTROLS

TASKMASTER™ AUTOMATED WORKCELL

Automation Controls, Maintenance, And Certification Assessments

PARTIAL SKILLSET LIST

MECHANICAL

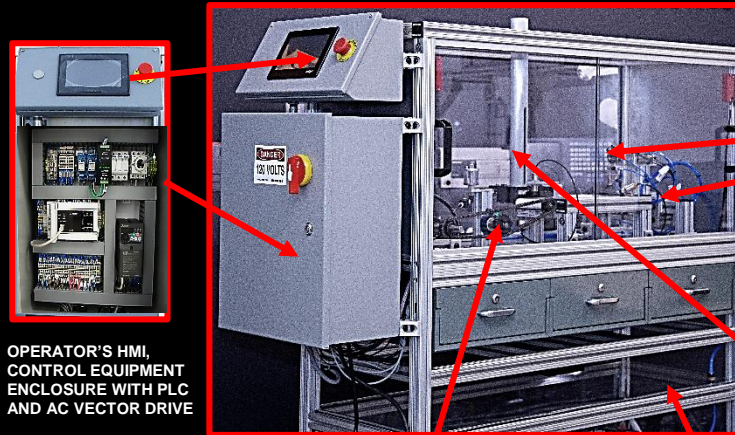
- INSTALL AND ALIGN 3-PHASE MOTOR AND DRIVE
- INSTALL AND ALIGN CONVEYOR ROLLER CHAIN DRIVE
- ADJUST CHAIN DRIVE TENSION IDLER
- LUBRICATE ROLLER CHAIN DRIVE BEARINGS
- SERVICE AND ADJUST ROLLER CHAIN OILER
- LOAD PART MAGAZINE
- TEST AND ADJUST PART EJECTION ACTUATOR
- TEST AND ADJUST PART GUIDE TO CONVEYOR TRACKING
- TEST AND ADJUST SPEED & PRESSURE TO PART HANDLER
- TROUBLESHOOT CONVEYOR DRIVE
- TROUBLESHOOT PART HANDLER
- TROUBLESHOOT PART EJECTION SYSTEM
- VERIFY INSTALLATION FROM FACTORY MECHANICAL DRAWINGS

PNEUMATICS

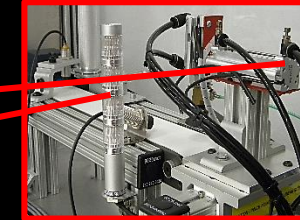
- TEST AND ADJUST ROBOT X-Y-Z AXIS SPEED
- TEST AND ADJUST ROBOT X-Y-Z AXIS PRESSURE
- SERVICE AND ADJUST FILTER, REGULATOR, AND LUBRICATOR
- VERIFY INSTALLATION FROM FACTORY PNEUMATIC DRAWINGS
- TROUBLESHOOT ELECTRICAL SOLENOID VALVES
- TROUBLESHOOT VACUUM GRIPPER SYSTEM
- LOCKOUT/TAGOUT PNEUMATIC SYSTEM

ELECTRICAL

- TEST AND ADJUST SAFETY RELAY AND SAFETY SWITCHES
- TEST E-STOP CIRCUIT
- START AND STOP PROCESS VIA TOUCH-SCREEN HMI
- TEST AND ADJUST CONVEYOR SPEED AND DIRECTION VIA HMI
- TROUBLESHOOT CONVEYOR MOTOR STARTING AND STOPPING
- VERIFY PLC I/O OPERATION
- TEST AND ADJUST PROXIMITY SENSOR POSITION
- TROUBLESHOOT PROXIMITY SENSORS
- VERIFY INSTALLATION FROM NEMA OR IEC ELECTRICAL DRAWINGS
- LOCKOUT/TAGOUT ELECTRICAL SYSTEM
- TEST AND TROUBLESHOOT ELECTRICAL SYSTEM C.B. TRIPS
- RESET CIRCUIT BREAKERS
- TEST AND TROUBLESHOOT DC CONTROL SYSTEM



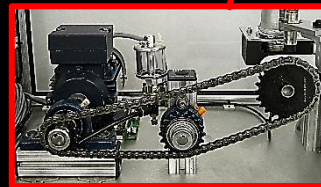
OPERATOR'S HMI,
CONTROL EQUIPMENT
ENCLOSURE WITH PLC
AND AC VECTOR DRIVE



3-AXIS PNEUMATIC ROBOT
WITH SPEED CONTROLS,
POSITION SENSORS, LINEAR
SLIDE, AND OPERATION
STATUS LAMPS ON LIGHT
TOWER



OPTIONAL ADD-ON
6-AXIS ARTICULATED
INDUSTRIAL ROBOT WITH
CONTROLLER



CONVEYOR DRIVE WITH 3-PHASE
MOTOR, SHAFT COUPLING, SHAFT
SUPPORT BEARINGS, ROLLER
CHAIN DRIVE AND CHAIN OILER



ON-BOARD PNEUMATIC
COMPRESSOR
W/ PRESSURE CONTROL, FILTER, &
LUBRICATOR



PART MAGAZINE, PART
LOADER, PROXIMITY &
MAGNETIC SENSORS, AND
PNEUMATIC ACTUATORS



OPTIONAL ADD-ON
INDUSTRIAL SCARA ROBOT
WITH CONTROLLER

POWER REQUIRED - STANDARD CLASSROOM 120-VAC
COURSEWARE SUPPLIED ON CD-ROM OR USB DRIVE

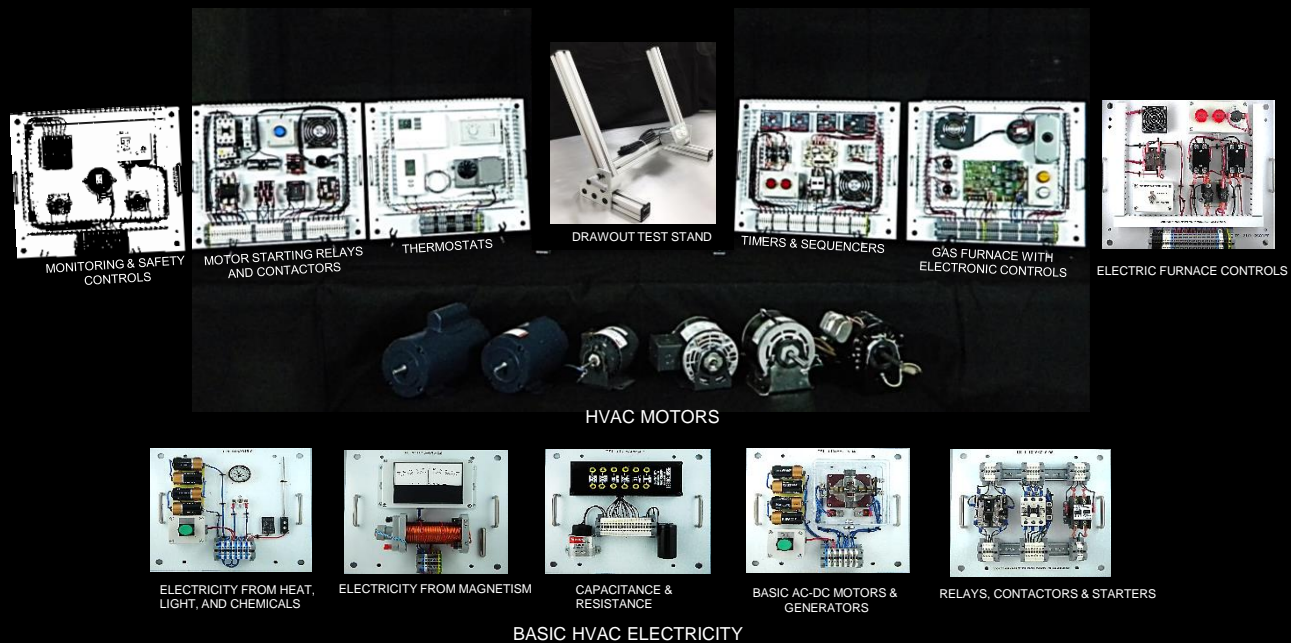
TASKMASTER™



HVAC CONTROLS AND MOTORS

TASKMASTER™

HVAC CONTROLS AND MOTORS



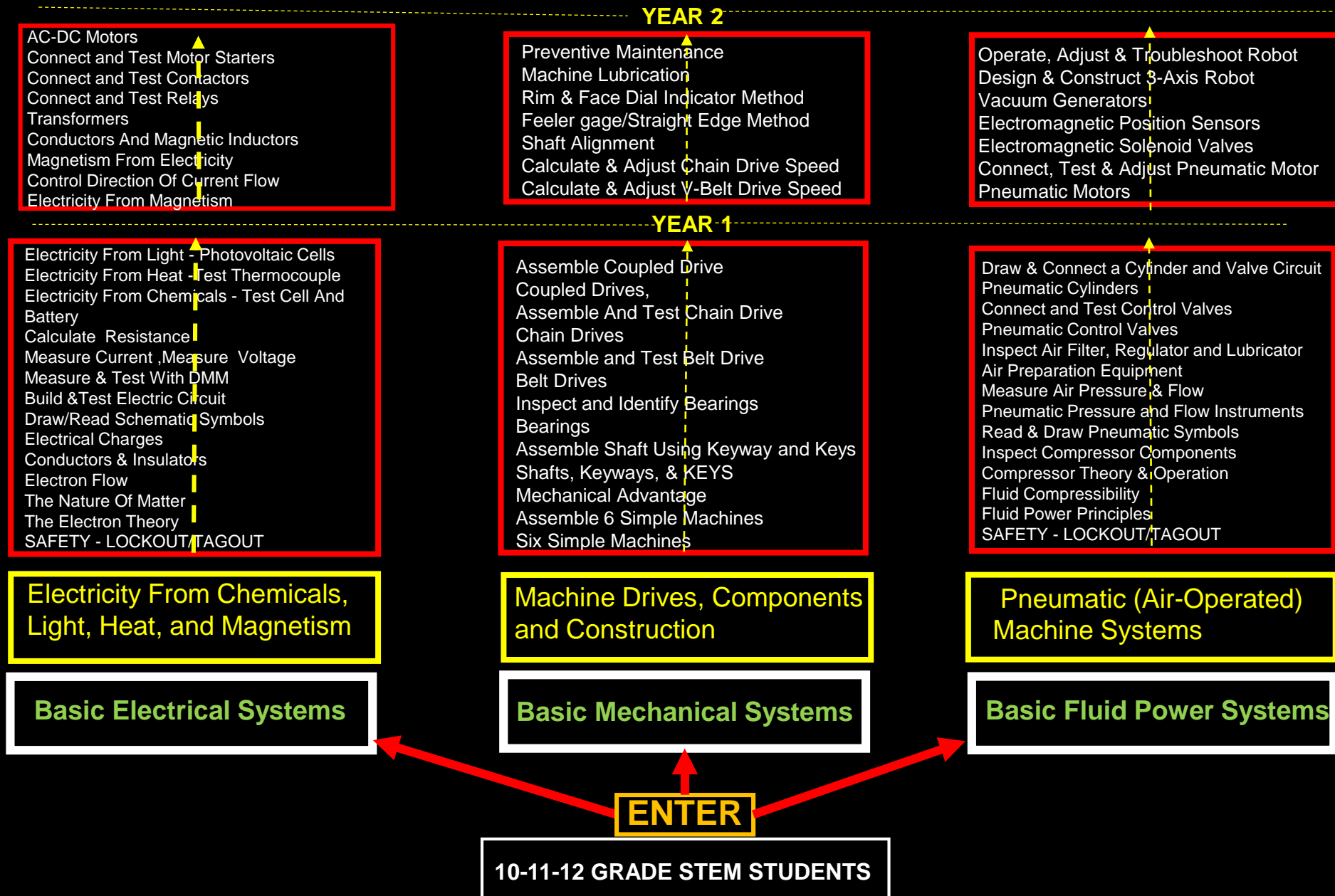
TASKMASTER™

Science Technology Engineering Math

The **TASKMASTER™** training solution provides a career- path for 10-11-12 Grade **STEM** students



THE STEM SOLUTION FOR TRAINING IN INDUSTRIAL CONTROLS & AUTOMATION



TASKMASTER™

STEM TRAINING DELIVERY PLATFORM

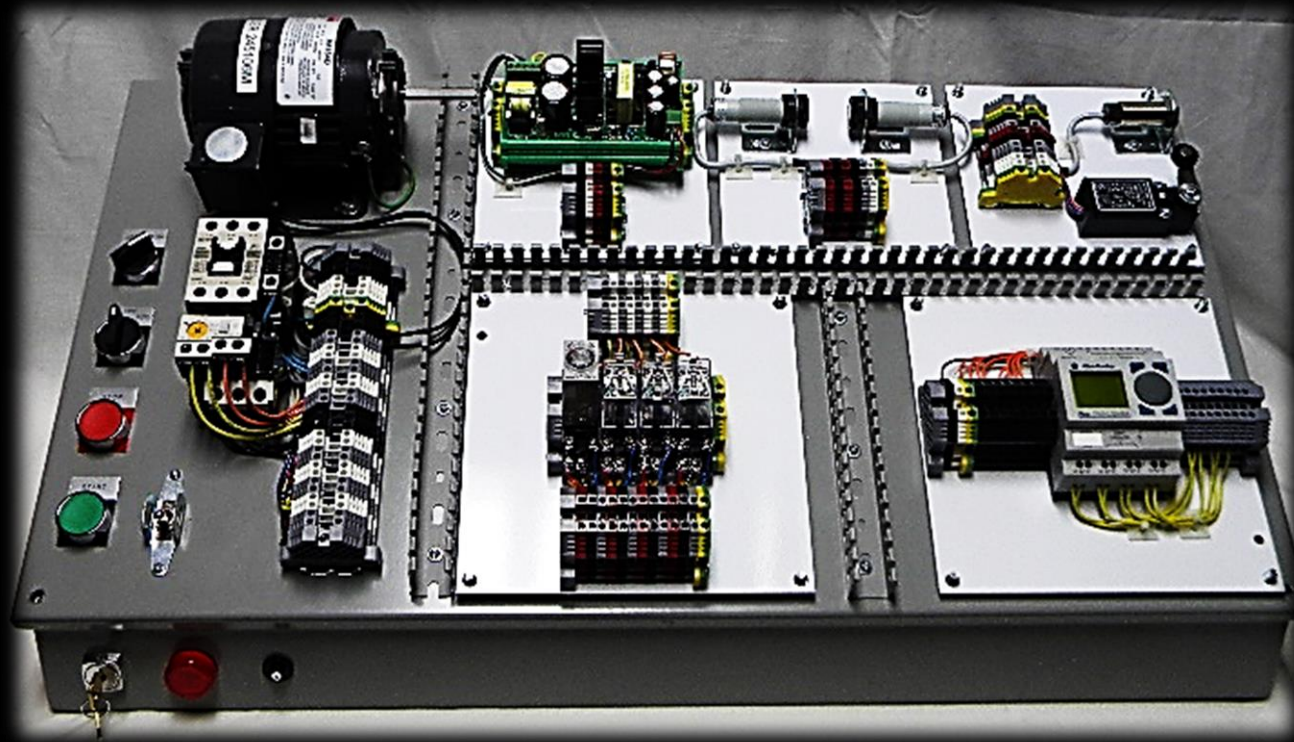


TABLE-TOP, MODULAR, AND MOBILE WITH ADD-ON COMPONENT PANELS

REQUIRES 120-VOLT STANDARD CLASSROOM POWER