

CATALOG ELECTRICAL ENGINEERING TECHNOLOGY

- construction electricity
- electricity & electronics
- electrical machines & drive systems
- unitec products
- automation & process control
- power supplies
- electrical energy
- hydraulics & pneumatics
- custom products



ALSO AVAILABLE:

AUTOMOTIVE

HD DIESEL

HELPING YOU TEACH TECHNOLOGY

Dear Customers,

For more than 40 years our company has manufactured high quality innovative training products for professional and technical training. We have developed an expertise in the fields of transportation and electrical technologies.

All of our educational products are built to help students meet the requirements of their specific programs and prepare them for a successful future in the workplace. Our products are designed with our philosophy of using OEM components found in industry today and adapting them for educational purposes by making them safer, increasing visibility, and adding fault insertion where possible. We build trainers not simulators! We feel that this philosophy will assist student in the following ways:

- Increased speed of learning;
- Increased confidence levels;
- Greater troubleshooting skills;
- Maintaining motivation through a correlation between training and the realities faced daily in industry.

While we have a solid line of standard products, we also pride ourselves in our ability to build customized products to meet specific program needs. In some cases, we build custom trainers from OEM components that are supplied by the school. What does all of this mean for you? Finally, a full line of training equipment built the way you want at a price you can afford.

If you have any questions or require any further information please call or send us an e-mail. A member of our team will be happy to assist you.

Best regards,

Kevin Boden
President

FOR MORE INFO

1-800-567-0791 (Canada & USA)

810-222-4525 (USA)

418-688-9067 (Canada)

info@consulab.com

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LIMITED WARRANTY

All Consulab products carry a limited one-year warranty on all parts and labor from the original date of delivery to the customer. Repair and/or replacement of components will be at the sole discretion of Consulab. This warranty does not cover component failure or damage as the result of abuse or use for other than product design specifications, and is void if any unauthorized modifications are made to the product.

CATALOG CONTENTS

Consulab is not responsible for any missing or erroneous information contained in this catalog. Product images are provided for informational purposes only, and may not reflect the exact configuration of the final product. Consulab reserves the right to change or modify the contents of this catalog without notice.



NOTICE

THIS PRODUCT IS BUILT ON A ONE-TO-ONE BASIS TO YOUR SPECIFICATIONS. DELIVERY AND PRICING OF PRODUCT MAY VARY BASED ON COMPLEXITY OF DESIGN AND THE AVAILABILITY OF COMPONENTS.

TESTIMONIALS



"We've been using ConsuLab training products as well as some of their competitors' products over the years. We've found ConsuLab products have comparative quality and durability at a very competitive price. Add to that their exceptional product support and customization capability and in my opinion they can't be beat!"

Professor Normand F. Morin
Coordinator for Millwright Techniques, Technician and Apprenticeship Programs
Cambrian College of Applied Arts & Technology

"As part of a CIDA-funded project for implementing new training programs at the most important vocational school in Haiti, the CFPH-CANADO, we proceeded with major purchases of specific training equipment. Through an international competitive bid tender process, ConsuLab was one of the winning suppliers for providing support to help build and equip the school. The quality of all materials produced and the outstanding support (courteous communication, deadlines respect, needs listening) made us very pleased to do business with that company."

Pierre Léonard
CIDA Field Project Director
CFPH-CANADO Project

"ATCO Electric currently uses the ConsuLab CL-1910 board with this particular product. You get more than you require a Power Line Technician to use but the ability to customize the particular Moduponents is a great asset. Since the inception of Labs in our Electrical and Transformer Theory classes our institute and provincial marks have excelled by approximately 8-10% our students understand the more complex theory with the hands on approach versus white board calculations. I would recommend the ConsuLab CL-1910 to other utilities in the market for a more hands on approach to theoretical training."

Trevor Oshaway
Training Specialist
ATCO Electric

"For more than 20 years, we have been working closely with ConsuLab. Their high quality pedagogical aides help our students better understand the different processes. ConsuLab has always been attentive to our needs, and available to answer any of our questions. Their on-going support and high quality product have earned our loyalty.."

Allan Flegg
President and School Director
Aviron Quebec Technical College

"Over the past few years, Fanshawe College has engaged your services for both the supply of new teaching/training aids and for the refurbishment of older equipment. The goods and services that we have received have been of consistent high quality – built to withstand the rigors of the learning environment and designed to assist in the acquisition of skills by all levels of learners. ConsuLab has been very responsive to our needs with respect to the timing of delivery and is very familiar with the unique challenges faced by training institutions. I would recommend ConsuLab without reservation."

Rod Cameron
Dean, Apprenticeship Training and Motive Power Technology
Fanshawe College
London, Ontario, Canada

CONSULAB MODUPONENT SYSTEM

GREAT FLEXIBILITY IN THE EXPERIMENTS

THE MODUPONENTS™ SYSTEM

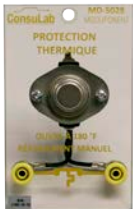
ConsuLab utilizes a patented construction process called «Moduponents». A Moduponent consists of a heavy duty clear plastic panel with all component securely mounted to it. Circuit construction and test points use banana plug receptacles for use with included jumper wires during student assignments and projects. The Moduponent can be mounted in a cabinet or wall racks. Moduponents are also portable for custom uses and trainer construction. All component symbols, labeling and schematic diagrams are silk-screened on the back side of the plastic to prevent damage or wear out. See below for a Moduponent example:

MODUPONENT™

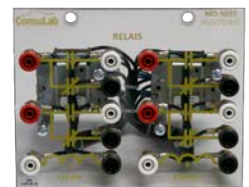
Each panel is built with strong clear Plexiglas

SYMBOLS AND DIAGRAMS

All the electric/electronic symbols and schematic diagrams are silk-screened on the back of the panels



**SINGLE
MODUPONENT**



**DUAL
MODUPONENT**

PRODUCT IDENTIFICATION

The product number is silk-screened on the top right corner of each Moduponent™

MOUNTING

The Moduponent™ slides in the retaining slots and is held in place with its locking screw located on top center

CONSULAB MODUPONENT SYSTEM

FULL ACHIEVEMENT OF PRACTICAL SKILLS

WE CAN BUILD CUSTOMIZED TRAINERS WITH MODUPONENTS OF YOUR CHOICE

- Select the specific Moduponents™ to meet your specific program needs
- Select the appropriate storage option to mount and store your Moduponents™ in your lab (single cabinet, dual cabinet, rack mount cabinet, wall brackets or portable modular unit).
- We can match your specific experiment requirements with corresponding standard product trainers if possible

SINGLE CABINET



RACK MOUNT CABINET



DUAL CABINET



FULL-SIZE PORTABLE UNIT



WALL BRACKETS



HALF-SIZE PORTABLE UNIT



FEATURES OF A STANDARD TRAINER WITH MODUPONENTS™

- Moduponents are selected and mounted based on specific training needs
- Mounting and storage of Moduponents™ is appropriate to product holding
- Student and instructor manuals when available



STANDARD TRAINERS	
MODEL #	SPECIFIC TRAINING NEEDS
CL-30	Industrial Power Transfor mers
CL-61	Basic Electrical Circuits
CL-1661	Power Electronics
CL-1900	Exploratory Electricity & Electronics
CL-1910	Fundamentals of Electricity
CL-1924	Gas Technology
CL-1950	Industrial Control Circuits
CL-1991	Air Conditioning System Control
CL-5100	Industrial Heating System Control
MD-5000	Gas Technology



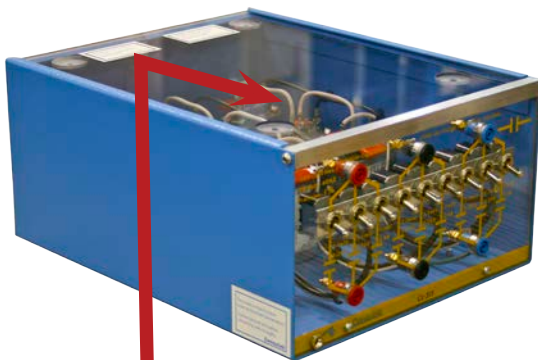
CONSULAB PORTABLE MODULAR UNITS

SAFE AND EASY MODULAR STACKING - SPACE-SAVING UNITS - INTERNAL PART VIEW

FEATURES OF CONSULAB PORTABLE MODULAR UNITS

- Designed into standard cubes with compatible dimensions
- Work and storage required space is minimized in the experiments
- Easy modular arrangement on a work table
- Safe and reliable unit stacking
- Symbols and schematic diagrams are silk-screened on the back of panels
- Easy access inside the units by sliding the clear plastic or vented cover
- Half or full size units available

HALF-SIZE UNIT



INSIDE ACCESS AND VIEW

Clear plastic slide cover allows to easily view the internal parts and access to the inside

FULL-SIZE UNIT



HANDLING

Embedded handles to provide easy and safe handling of the unit

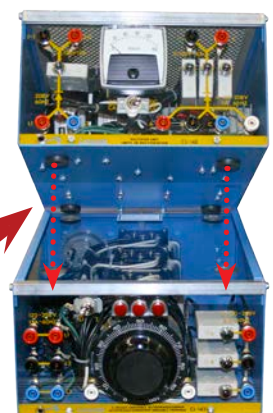
VENTILATION

The top stacked unit is equipped with a vented slide cover



STACKING

Rubber tabs under the unit permit safe and stable stacking



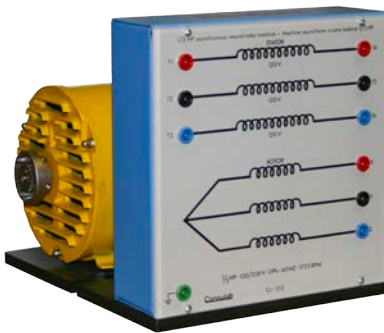
CONSULAB ROTARY MACHINES

RUGGED DESIGN - EASY CONNECTIONS - SAFE COUPLING

FEATURES OF CONSULAB ROTARY MACHINES

- Intended as a teaching aid for courses in AC/DC motors and generators
- Reproduce industrial-type power equipment in lab experiments
- User-friendly and compatible with ConsuLab portable modular units and Moduponents™
- Safe coupling and easy handling of the units
- Symbols and schematic diagrams silk-screened on the back of panels
- Interconnections with color-coded pathcords and safety terminals
- Include all the equipment for experiments on load, power supply, starting, measuring, etc.

PORTABLE OPTION



MOBILE CART OPTION*



MACHINE CONSOLE OPTION*



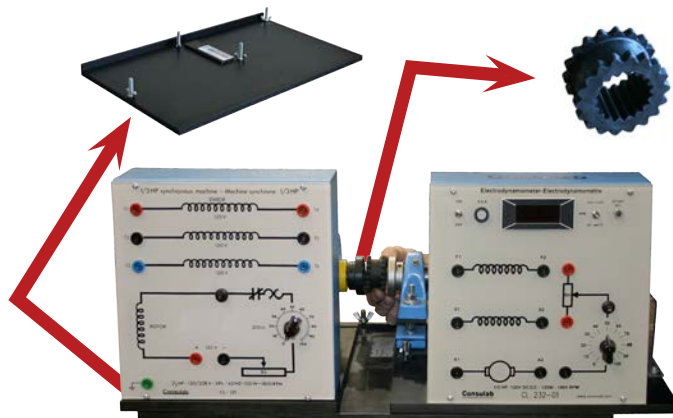
* if motor is available

ROTARY MACHINES COUPLING

- Mounting bases for coupling two or three portable units
- Toothed rubber bushing for coupling portable units or mobile carts
- Flexible metal rod for coupling machine consoles

TWO-UNIT BASE

RUBBER BUSHING



FLEXIBLE METAL ROD



CONSTRUCTION ELECTRICITY

GAS TECHNOLOGY TRAINER SERIES MD-5000



CUSTOM

Moduponents/Components Available on Request: (w/model number)

- Single upright stand (CL-1001-32-02)
- Wall mount cabinet or top section added to single stand to convert it to a double (CL-1001-32-01)
- Set of 26 jumper wires (CL-1012-03)
- 120/24V AC power supply (MD-5001)
- Resistors (MD-5002)
- 8&11-pin relay bases (MD-5003)
- DPDD toggle switches (MD-5008)
- SPDD toggle switches (MD-5009)
- 24V lamp holders (MD-5010)
- 120V lamp holders (MD-5011)
- Tekmar-256 one-stage boiler controller (MD-5015)
- Tekmar-261 two-stage boiler & setpoint controller (MD-5016)
- Fuses (MD-5018)
- Tekmar-002 10k temperature simulator (MD-5019)
- BASO BG1600M51EF-1AA pilot ignition control (MD-5021)
- Honeywell S8610U pilot ignition control (MD-5022)
- 120V power supply (MD-5024)
- 120-24V transformer (MD-5025)
- 750mV thermostat (MD-5026)
- 24V thermostat (MD-5027)
- Thermal protection (MD-5028)
- Maxitrol Selectra A1014 amplifier (MD-5029)
- Maxitrol Selectra TD114 temperature selector (MD-5031)
- 120V supply air fan (MD-5033)
- Air flow controller (MD-5034)
- Honeywell Q3400A1024 igniter-flame rod assembly (MD-5035)
- Honeywell Q313A1022 thermopile generator (MD-5036)

Educational Advantages

- Introduction of basic electricity
- Training on system monitoring, control and regulation devices
- Diagnosis and troubleshooting of problems with natural gas appliances
- Trainer is able to be customized with different Moduponents to meet specific program needs

Main Features

- OEM components on Moduponents™
- Control devices
- Flame monitor
- Indoor/outdoor temperature controllers
- Applied thermoelectricity
- Modular and complementary with each other
- Single/double stand or wall mount cabinet

RESIDENTIAL & COMMERCIAL ELECTRIC WIRING TRAINER w/MODUPONENTS CL-1700SM



CUSTOM

Educational Advantages

- Permits students to learn skills in the inspection, installation and servicing of electrical residential and commercial installations with common low-voltage systems
- OEM components mounted on a double-sided wall framing
- Folding structure with multiple sections for easy storage
- Compliant with common construction standards

Moduponents Included

- CL-1700SM-01 Low Voltage Control (2 wires)
- CL-1700SM-02 Low Voltage Control (3 wires)
- CL-1700SM-03 Hot Water Heater
- CL-1700SM-04 Return Call System (3 & 4 wires)
- CL-1700SM-05 Five Heat Switch & Transformer
- CL-1700SM-06 Reversing Drum Switch
- CL-1700SM-07 Heater Element (3 wires)
- CL-1700SM-08 Lamp Holders

CONSTRUCTION ELECTRICITY

FIRE ALARM SYSTEM TRAINERS

CL-10B (w/BINDING POSTS) CL-10T (w/TERMINALS)



Educational Advantages

- Permit students to learn skills in starting, servicing and inspecting fire alarm systems
- Designed for colleges
- OEM components mounted on panel
- Available with 5-way binding posts or terminals

Included Components

- MB Series Alarm Bell
- Klaxon Horn
- Horn Strobe
- Interface Module Isolator
- Heat Detector
- Ionisation Detector
- Optical Smoke Detector
- Heat Detector
- Photoelectric Duct Smoke Sensor
- Fire Alarm Manual Box
- Fire Alarm Control Panel
- Remote System Indicator
- Remote Zone Indicator

NURSE CALL SYSTEM TRAINERS

CL-11B (w/BINDING POSTS) CL-11T (w/TERMINALS)



Educational Advantages

- Permit students to learn skills in starting, servicing and inspecting nurse call systems
- Designed for colleges
- OEM components mounted on panel
- Available with 5-way binding posts or terminals

Included Components

- Patient Room Dome Lamp
- Annunciator Panel
- Emergency Pull Cord Station
- Bed Station
- Transformer
- 120V AC Inlet

SECURITY INTRUSION SYSTEM TRAINERS

CL-20B (w/BINDING POSTS) CL-20T (w/TERMINALS)



Educational Advantages

- Permit students to learn skills in starting, servicing and inspecting security intrusion systems
- Designed for colleges
- OEM components mounted on panel
- Available with 5-way binding posts or terminals

Included Components

- GE Control Panel Model NX-6V2
- Telephone Network Jack
- Sentrol Infrared Detector Model 6000 PIR
- Revere Speaker Model PI-IDSP
- Door Switch Assembly
- System Keypad
- Transformer

INTERCOM SYSTEM TRAINERS

CL-21B (w/BINDING POSTS) CL-21T (w/TERMINALS)



Educational Advantages

- Permit students to learn skills in starting, servicing and inspecting intercom systems
- Designed for colleges
- OEM components mounted on panel
- Available with 5-way binding posts or terminals

Included Components

- Apartment Phone Stations
- Apartment Lobby Entrance Panel
- Amplifier
- Electric Door Strike
- Transformer

CONSTRUCTION ELECTRICITY

FIRE ALARM SYSTEM WIRING TRAINER

CL-10SM



Educational Advantages

- Permit students to learn skills in installing, wiring, and starting fire alarm systems
- Designed for vocational schools and trades
- OEM components can be connected using 5-way binding posts or wiring terminals

Included Components

- MB Series Alarm Bell
- Klaxon Horn
- Horn Strobe
- Interface Module Isolator
- Heat Detector
- Ionisation Detector
- Optical Smoke Detector
- Heat Detector
- Photoelectronic Duct Smoke Sensor
- Fire Alarm Manual Box
- Fire Alarm Control Panel
- Remote System Indicator
- Remote Zone Indicator

NURSE CALL SYSTEM WIRING TRAINER

CL-11SM



Educational Advantages

- Permit students to learn skills in installing, wiring, and starting nurse call systems
- Designed for vocational schools and trades
- OEM components can be connected using wiring terminals

Included Components

- Patient Room Dome Lamp
- Annunciator Panel
- Emergency Pull Cord Station
- Bed Station
- Transformer
- 120V AC Inlet

SECURITY INTRUSION SYSTEM WIRING TRAINER

CL-20SM



Educational Advantages

- Permit students to learn skills in installing, wiring, and starting security intrusion systems
- Designed for vocational schools and trades
- OEM components can be connected using wiring terminals

Included Components

- GE Control Panel Model NX-6V2
- Telephone Network Jack
- Sentrol Infrared Detector Model 6000 PIR
- Revere Speaker Model PI-IDSP
- Door Switch Assembly
- System Keypad
- Transformer

INTERCOM SYSTEM WIRING TRAINER

CL-21SM



Educational Advantages

- Permit students to learn skills in installing, wiring, and starting intercom systems
- Designed for vocational schools and trades
- OEM components can be connected using wiring terminals

Included Components

- Apartment Phone Stations
- Apartment Lobby Entrance Panel
- Amplifier
- Electric Door Strike
- Transformer

CONSTRUCTION ELECTRICITY

AIR CONDITIONING SYSTEM CONTROL

CL-1991



Educational Advantages

- Designed as a training aid to teach A/C system controllers
- Allows the students to produce and explore a multitude of assemblies using a wide range of industrial components such as relays, detectors, pressure gauges, etc.
- The introduction of the principles of air control systems can be done in a scalable situation from very simple to complex actions to be taken

Main Features

- Permits the assembly and exploration of several A/C system controllers
- OEM industrial components mounted on Moduponents®
- Wall brackets offered in option for assembling
- More than thirty (30) Moduponents® available
- Modular and complementary with each other

HEATING SYSTEM CONTROL

CL-5100



Educational Advantages

- Designed as a training aid to teach heating system controllers
- Allows the students to produce and explore a multitude of assemblies using a wide range of industrial components such as pressure regulators, switching relays, thermostats, flame detectors, etc.
- The introduction of the principles of heating control systems can be done in a scalable situation from very simple to complex actions to be taken

Main Features

- Permits the assembly and exploration of several heating system controllers
- OEM industrial components mounted on Moduponents®
- Wall brackets offered in option for assembling
- More than thirty (30) Moduponents® available
- Modular and complementary with each other

HOME AUTOMATION TRAINER

CL-1565



Educational Advantages

- The most advanced equipment in residential lighting and home control technology
- Standard and radio frequency (RF) products
- The entire wireless home control system
- An elegantly simple user interface
- Completely compatible with other Leviton devices

Main Features

- Programming interface
- Dimmers
- Switches
- Wall control
- Combined control
- Power outlet
- Plug-in module
- And many more

ELECTRICITY & ELECTRONICS

BASIC ELECTRICAL CIRCUITS

CL-61



Educational Advantages

- Study of various switch circuits and lighting loads
- OEM components mounted on Moduponents™
- Includes more than ten experiments

Components / Moduponents™ Included

- Power supply (CL-148-24) 120/24/12 Vac
- Lamp holder (CL-601)
- SPST wall switch (CL-603)
- DPST wall switch (CL-604)
- 3-way wall switch (CL-605)
- 4-way wall switch (CL-606)
- SPST knife switch (CL-611)
- DPST knife switch (CL-612)
- TPST knife switch (CL-613)
- SPDT knife switch (CL-614)
- DPDT knife switch (CL-615)
- TPDT knife switch (CL-615)
- Remote Control Cable (CL-655)
- Jumper wires
- Storage cabinet

OHM'S LAW & DC CIRCUITS TRAINER

CL-1919-05



Educational Advantages

- Self-contained package with built-in power supply
- Student project manual provides learning assignments for circuit construction and understanding
- Built in DMM for electrical measurements and diagnosis
- Can be used to assist the instruction of operational theory of electrical/electronic circuits and components
- Meets many of the Electrical/Electronic tasks for NATEF, Alberta and Red Seal curriculums

Main Features

- Requires 120VAC to operate, outputs 2-14VDC (4A max)
- Panel mounted Digital Readout showing trainer DC voltage
- Built in DMM (Digital Multi-meter) with accessible external meter fuse
- Meter is powered by the trainers power supply. (no batteries)
- Adjustable Pulse Width Modulation control (0-100%)(1kHz)
- Each component has circuit connection receptacles for jumper wire hookup
- Included are test jumper wires and power cord
- User manual and activity assignments included

INTRODUCTION TO ELECTRICITY AND ELECTRONICS

CL-1900



Educational Advantages

- Deals with various electrical concepts
- Study of basic electrical and electronic components
- Study of electrical conversion
- Includes more than fifty experiments

Experiment Subjects List

- Electrical & electronic circuits
- Magnetism & electricity
- Chemistry & electricity
- Conversion of electrical energy
- Series circuits
- Parallel circuits
- Combination, series & parallel circuits
- Equipment using magnetic energy
- Capacitors
- Semiconductors
- Passive control elements
- Digital circuits

Also included

- Resistance plate
- Electronic circuit
- DC voltmeter, 0-3 V
- 2-scale ammeter, 0-50 mA
- DC motor, 3 V
- AC Transformer, 115/6 V
- All the parts required for the experiments

BASIC ELECTRICITY

CL-1910



Educational Advantages

- Basic principles in electricity
- Study of electric components and circuits
- OEM components mounted on Moduponents™
- Includes more than fifty experiments

Experiment Subjects List

- AC/DC measurements
- Series circuits
- Parallel circuits
- Combination circuits
- Magnetism
- Capacitors
- Temperature control
- Rectification
- Motor circuits

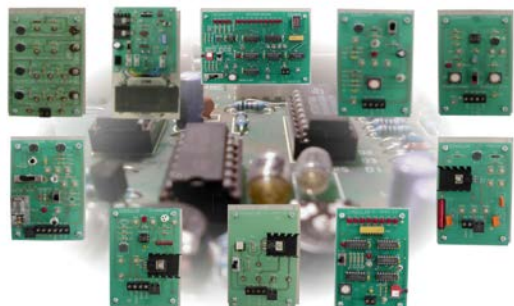
Also included

- Thermostat
- AC ammeter, 0-1 A
- Rheostat, 225 Ω, 50 W
- Universal motor
- D cells w/holders
- AC Transformer, 115/6 V
- AC power supply
- Buzzer & solenoid
- All the parts required for the experiments

ELECTRICITY & ELECTRONICS

SOLID-STATE CONTROL CIRCUITS

CL-9260



Main Features

- Designed to answer the objectives of any module related to electronics control circuits.
- Consists of ten (10) solid-state circuit boards mounted with OEM components on tabletop moduponents™
- Testing points
- Gives the student hands-on experiments with electronic components highly used in the industry

List of Moduponents™ Included

- CL-9260-01 AC/DC Power Supply
- CL-9260-02 Polarized Bipolar Transistor
- CL-9260-03 Schmitt Trigger
- CL-9260-04 Monostable Transistor Multivibrator
- CL-9260-05 Monostable Integrated Circuit Multivibrator
- CL-9260-06 Power Regulator
- CL-9260-07 Optical Insulation Solid-state Relay
- CL-9260-08 Solid-state Thermostat
- CL-9260-09 Decimal Digital Up-counter w/BCD-display Decoder
- CL-9260-10 8-Bit Shift Register

POWER ELECTRONICS TRAINER

CL-1661



Educational Advantages

- Study of static converters, rectifiers, inverters, etc.
- OEM components mounted on moduponents™
- Includes more than fifteen experiments

Components / Moduponents™ Included

- Autotransformer)
- 120/120VAC transformer
- 160mH-2A inductance
- 300mH-1A inductance
- 500mF-350VAC capacitance
- Resistances
- Diodes and rectifier bridge
- Thyristors
- Control circuit
- 0-5VAC ammeter
- 5-0-5VDC ammeter
- Jumper wires
- Storage cabinet

Optional Equipment

- DC motor
- Squirrel cage induction motor
- Rubber coupling
- Triple coupling base
- Prony brake
- Wattmeter / varmeter

INDUSTRIAL CONTROL CIRCUITS

CL-1950



Educational Advantages

- Study of industrial control circuits and solid-states circuits
- OEM components mounted on moduponents™
- Includes more than sixty experiments

Components / Moduponents™ Included

- DC ammeter
- 10-resistor group
- 10-resistor group
- 10-resistor group
- Indicator lamps
- 4-buttons group
- 4-diode bridge rectifier
- Diac / triac / thermistor / photo
- 10-capacitor group
- 4-transistor group
- 2-transistor group
- 2-DPDT switch group
- 115 VAC relays
- 2/6 VDC relays
- 4-pot group
- 4-pot group
- Power transistor
- Universal motor
- Shaded pole motor
- DC reg. supply
- AC Transfo and PS
- Thermometer
- Storage cabinet
- All the parts required for the experiments

TRANSFORMERS

CL-30



Educational Advantages

- Study of industrial transformers and three-phase circuits
- Vector analysis and trigonometry
- OEM components mounted on moduponents™
- Can be used concurrently with the CL-1950 trainer
- Includes more than thirty experiments

Components / Moduponents™ Included

- Transformer)
- 120-240/12-24 V, 50 VA
- Transformer
- 120-208-240/12-24 V, 50 VA
- Rheostats
- 22 Ω , 50 W
- 4-pole switch
- Ammeter
- 0-250 mA
- *Ammeter
- 0-1 A
- *4-diode bridge rectifier
- *2-DPDT switch group
- *4-potentiometer group
- 50-200 Ω / 1-5 k Ω
- *4-potentiometer group
- 20-100-250 k Ω / 1 M Ω
- *Transformer
- 120/12 V, center tap
- Thermometer
- Storage cabinet

* These Moduponents™ are also part of the CL-1950

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

ELECTRICAL MACHINES TRAINER FOR 1/3 HP (250 W) CL-100

The ConsuLab 1/3hp-250W rotary machines trainer is intended as a teaching aid for a course on AC/DC motors and generators. The ConsuLab modular units are portable and totally enclosed. Work space required during experiments is minimized since the modules can be stacked vertically. All interconnection panels are transparent so the components are in view at all times. Schematic diagrams and specifications are silk screened onto the back of the panel of each unit. Interconnections between components are made with jumper wires. When the experiment is in progress, the rotary machines are mounted on a rigid base and assembled with a rubber coupling, thereby eliminating any possible slippage. The ConsuLab trainer is complete with a laboratory manual (on CD-ROM) which contains details of 54 practical exercises. All parts used in this set of practical exercises are compatible with all other 1/3hp units produced by ConsuLab, so any program of interest can be covered, such as AC/DC control equipment, transformer, and many more. Requires a 120/208VAC 60Hz circuit.

Educational Advantages

- Designed as a teaching aid for a course on AC/DC motors and generators
- Work and storage required space is minimized in the experiments
- Easy modular arrangement on a work table
- Includes more than fifty experiments

Basic Equipment

Power Supply

- Variable 3 ph power AC supply (CL-143)
- AC/DC rectifying unit (CL-148)

Control & Operation Equipment

- Synchronizing unit (CL-125)
- SCR speed controller unit (CL-151-1)
- 3 ph rheostat unit (CL-152)

Transformers

- 100VA 1ph transformer (CL-314)

Electrical Machines

- Synchronous machine (CL-211)
- Wound-rotor induction motor (CL-212)
- Squirrel cage induction motor (CL-213)
- DC machine (CL-214)
- Capacitor-start motor (CL-223)
- Capacitor-run motor (CL-224)
- Universal motor (CL-225)

Experiment Subjects List

- Electrical circuits (16 experiments)
- DC Machines (14 experiments)
- Synchronous machines (6 experiments)
- Induction motors (4 experiments)
- Single phase motors (5 experiments)
- Transformers (8 experiments)
- SCR controllers (1 experiment)

Electrical Loads

- Variable resistive load unit (CL-311)
- Variable inductive load unit (CL-312)
- Variable capacitive load unit (CL-313)

Mechanical Load

- Prony brake (CL-231)

Electrical & Mechanical Measuring Equipment

- 3 ph analog wattmeter (CL-413)
- AC/DC analog volt-ammeter unit (CL-420)
- AC analog ammeters (CL-421)
- AC analog voltmeters (CL-422)
- Handheld tachometer (CL-1003)

Accessories

- Rubber coupling (CL-1007)
- Double coupling base (CL-1010)
- Jumper wires (41x)

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

POWER SUPPLIES

VARIABLE THREE PHASE AC SUPPLY CL-143



Technical Specifications

- 3 ph AC input: 120/208 VAC, 15 A
- Fixed 3 ph AC output: 120/208 VAC, 15 A
- Variable 3 ph AC output: 0-120/208 VAC, 5 A
- Fixed 1 ph AC output: 120 or 208 VAC, 15 A
- Variable 1 ph AC output: 0-120 VAC, 5 A or 3 ph AC output 0-208 VAC, 5 A
- Frequency: 60 Hz

AC/DC RECTIFYING UNIT CL-148



Technical Specifications

- 1 ph input: 208 VAC, 1 A
- 3 ph input: 0-120/208 VAC, 5 A
- Fixed DC output: 120 VDC, 2 A
- Variable DC output: 0-120 VDC, 8 A

SINGLE PHASE AC/DC SUPPLY CL-145

Technical Specifications

- 1 ph input: 120 VAC, 15 A
- Fixed 1 ph AC output: 120 VAC, 15 A
- Variable 1 ph AC output: 0-140 VAC, 5 A
- Variable DC output: 0-140 VDC, 5 A
- Frequency: 60 Hz

THREE PHASE AC/DC SUPPLY CL-149

Technical Specifications

- 3 ph AC input: 120/208 VAC, 15 A
- Fixed 3 ph AC output: 120/208 VAC, 15 A
- Fixed 1 ph AC output: 120 VAC, 15 A or 3 ph AC output 208 VAC, 15 A
- Variable 1 ph AC output: 0-140 VAC, 15 A
- Variable DC output: 0-140 VDC, 15 A
- Frequency: 60 Hz



STARTERS

DIRECT STARTER CL-134



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Reset button on front panel
- Pilot lamps (2): rated 125 V input & output
- Frequency: 60 Hz

SYNCHRONOUS MOTOR STARTER CL-135



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Time delay: adjustable
- Pilot lamps (2): rated 125 V input & output
- Start/stop push-button
- Frequency: 60 Hz

PRIMARY RESISTOR REDUCED VOLT. STARTER CL-138



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Number of steps: 2 (primary resistors)
- Time delay: adjustable
- Pilot lamp
- Start/stop push-button
- Frequency: 60 Hz

AUTOTRANSFORMER REDUCED VOLT. STARTER CL-139



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Number of steps: 2
- Reset button
- Pilot lamp
- Start/stop push-button rated at 250 V
- Frequency: 60 Hz

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

STARTERS

WYE-DELTA REDUCED VOLT. STARTER CL-140



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Delta-connected supply after delay
- Reset button
- Pilot lamp
- Start/stop push-button rated at 250 V
- Frequency: 60 Hz

PART-WINDING STARTER CL-1130



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Number of steps: 6 (part-winding)
- Reset button
- Pilot lamps (2)
- Start/stop push-button rated at 250 V
- Frequency: 60 Hz

SOFT STARTER CL-1131



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Equipped w/start motor controller
- Reset button
- Pilot lamps (2)
- Start/stop push-button rated at 250 V
- Frequency: 60 Hz

ROTOR-RESISTANCE STARTER CL-1132



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Number of steps: 6
- Reset button
- Pilot lamps (2)
- Start/stop push-button rated at 250 V
- Frequency: 60 Hz

MULTI-SPEED STARTER CL-1133



Technical Specifications

- Power: 120/208 VAC, 1/3 hp (250 W), 5 A
- Number of phases: 3
- Number of steps: 6
- Reset button
- Pilot lamp (2)
- Low speed /stop/high speed push-button
- Frequency: 60 Hz

SPECIFIC STARTERS AVAILABLE ON REQUEST

- 3 POINTS MANUAL DC STARTER
- 3 & 4 POINTS MANUAL DC STARTER
- C.E.F.M. DC STARTER
- TIMER RELAY DC STARTER

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

DC MACHINES

DC MACHINE (SERIES-SHUNT-COMPOUND) CL-214



Technical Specifications

As DC Motor

- Power: 120 VDC
- Speed: 1800 rpm
- Rotor field rheostat: 200 Ω , 50 W

As DC Generator

- Power: 120 VDC
- Output: 120 W
- Speed: 1800 rpm
- Thermal breaker protection

DIGITAL ELECTRO-DYNAMOMETER CL-232-1

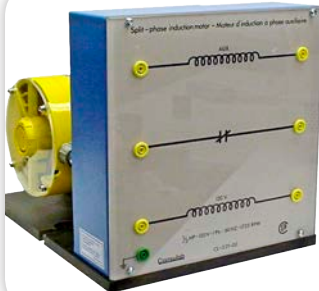


Technical Specifications

- Power: 120 VAC, 1 ph
- Motor: 125 VDC, 1800 rpm, 1/3 hp (250 W)
- Generator: 90 VDC - 120 W - 1800 rpm
- Field rheostat: 200 Ω - 75 W
- Rated torque: 1.33 N.m / 1.0 lb.ft
- Maximum torque: 3.40 N.m / 2.5 lb.ft
- Digital unit selector
- Thermal breaker protection

SINGLE PHASE MACHINES

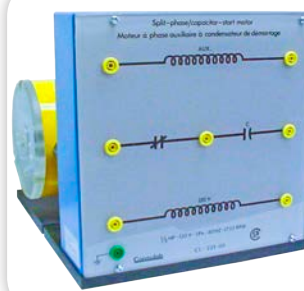
SPLIT-PHASE INDUCTION MOTOR CL-221



Technical Specifications

- Power: 120 VAC, 1 ph
- Speed: 1725 rpm
- Frequency: 60 Hz
- Number of machine connections: 6
- Centrifugal switch

CAPACITOR-START MOTOR CL-223



Technical Specifications

- Power: 120 VAC, 1 ph
- Speed: 1725 rpm
- Frequency: 60 Hz
- Number of machine connections: 7
- Centrifugal switch
- Capacitor mounted externally

CAPACITOR-RUN MOTOR CL-224



Technical Specifications

- Power: 120 VAC, 1 ph
- Speed: 1725 rpm
- Frequency: 60 Hz
- Number of machine connections: 6
- Capacitor mounted externally

UNIVERSAL MOTOR CL-225



Technical Specifications

- Power: 120 VAC, 1 ph or 120 VDC
- Speed: 1800 rpm
- Frequency: 60 Hz
- Number of field connections: 3
- Number of armature connections: 2
- Brush position adjustment

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

THREE PHASE MACHINES

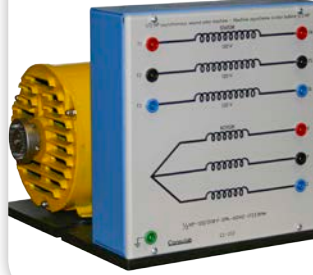
SYNCHRONOUS MACHINE CL-211



Technical Specifications

- As Synchronous Motor**
 - Power: 120/208 VAC, 3 ph
 - Speed: 1800 rpm
 - Number of stator windings: 3 (wye/delta)
 - Rotor field rheostat: 200 Ω , 50 W
- As Alternator**
 - Power: 120/208 VAC, 3 ph
 - Output: 120 VA
 - Speed: 1800 rpm
 - Power factor: 0.8
 - Thermal breaker protection

WOUND-ROTOR INDUCTION MOTOR CL-212



Technical Specifications

- As Synchronous Motor**
 - Power: 120/208 VAC, 3 ph
 - Speed: 1725 rpm
 - Number of stator windings: 3 (wye/delta)
 - Optional 3 ph rheostat: CL-152
- As Alternator**
 - Power: 120/208 VAC, 3 ph
 - Output: 120 VA
 - Speed: 1800 rpm
 - Power factor: 0.8
 - Thermal breaker protection

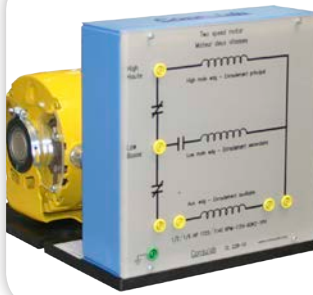
SQUIRREL CAGE INDUCTION MOTOR CL-213



Technical Specifications

- As Synchronous Motor**
 - Power: 120/208 VAC, 3 ph
 - Speed: 1725 rpm
 - Number of stator windings: 3 (wye/delta)
- As Alternator**
 - Power: 120/208 VAC, 3 ph
 - Output: 120 VA
 - Speed: 1800 rpm
 - Power factor: 0.8
 - Thermal breaker protection

TWO SPEED INDUCTION MOTOR CL-228



Technical Specifications

- Power: 120/208 VAC, 3 ph
- Speed: 1725 rpm (1/3 hp - 250 W)
850 rpm (1/12 hp - 62.5 W)
- Frequency: 60 Hz
- Number of stator connections: 6

OTHER MACHINES

STEPPER MOTOR CL-247



Technical Specifications

- Power: 120 VAC, 60 Hz / 24 VDC, 5A
- Max. torque: 1/2 N.m - 1/3 lb.ft
- Current control: 16 kHz (4 steps of PWM)
- RS232 w/USB/RS232 converter
- Microstep resolution: 200-51200 steps
- Auto setup
- Self test

VARIABLE SPEED MOTOR CL-215-2



Technical Specifications

- Power: 120 VAC, 60 Hz, 10 A
- Motor: 1 ph, 120 V / 3 ph, 240 V max / 0.33 hp
- Typical output: 0.25 kW
- Built-in drive with 12 configurations available
- RS485 with optional dedicated cable
- PC interface and remote controller
- Toggle switches for control digital outputs

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

CONTROL & OPERATION EQUIPMENT

SYNCHRONIZING UNIT CL-125



Technical Specifications

- Breaker: 5 A, 1/3 hp (250 W), 3 poles, 250 V
- Number of lamps: 3
- Lamp voltage: 250 V each
- Frequency: 60 Hz
- Shows the phase sequence and the frequency between systems

Educational Advantages

- Used in teaching electrical technology where a synchronizing switch is required for alternator synchronization
- Following the connection of the unit with two different three phase power supplies, three built-in red lamps on the front panel signal the phase sequence and the frequency gap between the two supply units

SCR SPEED CONTROLLER CL-151-1



Technical Specifications

- Voltage: Adjustable from 0 V to rated motor voltage
- Frequency range: 0 – 240 Hz
- Available in power ratings from 0.2 to 3.7 kW (0.25 to 5 HP)
- Built-in drive of your choice
- Programmable inputs such as preset speed, jog, etc.

Educational Advantages

- Switch and start indicator light
- Speed control adjustment
- Current limit adjustment for torque control at full load
- Transient voltage protection and AC fuse protection
- Acceleration trim pot adjustment
- Bridge assembly with built-in free wheeling diode
- Plug-in horsepower resistor
- Design with superior line and load voltage regulation

THREE PHASE RHEOSTAT UNIT CL-152



Technical Specifications

- Number of rheostats: 3
- Rheostats rating: 12 Ω , 50 W
- Thermal magnetic breakers (3)
- Reset button

Educational Advantages

- Three adjustable single-phase rheostats mounted on the same shaft and connected in wye
- Can be used for wound rotor motor applications

VARIABLE FREQUENCY SPEED CONTROLLER CL-150



Technical Specifications

- Power: 120 VAC, 1/3 hp (250 W)
- Field output voltage: 125 VDC
- Armature output voltage: 0-125 VDC
- Switch and start indicator light
- Speed control range: 0-100%
- Frequency: 60 Hz

Educational Advantages

- Easy start up and operation
- Most common application parameters are contained in a basic program group, making programming fast and easy
- Dynamic braking for all ratings 0.75 kW (1 HP) and greater
- Possibility of programming/controlling by computer and dedicated software
- Network solutions possibility
- You can select your own drive brand and model
- Programmable inputs such as preset speed, jog, etc.
- Frequency: 50-60 Hz

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

CONTROL & OPERATION EQUIPMENT

PROGRAMMABLE LOGIC CONTROLLER

CL-1544



Educational Advantages

- Based mainly on renowned industrial automation PLC modules
- Can precisely simulate actual production processes in a safe, offline environment
- Provided with advanced communications possibilities

Main Features

- Packed with analog and digital I/O
- Combines state-of-the-art programmable controller technology in a compact, easy-to-use package
- Select your own PLC model to meet your needs
- Perfect for simulating all of your programmable-control applications
- Programming software included

ELECTRICAL INSTALLATIONS TROUBLESHOOTING

CL-1718



Educational Advantages

- Supports the instruction of motor control circuits
- Provides instruction in motor starting systems when needed
- Provides instruction in the diagnosis and troubleshooting of electrical installations

Main Features

- Safety and low voltage light circuit (8 faults)
- Reversible full voltage AC magnetic starter (12 faults)
- Full voltage magnetic inverter/starter (13 faults)
- Reduced voltage primary resistor magnetic starter (12 faults)
- Two (2) 1/3 hp (250 W) electric motors (squirrel cage motor and capacitor start)

BASIC INDUSTRIAL CONTROL SYSTEM

CL-1560



Educational Advantages

- Can be used in courses covering basic industrial control and electromagnetical control systems
- Allows to implement applications of medium complexity
- Total flexibility in configuration and upgrade procedures
- Designed to permit students to develop, test and troubleshoot PLC and relay control circuits
- Double-sided trainer

Main Features

- Assembled with main industrial installation components
- Includes basic automation components
- Automation cable network and programmable logic control (PLC)
- Single phase and three phase motors

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

ELECTRICAL LOAD UNITS

VARIABLE RESISTIVE LOAD UNIT CL-311



Technical Specifications

- Can be used as DC or AC 1 ph / 3 ph load
- 9 variable resistors
- Max. power: 315 W AC/DC
- Max. current: 2.625 AAC/DC
- Resistors per phase: 240 / 480 / 960 Ω
- Current per phase: 0.5 / 0.25 / 0.125 A

VARIABLE INDUCTIVE LOAD UNIT CL-312



Technical Specifications

- Can be used as DC or AC 1 ph / 3 ph load
- 9 variable inductors
- Max. reactive power: 315 var AC/DC
- Max. current: 2.625 AAC/DC
- Inductors per phase: 635 / 1250 / 2500 mH
- Current per phase: 0.5 / 0.25 / 0.125 A

VARIABLE CAPACITIVE LOAD UNIT CL-313



Technical Specifications

- Can be used as DC or AC 1 ph / 3 ph load
- 9 variable capacitors
- Max. reactive power: 315 var AC/DC
- Max. current: 2.625 AAC/DC
- Capacitors per phase: 2.7 / 5.5 / 11 mF
- Current per phase: 0.5 / 0.25 / 0.125 A

THREE PHASE RHEOSTAT UNIT CL-152



Technical Specifications

- Number of rheostats: 3
- Rheostats rating: 12 Ω , 50 W
- Thermal magnetic breakers (3)
- Reset button

MECHANICAL LOAD UNITS

PRONY BRAKE CL-231



Technical Specifications

- Force scale: 0-20 Nm (0-14.75 lb.ft)
- Coupling shaft: 15.6 mm (5/8 in)
- Belt diameter: 55 mm (2.2 in)
- Lever diameter: 150 mm (6 in)
- Wheel diameter: 150 mm (6 in)
- Friction between the belt and the rotating disc is controlled by a handle

MAGNETIC PARTICLE BRAKE CL-246



Technical Specifications

- Power: 120 VAC, 60 Hz
- Rated load torque: 1.33 N.m / 1.0 lb.ft
- Max. load torque: 3.40 N.m / 2.5 lb.ft
- Max. speed: 4000 rpm
- Software interface included
- Operation in either rotational direction
- Automatic offset adjustment

DIGITAL ELECTRODYNAMOMETER CL-232-1



Technical Specifications

- Power: 120 VAC, 1 ph
- Motor: 125 VDC, 1800 rpm, 1/3 hp (250 W)
- Generator: 90 VDC - 120 W - 1800 rpm
- Field rheostat: 200 Ω -75 W
- Rated torque: 1.33 N.m / 1.0 lb.ft
- Maximum torque: 3.40 N.m / 2.5 lb.ft
- Digital unit selector

MECHANICAL LOAD MOUNTING BASE CL-240



Main Features

- Can be coupled with any 1/3 hp machine
- Available with the optional CL-234 Inertia Wheel
- Available with the optional CL-238 Centrifugal Contacts Terminals
- Available with the optional CL-239 Torque Angle Indicator

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

INSTRUMENTATION

SINGLE PHASE ANALOG WATTMETER CL-412



Technical Specifications

- Power: 120 VAC, 1 ph
- Max. voltage: 150 V AC/DC
- Max. current: 10 AAC/DC
- Frequency: 60 Hz
- Power scale: 0-750 W AC/DC
- Accuracy: $\pm 2\%$
- Thermal breaker protection

THREE PHASE ANALOG WATTMETERS CL-413



Technical Specifications

- Consists of two (2) 300W wattmeters
- Max. voltage: 250 V AC/DC
- Max. current: 2 AAC/DC
- Frequency: 60 Hz
- Power scale: 0-300 W AC/DC
- Accuracy: $\pm 2\%$
- Negative and positive control switch

ANALOG ELECTRONIC WATTMETER CL-413SM



Technical Specifications

- Max. power: 2 kW
- Max. voltage: 220 VAC, 1 ph
- Max. current: 10 AAC
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$
- Diode and thermal breaker protection

THREE PHASE WATTMETER-VARMETER CL-418



Technical Specifications

- Wattmeter
 - Max. voltage: 250 VAC
 - Max. current: 2 AAC
 - Power scale: 0-450 WAC
 - Negative and positive control switch
- Varmeter
 - Max. voltage: 250 VAC
 - Max. current: 2 AAC
 - Power scale: 0-450 var
 - Negative and positive control switch

PHASEMETER CL-419



Technical Specifications

- Operating voltage: 100-250 VAC
- Graduation: 0-180°
- Frequency: 50/60 Hz
- Indicator lights for negative/positive phasing
- Thermal breaker protection

POWER FACTOR INDICATOR UNIT CL-414



Technical Specifications

- Max. power: 5 kW
- Max. voltage: 220 VAC, 3 ph
- Phase sequence: 1-2-3
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$
- Diode and thermal breaker protection

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

INSTRUMENTATION

POWER ANALYZER CL-425



Technical Specifications

- Power: 100-240 VAC, 50-60 Hz
- Voltage: 50-600, 3 ph
- Current: 0.5-30 AAC
- Frequency: 45-65 Hz
- Accuracy: $\pm 2\%$
- Software interface included

Measurement Types

- Voltage: line, phase and main
- Current: phase (calculated neutral current)
- Power: real, reactive, apparent and total
- Cos ϕ and phase angle: per phase and total
- Frequency: for measured voltage

Accuracy

- Voltage: $\pm 0.2\%$ (50 à 830 VAC)
- Current: $\pm 0.2\%$
- Power: $\pm 0.5\%$ full scale
- Power factor: $\pm 0.5\%$
- Frequency: 0.05 %
- Real energy: Class 0.5S compliant with IEC/EN 62053-22
- Reactive energy: Class 2 compliant with IEC/EN 62053-23

Special Functions

- Average values integration function
- Power and current peak values (max. demand)
- Voltage and current asymmetry
- Voltage and current total harmonic distortion
- Voltage and current harmonic distortion analysis up to 31st rank with bargraph display
- Active, reactive, partial apparent and total energy meter with programmable tariff function
- Min. and max. values storage

Educational Advantages

- Configured to provide three phase measurements with harmonic analysis of basic current and voltage
- Compatible with all ConsuLab machines

DC ANALOG VOLTMETER-AMMETER CL-420



Technical Specifications

- DC milliammeter (1): 0-500 mADC
- DC ammeter (1): 0-2.5 / 5.0 ADC
- DC voltmeter (1): 0-20 / 200 VDC
- Accuracy: $\pm 2\%$

AC ANALOG AMMETERS CL-421



Technical Specifications

- AC ammeters (3): 0-1 / 3 / 10 / 30 AAC
- Accuracy: $\pm 2\%$
- Taut-band type: left zero

AC ANALOG VOLTMETERS CL-422



Technical Specifications

- AC voltmeters (3): 0-150 / 300 VAC
- Accuracy: $\pm 2\%$

HANDHELD TACHOMETER CL-1003



Technical Specifications

- Operates without physical contact with device being measured
- Optically detects a reflective target on the rotating object
- Mechanical adaptor used for reading shaft rotation in contacting measurements
- Measuring distance: 50-300 mm (2-12 in)
- Carrying case and reflective tape included

ELECTRICAL MACHINES & DRIVE SYSTEMS

1/3 HP (250 W) ELECTRICAL MACHINES

OTHER EQUIPMENTS

1PH TRANSFORMER CL-314



Technical Specifications

- Primary: 208 VAC with 1 tap at 104 V and 1 tap at 28 V
- Secondary: 1st (120 V, 0.83 A) 2nd (120 V, 0.83 A)
- Max. capacity: 200 VA
- Frequency: 60 Hz
- Regulation: 2% max.

3PH TRANSFORMER CL-315



Technical Specifications

- Primary: 208 VAC with 1 tap at 104 V and 1 tap at 28 V per phase
- Secondary: 1st (120 V, 0.83 A) 2nd (120 V, 0.83 A) per phase
- Max. capacity: 600 VA
- Frequency: 60 Hz
- Regulation: 2% max.

DISSECTABLE MACHINE MAS-DEM



Components Included

- Motor housing with stator wiring, fitted with a terminal block
- Squirrel-cage rotor squirrel-cage motor mock-up that can be assembled and disassembled depending on needs
- Left and right flanges
- Fan
- Screws with screwdriver kit

ACCESSORIES

DOUBLE / TRIPLE COUPLING BASE CL-1010-00 / CL-1010-03



Technical Specifications

- Rigid laminated wooden base
- Designed to couple two (2) Consulab rotating machines (CL-1010-00) or three (3) Consulab (CL-1010-03) rotating machines
- Equipped with wing screw anchors to safely bolt the machines

FLEXIBLE RUBBER COUPLING CL-1007



Technical Specifications

- Flexible sleeve made of thermoplastic rubber
- Locks safely into both shaft flanges
- Toothed wheel
- High temperature and motor lubrication resistant
- 22 x 25 mm (7/8 x 1 in)

JUMPER WIRES w/BANANA PLUGS CL-1012E



Technical Specifications

- Highly flexible safety jumper wires
- 4mm (III) safety piggy-back plugs
- 1 kV AC, 15 A
- A set contains:
 - Ten (10) blue cords, 25 cm (10 in)
 - Ten (10) yellow cords, 50 cm (20 in)
 - Ten (10) red cords, 75 cm (30 in)
 - Ten (10) black cords, 100 cm (40 in)
 - One (1) green cord, 100 cm (40 in)

REPLACING PARTS

- PART # 00797 PLASTIC TOP PIN
- PART # 00799 MALE LOCKING LATCH
- PART # 00800 FEMALE LOCKING LATCH
- PART # 02175 4MM BANANA PLUG END
- PART # 20010 BLANK SINGLE MODUPONENT
- PART # 20011 BLANK DOUBLE MODUPONENT
- PART # 20012 BLANK TRIPLE MODUPONENT

EXAMPLES OF CUSTOM SHELVING UNITS AVAILABLE ON REQUEST

CL-1001-00



CL-1001-32



CL-1005



CL-1001-31



ELECTRICAL MACHINES & DRIVE SYSTEMS

3 HP (2.2 kW) ELECTRICAL MACHINES

POWER SUPPLIES

VARIABLE THREE PHASE AC SUPPLY CL-141



Technical Specifications

- Power: 3 ph AC input: 120/208 VAC, 15 A
- Fixed output: 120/208 VAC, 15 A per ph
- Variable output: 0-120/208 VAC, 5 A per ph
- Frequency: 60 Hz
- Thermal protection
- Reset button

AC/DC RECTIFYING UNIT CL-146



Technical Specifications

- Power: 3 ph input: 120/208 VAC, 15 A
- Variable DC output: 0-120 VDC, 25 A (3 ph), 5 A (1 ph)
- Fixed DC output: 120 VDC, 5 A
- 0-150 V AC/DC built-in voltmeter

MACHINES (if motors are available)

SYNCHRONOUS MACHINE CL-201



Technical Specifications

- As Synchronous Motor
- Power: 208/240 VAC, 3 hp (2.2 kW), 3ph, 60Hz
- Full load speed: 1800 rpm
- Full load current: 9.7 A / 8.4 A
- Field: 120 V, 1 A
- As Alternator
- Power: 2.5 kVA,
- Output: 208/240 VAC, 3 ph, 60 Hz
- Full load speed: 1800 rpm
- Full load current: 7 A / 6 A
- Service factor: 1.15
- Field: 120 V, 1 A

WOUND ROTOR INDUCTION MACHINE CL-202



Technical Specifications

- Wye Connection Stator
- Power: 208/240 VAC, 3 hp (2.2 kW), 3ph, 60Hz
- Full load speed: 1725 rpm
- Full load current: 10.3 A / 8.4 A
- Service factor: 1.15
- Wye Connection Rotor
- Voltage: 150 V
- Current: 11 A

SQUIRREL CAGE INDUCTION MACHINE CL-203



Technical Specifications

- Wye Connection Stator
- Power: 208/240 VAC, 3 hp (2.2 kW), 3ph, 60Hz
- Full load speed: 1740 rpm
- Full load current: 15 A / 14.2 A
- Service factor: 1.15

DC MACHINE (SERIES-SHUNT-COMPOUND) CL-204



Technical Specifications

- As DC Motor
- Power: 125 VDC, 3 hp
- Full load speed: 1800 rpm
- Field current: 2 A
- As DC Motor
- Power: 125 VDC, 2 kW
- Full load speed: 1800 rpm
- Full load current: 16 A
- Field current: 2 A

ELECTRICAL MACHINES & DRIVE SYSTEMS

3 HP (2.2 kW) ELECTRICAL MACHINES

LOAD UNITS

ELECTRO-DYNAMOMETER CL-205



Technical Specifications

- As DC Motor
 - Power: 125 VDC, 3 hp
 - Full load speed: 1750 rpm
 - Field current: 2 A
- As DC Generator
 - Power: 125 VDC, 2 kW
 - Full load speed: 1750 rpm
 - Full load current: 16 A
 - Field current: 2 A
 - Field rheostat: 200 Ω , 300 W
 - Max. torque: 34 N.m / 25 lb.ft

VARIABLE RESISTIVE LOAD UNIT CL-301



Technical Specifications

- Can be used as DC or AC 3 ph load
- Total power: 1290 W at 120 V AC/DC
- Max. current: 4 A
- Resistors: 30 / 60 / 60 / 120 / 120 / 240 / 480 Ω
- Current range: 0.125 / 0.5 / 1 / 1 / 2 / 2 / 4 A

VARIABLE INDUCTIVE LOAD UNIT CL-302



Technical Specifications

- Can be used as AC 3 ph load
- Total reactive power: 1170 vars at 120 V AC
- Max. current: 4 A
- Inductors: 80 / 160 / 160 / 320 / 640 / 1270 mH
- Current range: 0.125 / 0.5 / 1 / 2 / 2 / 4 A

VARIABLE CAPACITIVE LOAD UNIT CL-303



Technical Specifications

- Can be used as AC 3 ph load
- Total reactive power: 1270 vars at 120 VAC
- Max. current: 4 A
- Capacitors: 5 / 11 / 22 / 44 / 44 / 88 mF
- Current range: 0.125 / 0.5 / 1 / 2 / 2 / 4 A

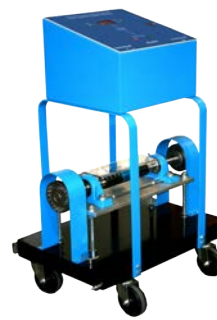
EDDY CURRENT BRAKE CL-207



Technical Specifications

- Power: 120 VAC, 60 Hz
- Max. torque: 20 N.m / 14.75 lb.ft
- Torque Meter: 0 - $\pm$ 40 N.m / 0 - $\pm$ 30 lb.ft
- Max. speed: 4000 rpm
- Software interface included
- Control modes: internal, external, PC
- BNC connector for load torque control

TORQUE METER CL-210 CL-210-1 (WITH RPM)



Technical Specifications

- Power: 120 VAC, 60 Hz
- Torque scale: 10-100 N.m / 7.5-75 lb.ft
- Max. speed: 4000 rpm
- Contactless transducer
- Torque direction indicator
- Analog output for oscilloscopes
- Optional RPM digital display

ELECTRICAL MACHINES & DRIVE SYSTEMS

3 HP (2.2 kW) ELECTRICAL MACHINES

INSTRUMENTATION

POWER ANALYZER

CL-425



Technical Specifications

- Power: 100-240 VAC, 50-60 Hz
- Voltage: 50-600, 3 ph
- Current: 0.5-30 AAC
- Frequency: 45-65 Hz
- Accuracy: $\pm 2\%$
- Software interface included

Educational Advantages

- Configured to provide three phase measurements with harmonic analysis of basic current and voltage
- Compatible with all ConsuLab machines

Measurement Types

- Voltage: line, phase and main
- Current : phase (calculated neutral current)
- Power: real, reactive, apparent and total
- Cos ϕ and phase angle: per phase and total
- Frequency: for measured voltage

ANALOG ELECTRONIC WATTMETER

CL-413SM



Technical Specifications

- Max. power: 2 kW
- Max. voltage: 220 VAC, 1 ph
- Max. current: 10 AAC
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$

POWER FACTOR INDICATOR UNIT

CL-414



Technical Specifications

- Max. power: 5 kW
- Max. voltage: 220 VAC, 3 ph
- Phase sequence: 1-2-3
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$

MAGNETIC AMPLIFIER UNIT

CL-153



Technical Specifications

- Max. power: 5 kW
- Max. voltage: 220 VAC, 3 ph
- Phase sequence: 1-2-3
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$

SINGLE PHASE ANALOG WATTMETER

CL-410



Technical Specifications

- Max. power: 2 kW
- Max. voltage: 220 VAC, 1 ph
- Max. current: 10 AAC
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$

THREE PHASE ANALOG WATTMETER

CL-411



Technical Specifications

- Max. power: 5 kW
- Max. voltage: 220 VAC, 3 ph
- Phase sequence: 1-2-3
- Frequency: 60 Hz
- Accuracy: $\pm 2\%$

OTHER MEASURING INSTRUMENTS AVAILABLE ON REQUEST

- AC ANALOG VOLTMETER / AMMETERS
- DC ANALOG VOLTMETER / AMMETERS

ELECTRICAL MACHINES & DRIVE SYSTEMS

3 HP (2.2 kW) ELECTRICAL MACHINES

CONTROL & OPERATION EQUIPMENT

ELECTRICAL INSTALLATIONS TROUBLESHOOTING CL-1718



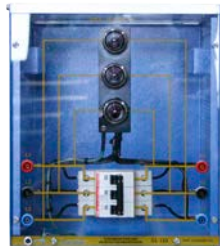
Educational Advantages

- Supports the instruction of motor control circuits
- Provides instruction in motor starting systems when needed
- Provides instruction in the diagnosis and troubleshooting of electrical installations

Main Features

- Safety and low voltage light circuit (8 faults)
- Reversible full voltage AC magnetic starter (12 faults)
- Full voltage magnetic inverter/starter (13 faults)
- Reduced voltage primary resistor magnetic starter (12 faults)
- Two (2) 1/3 hp (250 W) electric motors (squirrel cage motor and capacitor start)

SYNCHRONIZING UNIT CL-122



Technical Specifications

- Breaker: 15 A, 3 hp (2.2 kW), 3 poles, 250 V
- Number of lamps: 3
- Lamp voltage: 250 V each

- Frequency: 60 Hz
- Shows the phase sequence and the frequency between systems

VOLTAGE REGULATOR CL-1033



Technical Specifications

- Supply: 120 VAC
- Frequency: 60 Hz
- Detected voltage: 208 VAC, 1 ph
- Voltage adjustment range: 208 V $\pm$ 10 %

- Voltage regulation: 1 %
- Max. output voltage: 160 VDC
- Max. output current: 3.5 ADC

ACCESSORIES

JUMPER WIRES w/BANANA PLUGS CL-1006



Technical Specifications

- Highly flexible safety jumper wires
- 4mm diameter safety piggy-back plugs
- 1 kVAC, 32 A
- A set contains:
 - Ten (9) yellow cords, 50 cm (20 in)
 - Ten (9) red cords, 75 cm (30 in)
 - Ten (9) black cords, 100 cm (40 in)
 - One (1) green cord, 100 cm (40 in)

FLEXIBLE RUBBER COUPLING CL-1008



Technical Specifications

- Flexible sleeve made of thermoplastic rubber
- Locks safely into both shaft flanges
- High temperature and motor lubrication resistant
- 35 x 47 mm (1 1/2 x 1 3/4 in)
- Toothed wheel

UNITEC PRODUCTS REFURBISHING

DC MACHINE CL-U101



Refurbishing Work

- Complete console disassembling
- Complete motor disassembling
- Motor bearing replacement
- Console mechanical reassembling
- Electrical reassembling and rewiring
- Front panel replacement
- Complete testing and verification



SYNCHRONOUS MACHINE CL-U102



Refurbishing Work

- Complete console disassembling
- Complete motor disassembling
- Motor bearing replacement
- Console mechanical reassembling
- Electrical reassembling and rewiring
- Front panel replacement
- Complete testing and verification



SQUIRREL CAGE INDUCTION MACHINE CL-U103



Refurbishing Work

- Complete console disassembling
- Complete motor disassembling
- Motor bearing replacement
- Console mechanical reassembling
- Electrical reassembling and rewiring
- Front panel replacement
- Complete testing and verification



WOUND ROTOR INDUCTION MACHINE CL-U104



Refurbishing Work

- Complete console disassembling
- Complete motor disassembling
- Motor bearing replacement
- Console mechanical reassembling
- Electrical reassembling and rewiring
- Front panel replacement
- Complete testing and verification



CONTACTLESS TORQUE METER CL-U203



Refurbishing Work

- Complete console disassembling
- Replacement of torque sensor and control panel
- Complete testing and verification



COMBINED LOAD BANK CL-U401



Refurbishing Work

- Complete console disassembling
- Complete load disassembling
- Complete testing and verification
- Front panel replacement



EDDY CURRENT BRAKE CL-U211



Refurbishing Work

- Replacement of control panel
- Replacement of braking unit and control panel
- Complete testing and verification



FLEXIBLE COUPLER CL-U108



Technical Specifications

- Flexible sleeve made of chrome-plated steel
- Designed as to absorb mechanical shocks
- Silver-brazed core for better flexibility
- 15 x 1.25 cm (6 x 1/2 in)

**NEW EQUIPMENT ON REQUEST
IF MOTORS ARE AVAILABLE**

CUSTOM PRODUCTS

We can customize your power electrical test benches and drive systems with required voltages and currents, measuring instruments and other components to meet your needs.

EXAMPLES OF CUSTOM PRODUCT

ELECTRICAL MACHINES & DRIVES TECHNOLOGY
CL-7204-1



ELECTRICAL MACHINES & DRIVES TECHNOLOGY
CL-7204-2



SYNCHRONIZING UNIT
CL-1001-125



TESTING BENCH
CL-7108 SERIES



TESTING BENCH
CL-7121 SERIES



TESTING BENCH
CL-7122 SERIES



AUTOMATION & PROCESS CONTROL

PROGRAMMABLE LOGIC CONTROLLER CL-1544



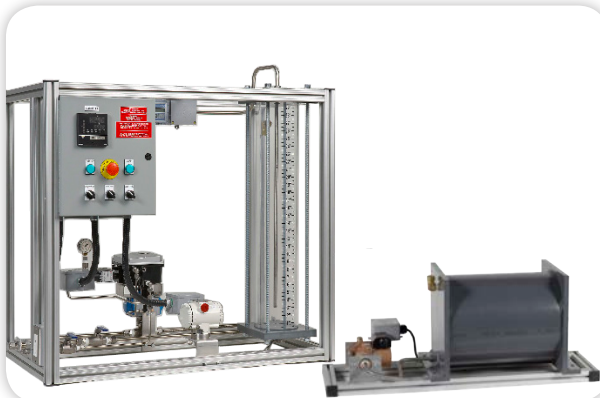
Educational Advantages

- Based mainly on renowned industrial automation PLC modules
- Can precisely simulate actual production processes in a safe, offline environment
- Provided with advanced communications possibilities

Main Features

- Packed with analog and digital I/O
- Combines state-of-the-art programmable controller technology in a compact, easy-to-use package
- Select your own PLC model to meet your needs
- Perfect for simulating all of your programmable-control applications
- Programming software included

BASIC AUTOMATION AND CONTROL TRAINER ED-7000



Main Features

- Designed for vocational schools and trades
- Good choice of processes, loops and their static and dynamic characteristics (time constants, time delays, process gains) were all made carefully
- 2 loops available: Flow and Level
- The system consists of pumping water into a reservoir, and recycling this water
- Trainer mounted in 2 sections
- Allows the students to become familiar with:
 - ABB CM30 process controller
 - Flow measurement with ABB 264 pressure flowmeter
 - Level measurement with Burkert 8335 turbine flowmeter
 - 1/2" stainless steel control valve using Jamesbury electro pneumatic actuator
 - Neles NP724 electro pneumatic positioner
 - Armstrong pump 0-4 USGPM
 - Current/pressure signals converted with Fairchild TA6000
 - Control panel for loop selecting w/panic button

ADVANCED AUTOMATION AND CONTROL TRAINER ED-8000



Main Features

- Designed for technical college and universities
- Good choice of processes, loops and their static and dynamic characteristics (time constants, time delays, process gains) were all made carefully
- 3 loops available: Flow, Level and Pressure
- The system consists of pumping water into a reservoir, and recycling this water
- Options available:
 - Temperature Control Loop with Heating
 - Temperature Control Loop with Heating and a Cooler
 - Real Heat and Cooling Control
- Allows the students to become familiar with:
 - Level measurement with Ohmart Vega by guided wave radar
 - Pressure with ABB transmitter to the pump outlet
 - Control valve Badger Meter with ABB positioner
 - Variable speed pump drive with ABB (ACS350)
 - Standard signal 4-20 mADC
 - Calibration
 - Control modes: ON/OFF, P, PI, PID
 - Tuning
 - Loop control start-up
 - Single loop

POWER SUPPLIES

We can customize your power supplies with required voltages and currents, measuring instruments and other components to meet your needs

EXAMPLES OF CUSTOM POWER SUPPLY

POWER SUPPLY

0-40 VAC, 5-10 A / 0-40 VDC, 5-10 A

CL-169-00



CUSTOM

Technical Specifications

- Supply: 115 V, 50/60 Hz, 200 VA
- Output voltage: 0-40 VAC / 0-40 VDC simultaneously operated
- Output current: 5 A (continuous) / 10 A (intermittent)
- Ripple factor: 5 V p-to-p
- Thermal magnetic circuit breaker and overload relay
- ON/OFF indicator light

POWER SUPPLY w/AMMETER

0-40 VAC, 5-10 A / 0-40 VDC, 5-10 A

CL-169-01



CUSTOM

Technical Specifications

- Supply: 115 V, 50/60 Hz, 200 VA
- Output voltage: 0-40 VAC / 0-40 VDC simultaneously operated
- Output current: 5 A (continuous) / 10 A (intermittent)
- Ripple factor: 5 V p-to-p
- Thermal magnetic circuit breaker and overload relay
- Analog ammeter: 0-5 A AC/DC
- ON/OFF indicator light

POWER SUPPLY

0-25 VAC, 5 A / 0-120 VAC, 2 A / 0-25 VDC, 5 A

CL-169-02



CUSTOM

Technical Specifications

- Supply: 120 VAC, 60 Hz
- Output voltage: 0-120 VAC / 0-25 VAC / 0-25 VDC variable and continuous
- Output current: 5 AAC / 5 ADC / 2 AAC
- Ripple factor: > 5%
- AC outlet
- Thermal magnetic circuit breaker and overload relay
- ON/OFF indicator light

POWER SUPPLY

120 VAC, 10 A / 0-120 VAC, 2 A / 0-50 VAC, 2 A / 0-50 VDC, 2 A

CL-169-03



CUSTOM

Technical Specifications

- Supply: 120/220 VAC, 60 Hz
- Output voltage: 0-120 VAC, 2 A (variable) / 0-50 VAC, 2 A (variable) / 0-50 VDC, 2 A (variable) / 120 V C, 10 A (fixed) /
- Ripple factor: > 5%
- AC outlets (2)
- Thermal magnetic circuit breaker and overload relay
- ON/OFF indicator light

POWER SUPPLY

0-60-120 VCA, 5 A / 0-25 VDC, 1 A / 5 VDC, 3 A

CL-169-10



CUSTOM

Technical Specifications

- Supply: 120 V - 60 Hz
- Output voltage: 0-120 VAC, 0-60 VAC (2x), 0-25 VDC, 0-25 VDC, 5 VDC
- Output current: 4 / 0.5 / 0.5 / 3 A
- Thermal magnetic circuit breaker and overload relay
- ON/OFF indicator light

POWER SUPPLY

1,5-10 VDC, 2 A

CL-162



CUSTOM

Technical Specifications

- Supply: 120 VAC, 46 VA, 60 Hz
- Output voltage: 1.5, 3, 5, 6, 9, 10 VDC
- Output current: 2 A max.
- Thermal magnetic circuit breaker and overload relay
- ON/OFF indicator light

ELECTRICAL ENERGY

POWER ENERGY TRAINER CL-1400



Educational Advantages

- Introduces the students to electrical metering used by power companies
- Demonstrates peak load and power variables used by power companies in calculating bills sent to their customers
- Helps the student understand the value of techniques that improve the use and power variables, both of which reduce the overall cost of the electrical energy used

Main Features

- Supply voltage: 120/208 VAC, 3 ph, 60 hz
- Complete with clamp-on, potential and current transformers, energy power and apparent power meters, stop watch, test switch assembly, peak load demand and power factor regulators, 3Ø switch, lighting and heating simulators, 3-pole breaker and magnetic contactor
- Includes an operation manual with examples of application
- Stand with lockable swivel casters

TRANSMISSION LINES TRAINER CL-1450



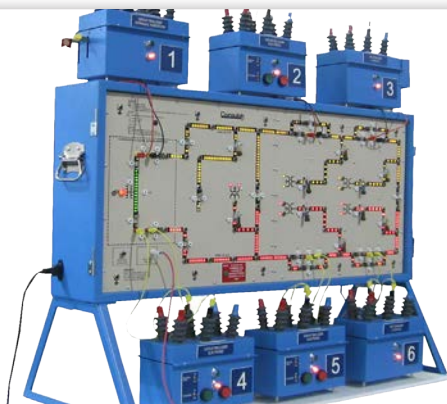
Educational Advantages

- Demonstrates the most important features and specifications of transmission lines used in electrical energy
- Contains all the equipment and theoretical references required to analyze networks transmitting electrical energy
- Deals specifically with electrical energy distribution and transportation
- Includes more than ten (10) experiments

Main Features

- Supply voltage: 120/208 VAC, 3 ph, 60 hz
- Basic equipment: 3 ph transformer (1), 3 ph correcting unit (1), 3 ph network unit (2), 3 ph wattmeter/varmeter (1), phase meter (1), stroboscope (1), voltage regulator (1) and mechanical load unit (1)
- Add-on equipment (included in the CL-100): variable AC/DC power supply (1), DC rectifier (1), synchronous machine (1), DC machine (1), electric load units (3), DC measurement unit (1), AC voltmeter unit (1), AC ammeter unit (1), connecting leads (41), coupling base (1) and coupler (1)

POWER DISTRIBUTION NETWORK COORDINATION & PROTECTION CL-1510



Main Features

The trainer allows the student to:

- Learn how to coordinate and protect general electrical distribution networks
- Learn the linemen working code
- Identify the fault types
- Read protection lines
- List the main protection components
- Understand the co-ordination and protection basics
- Distinguish the network automated equipment

HYDRAULICS & PNEUMATICS

BASIC HYDRAULICS

MF102S-BH (SINGLE) MF102D-BH (DUAL)



- Can be configured with hydraulic components of your choice
- Designed to help students learn all aspects of hydraulics that include:
 - Basic hydraulic principles and laws
 - How hydraulic components work
 - How hydraulic components interact
 - Hydraulic symbols
 - Problem solving skills

BASIC PNEUMATICS

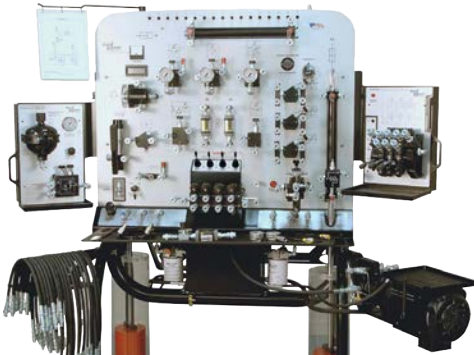
MF700S-PN (SINGLE) MF700D-PN (DUAL)



- Can be configured with pneumatic components of your choice
- Designed to help students learn all aspects of pneumatics that include:
 - Basic pneumatic principles and laws
 - How pneumatic components work
 - How pneumatic components interact
 - Pneumatic symbols
 - Problem solving skills

BASIC THROUGH ADVANCED HYDRAULICS w/TROUBLESHOOTING

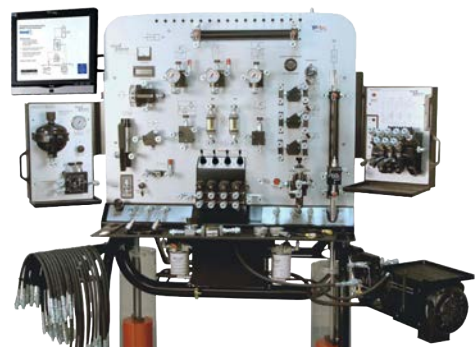
MF102S-H-TS (SINGLE) MF102D-H-TS (DUAL)



- Allow students to:
 - Teach a complete course in basic and advanced hydraulics
 - Troubleshoot hydraulic components and systems
 - Activate one or more switches which instantly transforms one or more “healthy” components into one or more worn components
- Include the same components as the MF102-H Series, troubleshooting package, optional load-sensing and plug-n-play modules

BASIC THROUGH ADVANCED HYDRAULICS w/TROUBLESHOOTING & PC TOUCHSCREEN

MF102S-H-TSE (SINGLE) MF102D-H-TSE (DUAL)



- Allow students to:
 - Teach a complete course in basic and advanced hydraulics
 - Troubleshoot hydraulic components and systems
 - Activate one or more switches which instantly transforms one or more “healthy” components into one or more worn components
- Include the same components as the MF102-H Series, troubleshooting package, PC touchscreen, optional load-sensing and plug-n-play modules

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4210 JEAN-MARCHAND STREET
QUEBEC CITY (QUEBEC) G2C 1Y6, CANADA
PHONE: 1-800-567-0791 (CANADA & USA)
810-222-4525 (USA) – 418-688-9067 (CANADA)
FAX: 418-843-3444
info@consulab.com
WWW.CONSULAB.COM

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