Schneider Electric France

Energy training

Educational solutions

> Catalogue 2015 - 2016

Schneider Electric

Schneider Electric and education

Schneider Electric is committed to supporting teachers and trainers in the technical education field by sharing their expertise in new and emerging energy technologies.

This long-standing commitment was renewed in 2013 as part of a joint agreement between Schneider Electric and the French Ministry of Education.

“Schneider Electric has been committed to education and training for more than 50 years.
Working together with the French Department for Education, we have forged relationships between stakeholders in the education system and the world of business.
This new agreement provides a collaborative platform to drive this initiative forward, focusing on new energy management technologies on a national and international scale.”

At an international level, Schneider Electric France and the French Ministry of Education have agreed to consolidate their cooperation to support France's partner countries in implementing effective vocational training policies. The idea is to target students in disadvantaged regions as part of a program aimed at contributing to expansion of the local economy and reducing poverty.
At a national level, this agreement promotes assistance in regional education authorities through the “Ingénieurs Pour l’École” (Engineers for School) scheme. The aim of all these initiatives is to bring the worlds of industry and education closer together.

Energy transition is leading us to the jobs of the future

The success of energy transition relies not only on the new energy technologies themselves, but also on the people using them.

France is committed to energy transition, a process which is driving our economic growth.

To bring about this change, we need not only to increase the use of renewable energies, but also to manage our energy requirements more efficiently.

The digitization of consumption data and production methods will help us redress the balance between consumption and sustainable development, between comfort and efficiency.

New technologies already exist, but they will only ever be successful if we prepare our young people to engage with the solutions of tomorrow.

These are the people at the heart of energy transition; our future professionals who will have to juggle multiple technologies: communications, energy efficiency, home automation, renewable energy and smart grids.

Thierry Ruard
VP Schneider Electric
France Energy Training

This is why Schneider Electric France Energy Training's mission is to support the world of education in facing these new challenges.

Each year we train some 800 teachers and trainers through regional technical training courses and training days.

We are now also integrating more online resources into our teaching programmes and materials. Rather than being a strictly linear process, learning today should also involve a commitment from students to invest in their education in a more tailored approach.

This is Schneider Electric's commitment - to support you throughout these changes and achieve a successful transition.

To find out more:
http://www.schneider-electric.fr/sites/france/fr/produits-services/energy-training/energy-training.page

Structure of the catalogue

To help you with your selection,
this catalogue is divided into different sections:

Safety

For our range of electrical accreditation preparation, emergency lighting, fire safety and machine safety equipment

Energy infrastructure

For our range of residential or small business electrical distribution, neutral earthing systems, discrimination, electrical interference, renewable energy and EV charging station equipment

Building management & energy efficiency

For our range of building management, energy measurement, KNX control, fibre optic and ventilation equipment

Industry & machines

For our range of detection, motor starter, variable speed control, control system, communication and industrial system equipment

BipBop

For our purpose-designed range of equipment for teaching the basic concepts of electricity in developing countries

Services

For our range of services available to help get you started with our teaching equipment - such as commissioning and training - and the relevant contact information

Contents

Safety

Contents

Chapter 1
Safety

Accreditation cases
VALHABILIS

Learning objectives

- To understand and identify LV electrical hazards
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments and repairs
- To prepare for low voltage BO, B1V, BE and BS electrical accreditation according to standard NF C 18-510

Main industries

- Electrical engineering
- Energy engineering
- Building sector

Characteristics

Power supply	230 V/100 VA
Dimensions (H x W x D)	**Case 1** 450 x 460 x 290 mm
Weight	10 kg
	Case 2 450 x 460 x 290 mm
	12.5 kg

Presentation

VALHABILIS cases are designed for training non-electricians, such as painters, plumbers, and air conditioning installers.
They allow students to practise dealing with the electrical hazards involved when working on low voltage installations. There are two complementary cases which simulate commercial or industrial electrical installations.

Description

- The first case contains 2 domestic socket outlets and 1 lighting output for performing testing, locking, connection and replacement operations.
- The second case is designed to be connected to the first and is used to perform testing and measuring operations on a motor starter.

Personal protection equipment kits are available as an option:
- Voltage tester
- Lockout devices
- Warning tape
- PPE (personal protection equipment):
  - insulating gloves
  - face shield

Benefits

- Compact, mobile equipment
- Preparation for electrical accreditation in the building services sector

To order

MD1AA630	VALHABILIS
MD1AA639	Voltage tester and PPE kits

Accreditation test bench

Learning objectives

- To understand and identify LV electrical hazards
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments and repairs
- To prepare for low voltage BO, B1V, BE and BS electrical accreditation according to standard NF C 18-510

Main industries

- Electrical engineering
- Building sector

Characteristics

Power supply	400 V/16 A
Dimensions (H x W x D)	1800 x 1100 x 700 mm
Weight	100 kg

Presentation

This bench has been designed to help prepare electricians for their electrical accreditation using equipment which replicates the environment in a commercial and industrial electrical installation.
The bench features two separate sides - a commercial-domestic side and an industrial side.
It is available in two versions: assembled but not wired, or assembled and wired.

Description

The bench is mounted on a frame with locking castors.
- Commercial-domestic side:
  - switchboard
  - 2 power sockets (1 domestic, 1 commercial)
  - 1 light
  - stand-alone emergency lighting unit
  - housing service duct
  - EDF plate
  - modular cabinet
- Industrial side:
  - industrial cabinet
  - motor starter plate
  - reversing control unit
  - electric motor
  - ball screw for operating two limit switches
  - 1 emergency switch-off device

Available as an option: voltage tester and PPE kits
See page 8.

Wired accreditation test bench with motor and ball screw

Commercial side

Benefits

- Replicates real-life situations
- Both sides can be used simultaneously
- Preparation for electrical accreditation in the building services sector

To order

MD1AAHABILAV	Accreditation test bench with motor and ball screw (wired)
MD1AAHABILAVNC	Accreditation test bench with motor and ball screw (non-wired)
MD1AA639	Voltage tester and PPE kits

Accreditation system
HABILIS

Learning objectives

- To study an industrial system
- To understand the issues associated with lockout
- To carry out practical exercises corresponding to real-life tasks
- To be trained to carry out B1V, B2V, BC, BE, BR and BS accreditation operations according to standard NF C 18-510.
- To identify components
- To analyze hazards
- To work in the vicinity of bare live parts
- To make adjustments
- To carry out maintenance and repair operations in the electrical cabinet

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	400 V/1 kVA
Dimensions (H x W x D)	**Enclosure without/with beacon** 1970/2160 x 860 x 670 mm
Weight	186 kg
	Operative part 600 x 600 x 600 mm 43 kg
	PLC panel 1150 x 340 x 430 mm 15 kg

Presentation

The HABILIS system simulates operation of an industrial kneader in the food processing industry. It replicates a process which requires continuity of service.
The purpose of this equipment is to provide students with the opportunity to work on real-life scenarios encountered on industrial equipment.
Students must apply the relevant electrical safety procedures.
Note: BS accreditation training requires the MD1AA638 BS cabinet (see page 11).

Description

Enclosure with control cabinet
- Electrical cabinet mounted on braked castors and stabilizer feet
- 1 externally controlled padlocking isolator
- 1 padlocking circuit breaker
- Power distribution by busbars protected by a removable screen
- 24 VAC control and signalling circuits
- 3 locking/padlocking feeders:
  - 1 motor feeder via variable speed drive backed up by UPS
  - 1 cover motor feeder (reversing contactor)
  - 1 heater feeder
- 1 free slot for mounting and wiring an extra circuit
- 1 UPS

Kneader operative part
- 1 mechanism for opening/closing the kneader bowl cover, operated by a 90 W motor
- 1 kneading blade operated by a 90 W motor
- 1 resistance heating element
- Inductive sensors and limit switches necessary for operation

PLC panel
- 1 Magelis HMI terminal
- 1 TSX Micro or M340 PLC

Voltage tester and PPE kit
- 1 voltage tester
- 2 insulated screwdrivers
- 2 beacons with bracket and 5 m cable
- Lockout accessories
- “Restricted work area” sign
- PPE (insulating gloves, face shield)

Control cabinet enclosure

Kneader

Benefits

- Accreditation on industrial equipment
- Accreditation on a protected circuit
- PLC panel available as an option to transform the equipment into an automated system

To order

MD1AA513	Enclosure and control cabinet
MD1AA514	Kneader operative part
MD1AA516	TSX Micro PLC panel
MD1AA516MR	M340 PLC panel
MD1AA518	Voltage tester and PPE kit

Additional case for BS accreditation
BS case

Learning objectives

- To perform routine operations on low voltage electrical installations
- To prepare for BS accreditation by carrying out tasks in accordance with standard NF C 18-510

Main industries

- Electrical engineering
- HVAC engineering
- Building sector

Characteristics

Power supply	230 V/10 A
Dimensions (H x W x D)	230 x 300 x 120 mm
Weight	2.5 kg

Presentation

This case is used to perform simple electrical tasks such as like-for-like replacement of a bulb or fuse to qualify for BS accreditation.
It can be used on its own or with the HABILIS and VALHABILIS systems (both of which were marketed prior to the introduction of the regulations concerning BS accreditation).

Description

ABS case containing:
- 1 cable gland plate output protected by a 10 A circuit breaker
- 1 lighting output protected by a 10 A fuse
- 1 lampholder for bulb replacement tasks

The cable gland output is designed to be replaced by a 2P+E socket

Accessories supplied with the case
- Set of 5 2P+E sockets
- 1 bulb
- Fuses
- 2 lockout devices

Benefits

- Cost-effective solution
- Compatible with HABILIS and VALHABILIS equipment

To order

MD1AA638	BS accreditation case for HABILIS

Safety awareness case
SECURIS

Learning objectives

- To learn how to manage electrical and mechanical hazards in the following contexts:
  - cutting and restoring the power supply, emergency stop circuit, self-powered supply
  - opening the cover during operation, role of the limit switch, machinery directive
  - insulation fault and contact with a live part
- To study thermal magnetic circuit-breakers
- To study RCBOs

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/40 VA
Dimensions (H x W x D)	520 x 380 x 150 mm
Weight	7 kg

Presentation

The SECURIS case is designed to make students aware of the issues related to safety systems. It uses the example of a machine with a safety door/cover to explain how safety devices work to counter electrical and mechanical hazards.

Description

- Demo case with transparent cover
- 30 mA RCBO
- Mushroom head emergency stop button
- Safety leads included

Benefits

- Introduction to industrial and domestic safety
- Easy to use

To order

MD1VSE1F	SECURIS case

Addressable stand-alone emergency lighting unit case

Learning objectives

- To learn about the addressable emergency lighting system
- To identify system components
- To configure and address lighting units
- To configure the controller remotely via the web server
- To test the system using the controller
- To conduct maintenance operations with lockout
- To install additional equipment

Main industries

- Electrical engineering
- Electronic engineering
- Electronic engineering

Characteristics

Power supply	230 V/100 VA
Dimensions (H x W x D)	560 x 470 x 345 mm
Weight	19 kg

Presentation

This case is used to study and set up an emergency lighting system. The addressable Dardo Plus system facilitates testing of stand-alone emergency lighting unit installations in compliance with standard EN 50172 by means of a 2-wire bus system which can be connected to up to 100 emergency lights.
The lighting units are addressed and configured using coded rotary switches. Tests are performed automatically by the control unit and sent to the printer or to a PC for centralized data management.

Description

- 1 LED stand-alone emergency evacuation lighting unit
- 1 fluorescent tube stand-alone emergency background lighting unit
- 1 Dardo control unit
- 1 DCM communication module with web server
- 1 DARDO printer
- 1 halogen spotlight
- 1 x 24 V power supply
- Dardo bus measuring points
- Switches for disconnecting the batteries in the stand-alone emergency lighting units

Available as an option
Address tester: Used to test addresses and help prevent any configuration errors

Benefits

- Use of Web server
- Testing and safety procedures
- Option to extend the number of addressable emergency lighting units

To order

MDGVBAES	Stand-alone emergency lighting unit system
MDGBAESPCK	Address tester option

Addressable emergency lighting pack
Stand-alone emergency lighting unit pack

Learning objectives

- To study an addressable emergency lighting system
- To identify and address lighting units
- To test system components
- To configure and control the system remotely via web server

Main industries

- Electronic engineering
- Electronic engineering
- Electrical engineering

Characteristics

Power supply	230 V/100 VA
Dimensions (H x W x D)	400 x 400 x 600 mm
Weight	12 kg

Presentation

The stand-alone emergency lighting unit pack is used to study and set up an addressable emergency lighting system.
Addressing is simple, using 2 thumbwheels on each lighting unit.
A tester device helps prevent errors by testing the addresses and detecting any duplicates or missing addresses. Each lighting unit is tested according to the addressing scheme. A test report is available immediately.
The system is fully scalable, offering the options to add external stand-alone emergency lighting units, remote monitoring and SMS and/or e-mail maintenance alerts (DCM interface).

Description

Pack contents
- 1 Dardo Plus control unit
- 1 DCM communication module with web server
- 1 LED stand-alone emergency evacuation lighting unit
- 1 fluorescent tube stand-alone emergency background lighting unit
- 1 x 12 V halogen spotlight (for simulating actual lighting)
- 1 x 24 V power supply

Available as an option
- 1 Dardo Plus Printer

for printing the test reports required by standard EN 50172
- Address tester

Benefits

- Set up in 3D cubicles
- Complete predefined package
- Low-cost solution

To order

MD1APESADR	Addressable emergency lighting pack
MD1APESPRT	Printer for Dardo Plus pack
MDGBAESPCK	Address tester option

Addressable fire safety bench

Learning objectives

- To study and implement the standards and regulations relating to a fire safety system
- To wire the different elements
- To configure and program the control and signalling equipment
- To carry out maintenance operations:
  - preventive maintenance of system components
  - corrective maintenance of the system

Main industries

- Electronic engineering
- Electrical engineering
- Electrical engineering

Characteristics

Power supply	230 V/850 VA
Dimensions (H x W x D)	1930 x 1070 x 600 mm
Weight	93 kg

Presentation

The fire safety bench represents part of an establishment that receives the public (such as a holiday village).
The safety components are located in the different parts of the building represented and provide the following functions:

- acknowledgement and processing of fire hazard information
- management of alarms and emergency shutdown

Description

- Mobile frame on locking castors
- 1 addressable optical smoke detector
- 1 addressable thermo-velocimetric heat detector
- 2 addressable manual call points
- 1 electromagnetic release activated by current interruption
- 1 sound diffuser
- 1 activation indicator
- 1 satellite stand-alone siren unit
- 1 control and signalling device
- 1 fire control panel
- 1 central fire safety system
- 1 test aerosol
- 1 set of safety leads
- 2 emergency release keys
- 1 control and signalling software package for PC with connection cable
- 1 set of fuses and end of line resistors

Benefits

- Representation of a real-life installation
- Rugged wiring on safety sockets

To order

MDG99130A	Addressable fire safety bench

Machine safety modular offer

Learning objectives

- To study the different safety categories and determine the levels of risk
- To install appropriate safety devices in compliance with the relevant standards
- To study modular safety functions:
  - emergency stop monitoring
  - safety switch monitoring
  - coded magnetic switch monitoring
  - zero speed monitoring via connection to a key operated safety limit switch

Main industries

- Electrotechnical engineering
- Industrial maintenance

Characteristics

Power supply	230/400 V/100 VA
Dimensions (H x W x D) **Weight**	**Operative part frame** 640 x 1000 x 410 mm 29 kg
	Control part frame 910 x 1030 x 400 mm 6.5 kg
	Modules 70 x 150 x 245 mm 0.7 kg

Presentation

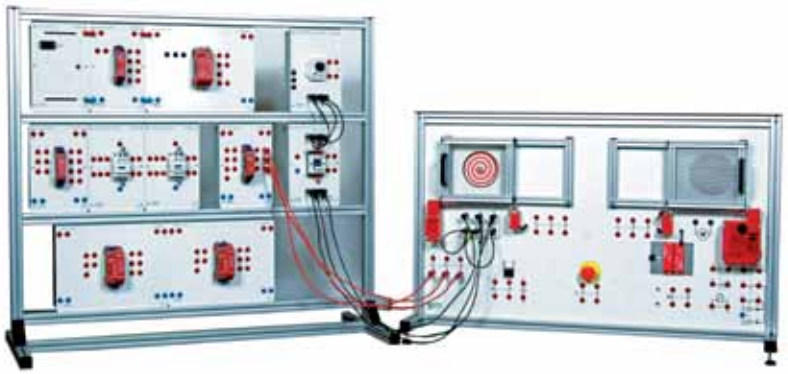
The machine safety modular offer is made up of 2 parts:
an operative part mounted on a panel and a control part mounted on a modular frame. Its purpose is for students to build the safety circuit by wiring the safety switches, PREVENTA modules and line contactors with the aim of learning about safety categories 3 and 4.
The operative part comprises 2 rotating parts protected by removable screens and equipped with safety limit switches.

Components

Operative part
Safety switch with turret head, safety interlock switch, safety limit switch, coded magnetic switch; wired via double-recess sockets.

Control part
The MD1AMLSECU standard offer comprises the modules listed below. You can also order each module separately.

Description	Qty	Ref.
Support frame	1	MD1AM000
Emergency stop monitoring safety module	1	MD1AM9001
Emergency stop monitoring safety module and limit switch	1	MD1AM9002
Coded magnetic switch monitoring module	1	MD1AM9003
Time delay monitoring module	1	MD1AM9004
Zero speed monitoring module	1	MD1AM9005
Time delay monitoring module	1	MD1AM9006
24 V DC/2.5 A power supply module	1	MD1AM4001
Auxiliary contactor modules	2	MD1AM1011
Thermal-magnetic circuit breaker module	1	MD1AM1003
Contactor module	1	MD1AM1008



Benefits

- Quick, safe setup
- Rugged wiring using safety sockets

To order

MD1AMP011	Machine safety offer - operative part
MD1AMLSECU	Machine safety offer - modular control part

Notes

Energy infrastructure

Contents

Chapter 2
Energy infrastructure

Distribution

Distribution

Energy infrastructure

Distribution

Medium voltage cubicles

Learning objectives

- To learn about MV installations
- To identify the different MV components
- To identify the hazards
- To use and operate an MV installation:
  - opening, closing, earthing
  - interlocking operations, padlocks
  - lockout
- To learn about the different types of disconnection
- To perform maintenance operations such as:
  - replacing MV fuses
  - checking the interlocking device
  - adapting the auxiliaries
- To apply the NF C 18-510 standard safety requirements
- To prepare for MV accreditation

Main industries

- Electrotechnical engineering
- Industrial maintenance

Characteristics

Power supply	400 V/6.4 kVA
Dimensions (H x W x D) **Weight**	**2 IM + QM cubicles** 2510 x 1125 x 1000 mm 480 kg
	Transformer 1250 x 1000 x 700 mm 300 kg
	LV switchboard 2310 x 1000 x 530 mm 214 kg

Presentation

This equipment is set up according to customer specification and is designed to help teach students the practices and procedures for working on medium voltage installations.
The medium voltage equipment has been modified for training purposes. The cubicles are set up for a 400 V power supply but operate in the same way as if they were powered at 20 kV. The transformer is supplied without oil or windings.
The standard offer comprises two IM cubicles, a QM cubicle and an MV/LV transformer but other combinations are possible (e.g. 1 IM + 1 QM with transformer, 1 IM + 1 QM without transformer, etc.). An LV switchboard is available as an option where an interlocking circuit is required.

Description

IM switch cubicle
- 1 x 400 A 3-pole busbar
- 1 SF6 gas-insulated switch disconnector + earthing switch
- 1 CIT type manual operating mechanism
- 3 voltage presence indicators
- 3 single-pole dry type cable connections

Motorized QM fuse switch combination cubicle
- 1 x 400 A 3-pole busbar
- 1 SF6 gas-insulated switch disconnector + earthing switch
- 1 x 48 VDC motorized operating mechanism
- 1 set of 3 SOLEFUS 24 kV fuses
- 1 SEPAM series 20 protection relay
- 1 MV/transformer/LV switchboard interlock (Profalux C4 type)

Accessories provided
- Connection cables
- Safety accessories kit: pole, voltage tester, stool, gloves, extinguisher, etc.

Available as an option
- MINERA 100 kVA MV/LV oil transformer adapted for training purposes
- LV switchboard with plug-in circuit breaker lockable via interlock
- Primary/secondary injection kit for testing operation of the protection devices

SM6 QM cubicle

On-site cubicle + transformer + LV switchboard installation

Benefits

- Simulates actual behaviour of MV equipment
- On-site installation and training
- Full locking sequence up to LV switchboard

To order

UEHGHTA	2 IM + 1 QM with on-site commissioning
UEHGHTR	Transformer adapted for training purposes
UEHGINJ	Injection testing kit

LV switchboard for professional training

Learning objectives

- To perform wiring and accreditation tasks with intervention on busbars
- To identify components
- To perform wiring tasks in accordance with regulations
- To check wiring to ensure that it is mechanically and electrically sound
- To connect teaching equipment in order to take energy measurements

Main industry

- Electrotechnical engineering

Characteristics

Power supply	400 V/20 kVA
Dimensions (H x W x D)	2310 (with beacon) x 1000 x 530 mm
Weight	214 kg

Presentation

This LV switchboard enclosure is designed for students to learn how to perform wiring tasks on a low voltage switchboard. It has a front and rear access door each with different keys to prevent electrical shock hazards.
The enclosure is supplied ready-assembled with the components mounted in position, either pre-wired or non-wired depending on the version.
An accessories kit and a tool kit are available to help perform the wiring tasks.

Description

- Primary power supply
- NS160 residual current circuit breaker
- Visible break switch disconnector
- 1 busbar protected by transparent cover
- 1 PM700 power meter with 3 CTs
- Emergency stop device on enclosure
- 11 x 2 to 63 A feeders
- Feeder control via ON/OFF pushbutton with signalling
- Illuminated beacon to indicate power on
- Power terminal blocks

Available as an option

- Accessories kit: wires, lugs, cable ends and sheaths
- Tool kit: screwdriver, pliers, Allen keys

Non-wired LV switchboard for professional training

Front view

Benefits

- Enclosure identical to real LV switchboards
- Powering real systems
- Power and control wiring tasks

To order

MD1AA720NC	Non-wired LV switchboard
MD1AA720	Wired LV switchboard
MD1AA728:	Accessories kit
MD1AA729	Tool kit

LV switchboard for vocational training

Nouvelle version

Learning objectives

- To analyze the functions of an LV switchboard
- To identify components
- To carry out commissioning and maintenance operations on the LV switchboard
- To configure/set parameters for the communication network
- To wire a feeder
- To lock out a feeder
- To implement reactive power factor correction
- To study a UPS
- To prepare for electrical accreditation

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	400 V/20 kVA
Dimensions (H x W x D)	2500/2110 x 1400 x 550 mm (with/without beacon)
Weight	260 kg

Presentation

This LV switchboard adapted for teaching purposes is designed for students to learn how to implement the different technologies used in an LV switchboard (source changeover, power meter, UPS, controller, load shedding, etc.). It is used to distribute and control electrical energy on a dedicated teaching platform.
A PLC is used to centralize data via a Modbus and/or Ethernet link.

Description

The composition of the feeders will be adapted according to customer specification (see the selection table on our website).

- 1 PRISMA P cubicle with cable duct
- 1 normal/backup power supply via 100 A switch disconnectors
- 1 NS160N circuit breaker-changeover switch plate with STR22 protection relay
- 1 motor mechanism with BA controller for source changeover
- 2 Powerclip busbars
- 2 RCP phase control relays
- 1 RCU voltage control relay
- 10 feeders maximum, pre-wired depending on the configuration
- Acti 9 Smartlink communication system
- 1 TSX57, M340 or M221 PLC with web server module and HTML pages
- 1 x 1 kVA UPS
- 1 PM800 power meter

Available as an option
Reactive power factor correction cabinet with capacitors

Benefits

- Switchboard mounted, wired, tested and validated by Schneider Electric
- Remote monitoring
- Feeders can be adapted to suit the teaching platform

To order

MD1AA780P	LV switchboard for vocational training with TSX57
MD1AA780MR	LV switchboard for vocational training with M340
MD1AA780SO	LV switchboard for vocational training with M221

Energy management LV switchboard
SMART PANEL

Nouveau

Training @

Learning objectives

- To study the equipment
- To wire up a feeder
- To set up and lock out feeders
- To study Ethernet and Modbus communication
- To study the RT2012 French energy efficiency standard
- To implement the necessary data-driven energy efficiency actions
- To manage alarms and preventive maintenance

Main industries

- Electrotechnical engineering
- Energy engineering

Characteristics

Power supply	400 V/20 kVA
Dimensions (H x W x D)	2010 x 1000 x 400 mm
Weight	250 kg

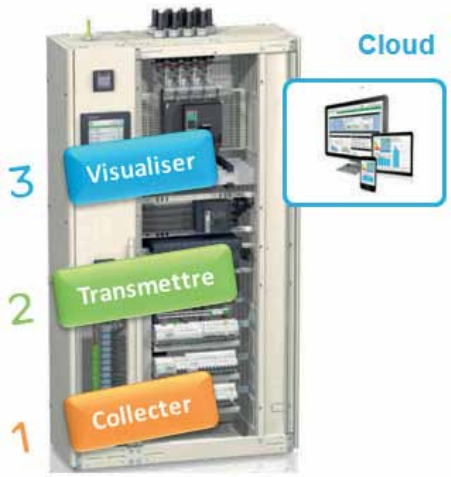
Presentation

The SMART PANEL is Schneider Electric's new energy management switchboard adapted for teaching purposes. It integrates the latest electrical distribution technologies for improving energy efficiency.
It is supplied with the RT2012 “Analyses and Solutions” guide and the Energy Efficiency White Paper.

Description

The composition of the feeders will be adapted according to customer specification (see the selection table on our website).

- PRISMA P cubicle with cable duct
- Digitized switchboard
- Acti 9 Smartlink Ethernet communication system
- Data feedback and feeder control
- Embedded and stand-alone functions: measurement and control of energy and fluid consumption levels
- Main Compact NSX circuit breaker with Ethernet interface
- Communication interface for the modular products (circuit breakers, meters, etc.)
- Choice of 10 feeders (see selection table)
- Real-time control and monitoring via touch screen
- Embedded web pages for display on a PC
- Remote display of operator screens via app on tablet



Benefits

- Full integration of RT2012 requirements
- New generation digitized LV switchboard
- Energy-efficient control

To order

MD1AA790SP	SMART PANEL energy management switchboard

Lighting and heating cabinets for RT2012 compliance

Nouvelle version

Training @

Learning objectives

- To set heating and lighting programs
- To use Modbus, Ethernet TCP/IP and KNX communication protocols
- To study the lighting requirements of the RT2012 standard:
  - lighting control
  - monitoring lighting controls
- To study the heating requirements of the RT2012 standard (refresher):
  - heating control
  - monitoring heat settings
- To study the metering requirements of the RT2012 standard:
  - measuring energy consumption

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	930 x 600 x 250 mm
Weight	30 kg

Presentation

These heating and lighting cabinets are designed to learn how to control, monitor and measure the energy consumption as described in the French energy efficiency standard RT2012. They feed information back to the teaching LV switchboard via Ethernet TCP/IP or Modbus. The heating cabinet is used to set heating programs with a DICTALIS LV switchboard.

Description

MD1AA665ECL lighting cabinet

- 1 Prisma Plus enclosure with transparent door
- 1 surge arrester
- 1 smart meter
- 1 SMART LINK gateway with Modbus and Ethernet communication
- 4 Reflex integrated control circuit breakers
- 1 emergency stop on the side of the cabinet
- 1 two-tone lens unit on top of the cabinet
- 4 lighting zones
- 3 light banks in parallel for each lighting zone
- Timer programs in the LV switchboard

MD1AA665CH heating cabinet

- 1 Prisma Plus enclosure with transparent door
- 1 smart meter
- 1 Ethernet/KNX gateway
- 1 touch screen for local control
- 1 thermostat (for installation indoors)
- 1 temperature and light level sensor (for installation outdoors)
- 1 temperature, CO2 and humidity sensor (for installation indoors)
- 1 emergency stop on the side of the cabinet
- 1 two-tone tower light
- 4 regulated zones + 1 non-regulated zone

Heating cabinet

Lighting cabinet

Benefits

- Compatible with all Ethernet TCP/IP/ Modbus LV switchboards
- Scalable Ethernet architecture
- Heating cabinet can be controlled remotely on a tablet

To order

MD1AA665ECL	Lighting cabinet for RT2012 compliance
MD1AA665CH	KNX heating cabinet for RT2012 compliance

Cabinets for upgrading LV switchboards to energy management switchboards

IRIO cabinet + analog and digital interface cabinet

Nouvelle version

Training @

Learning objectives

- To manage an installation remotely
- To use the energy management switchboard functions:
  - concentrating and storing data/ measurements
  - simple mathematical calculations
  - detecting and timestamping alarms
  - simple load management
  - publishing data
  - dashboards configured according to customer requirements
  - energy monitoring charts
- To monitor and analyze energy consumption
- To apply the requirements of the French energy efficiency standard RT2012

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**IRIO controller cabinet** 300 x 400 x 200 mm
Weight	5 kg
	Analog/digital interface cabinet 530 x 400 x 200 mm
	14 kg

Presentation

The IRIO cabinet is installed near an existing LV switchboard.
It is used to transform an LV switchboard into an energy management switchboard by taking energy measurements on the various feeders.

Description

IRIO controller cabinet
- 1 IRIO controller
- 1 Ethernet/Zigbee gateway
- 1 switch
- Necessary protection devices

Kit for measuring 6 LV switchboard feeders
- 1 Zigbee communication module
- 1 DC power supply
- 6 energy meters:
  - 3 single-phase meters
  - 3 three-phase meters

The Zigbee communication module is installed in the LV switchboard. It is used to feed information back to the controller cabinet.
Energy meters should be installed on each of the LV switchboard feeders to be controlled.

Analog and digital interface cabinet
- 1 M221 PLC with 9 x 24 DC inputs, 7 relay outputs, 2 inputs + 4 outputs (0-10 V analog) and 1 Ethernet port
- 1 x 24 VDC 3 A power supply
- 2 circuit breakers
- 1 voltage presence indicator
- 1 RJ45/RJ45 cable (5 m)

IRIO controller cabinet

Kit for measuring 6 LV switchboard feeders

Benefits

- Can be adapted to any LV switchboard
- No wiring between the LV switchboard and the IRIO cabinet

To order

MDGIRIOCC	IRIO controller cabinet
MDGIRIOME	IRIO measuring kit
MD1AA665INT	Analog and digital interface cabinet

IT system cabinet and secondary distribution boards

Learning objectives

- To create an IT electrical supply system
- To grasp the principle of continuity of service for an installation as well as the associated maintenance methods
- To implement an IT earthing system (neutral isolated from earth)
- To establish connections with a communicating LV switchboard cabinet to be able to complete the possible workshop architectures

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply **Dimensions (H x W x D)** **Weight**	**IT system cabinet** 400 V/10 kVA 1540 x 800 x 590 mm 203 kg
	System or commercial distribution board 400 V/23 kVA 645 x 480 x 250 mm 18 kg

Presentation

This mobile cabinet is used to replicate an IT system on a dedicated teaching platform. It is designed to demonstrate the principle of continuity of service for an installation as well as the associated maintenance methods.
The system distribution board is used to protect power supplies on industrial systems (machines, operative parts, etc.).
The commercial distribution board is used to protect power supplies on commercial systems (lighting, socket outlets, etc.).
The status of the different feeders is centralized on Twido PLCs. Data is sent via the Ethernet network to a concentrator PLC in an LV switchboard.

Description

IT system cabinet
- Electrical distribution cabinet on 4 locking castors
- 1 x 400 V/230-400 V 10 kVA three-phase transformer
- 3 three-phase feeders protected by 10 A circuit breakers
- 1 IM20 permanent insulation monitor (PIM)
- 1 Twido PLC

System distribution board
- Prisma Plus modular switchgear enclosure
- 1 master switch
- Padlockable external handle
- 2 x 2-pole circuit breakers
- 4 x 3-pole circuit breakers
- 1 Twido PLC

Commercial distribution board
- Prisma Plus modular switchgear cabinet
- 1 master switch
- Padlockable external handle
- 6 x 2-pole circuit breakers
- 1 Twido PLC

IT system cabinet

System/commercial distribution board

Benefits

- Compact, mobile IT system cabinet
- 3 three-phase feeders for connecting various devices
- Distribution boards communicating via Ethernet with an LV switchboard

To order

MD1AA700TIT	IT system cabinet
MD1AA700TDS	System distribution board
MD1AA700TDT	Commercial distribution board

IT system enclosure for hospital environment

Nouvelle version

Learning objectives

- To explain earthing systems and the isolated neutral
- To commission the IT system enclosure
- To connect a feeder for measurement purposes
- To locate insulation faults manually or automatically
- To connect an RCD to a feeder
- To set the parameters of a permanent insulation monitor
- To set the communication system parameters (Ethernet)
- To use the ETG100 module web pages with fault reports

Main industries

- Electrical engineering
- Industrial maintenance

Characteristics

Power supply	400 V/10 kVA
Dimensions (H x W x D)	2200 x 850 x 450 mm
Weight	200 kg

Presentation

The IT system enclosure is designed to demonstrate and implement a specific IT system application. Hospitals require a high level of continuity of service in operating theatres.
Operating data is fed back in real time to a supervisory program intended for use by medical and maintenance personnel.
This product is used to simulate insulation or short-circuit faults as well as mains voltage drops.

Description

- 1 Prisma P cubicle
- 1 x 400 V/400 V 10 kVA transformer with star-delta connection
- 6 feeders for protecting electronic circuits
- Mimic panel:
  - wiring diagram of cubicle
  - 6 feeders with measuring points
- Cables required for use
- System for simulating faults on 5 feeders (selection via switch)
- System for simulating a second fault, short-circuit current limiting
- Communicating permanent insulation monitor with automatic fault location
- Source changeover for simulating loss of voltage and automatic changeover to a backup power source

Available as an option
Three-phase UPS with 10 minute independent operation

Benefits

- Same equipment as used in hospitals
- System originating from Schneider Electric's dedicated medical solutions range
- Communicating equipment

To order

MD1AA710	Medical IT enclosure
MD1AA719	Three-phase UPS option

Earthing systems bench
Earthing systems bench

Learning objectives

- To study the different earthing systems: TN, TT and IT
- To apply the protection standards for LV electrical distribution to each type of earthing system
- To learn how to locate faults

Main industries

- Electrical engineering
- Industrial maintenance

Characteristics

Power supply	400 V/4 kVA
Dimensions (H x W x D)	1950 x 770 x 600 mm
Weight	152 kg

Presentation

This bench is designed for studying the different earthing systems. It has 2 working sides:
- one side to study the TN and TT neutral earthing systems
- one side to study the IT neutral earthing system

Receivers are simulated by loads installed in the lower part of the bench.
The IM400 version is used for automatic fault location.
The IM20 version is used for manual fault location.

Description

The bench is mounted on a frame with locking castors.
Each side comprises:
- 1 mimic diagram of the distribution architecture
- 3 single or three-phase receivers representing a person
- Protection via thermal-magnetic circuit breakers and RCBOs
- Residual current circuit breakers and contactors
- 1 permanent insulation monitor for IT system (IM400 or IM20)
- Built-in XD301 detectors on the IM400 version
- In the lower part:
  - power resistors
  - power transformer
- 1 set of safety leads included

Fault location kit for version IM20
- XP15 current probe
- 1 XGR leakage current generator
- 1 XRM mobile receiver

IT side

TT + TN side

Benefits

- Both sides can be used simultaneously
- Only 1 piece of equipment required for all 3 earthing systems
- Safe, rugged wiring

To order

MDG99603	Earthing system bench - IM400 version
MDG99605	Earthing system bench - IM20 version
MDG99609	Fault location kit for IM20

Protection discrimination bench

Learning objectives

- To use an adjustable residual current relay with separate current transformer
- To analyze the causes and effects of short-circuit currents
  - calculation methods
  - choice of protection devices
- To study the operating principles of a thermal-magnetic circuit breaker
  - tripping curves
  - breaking capacity
- To use and trace the tripping curve for a given rating
- To implement discrimination between upstream and downstream protection devices
- To simulate situations of total discrimination, partial discrimination and non-discrimination
- To study the concept of discrimination on 2 or 3 levels:
  - consequences and effects on an installation
- To select the earth fault loop impedance by induction coils of adjustable values
- To provide a simplified presentation of breaking by a very low voltage electric arc
- To limit the short-circuit current

Main industries

- Electrical engineering
- Industrial maintenance

Characteristics

Power supply	230 V/3.2 kVA
Dimensions (H x W x D)	1850 x 730 x 620 mm
Weight	150 kg

Presentation

This bench is designed to study and implement two discrimination strategies - current discrimination and time discrimination - for protection devices in low voltage distribution systems.
Two isolation transformers are used to limit the energy involved when forcing the faults necessary for the purposes of study.

Description

The bench is mounted on a frame with locking castors.
It features:

- 2 mimic panels:
  - current discrimination
  - time discrimination
- Circuit breakers with different tripping curves (B, C or D)
- 2 x 220 V/48 V isolation transformers on the lower part
- 1 set of induction coils (for current discrimination)
- 1 rheostat (for time discrimination)
- 1 safety device to open the protection panels
- 1 set of safety leads included

Current discrimination side

Time discrimination side

Benefits

- Both sides can be used simultaneously
- Only 1 piece of equipment required for both discrimination types
- Safe, rugged wiring

To order

MDG99610	Discrimination bench

Power quality

Power quality

Energy infrastructure

Power quality

Reactive power factor correction

Reactive power factor correction cabinet

Learning objectives

- To measure the phase shift factor on linear and non-linear loads:
  - influence of line length
  - solutions for correcting the phase shift factor
- To highlight, measure and reduce inrush currents associated with capacitor activation
- To highlight the overloads on capacitors (anti-resonance) associated with harmonic phenomena
- To implement appropriate solutions

Main industry

- Electrical engineering

Characteristics

Power supply	230 V/3.2 kVA
Dimensions (H x W x D)	**Control cabinet**
Weight	950 x 700 x 370 mm
	70 kg
	Lamp cabinet
	420 x 800 x 300 mm
	18 kg

Presentation

This cabinet represents a reactive power factor correction installation. It includes the following functions:

- Phase-shifted linear loads for varying the installation phase shift factor
- A varmeter measurement system
- A reactive power factor correction system performed by capacitor steps controlled by the power factor relay
- A solid state contactor to limit the capacitor inrush current
- A non-linear load system to highlight anti-resonance phenomena from harmonics circulating in the capacitors
- A correcting device with an anti-resonance reactor

Note
Measurements and practical exercises require the use of a universal RMS controller or special instruments such as harmonics analyzers.

Description

Control cabinet

- 1 mimic panel
- 1 VARLOGIC measurement system
- 1 set of 3 capacitors
- 1 set of 3 induction coils
- Measuring points on the right-hand side

Lamp cabinet

- 3 x 500 W halogen lamps controlled by a dimmer switch

Control cabinet

Lamp cabinet

Benefits

- Compact system for studying reactive power factor correction
- Applications in applied physics
- Safe measuring points

To order

MDG99160	Reactive power factor correction cabinet + lamp cabinet
MDG99169	Optional trolley

Electromagnetic interference
HARMOCEM

Learning objectives

- To identify the harmonics generated by different receivers
- To identify interference caused by the coexistence of power and data signals (EMC)
- To measure radiated and conducted emissions
- To implement appropriate solutions in accordance with the relevant wiring regulations

Main industry

- Electrical engineering

Characteristics

Power supply	230 V/1.5 kVA
Dimensions (H x W x D)	**Control cabinet**
Weight	810 x 700 x 350 mm
	60 kg
	Load cabinet
	750 x 700 x 330 mm
	42 kg
	Active filter option
	225 x 340 x 340 mm
	8 kg

Presentation

The HARMOCEM package consists of two cabinets for replicating the electromagnetic interference phenomena encountered in industrial environments and assessing the performance of the various solutions.
An active filter is available as an option to complement the study of anti-harmonics solutions.
Measurements and practical exercises require the use of a spectrum analyzer (HF) and a harmonics analyzer (LF).

Description

The HARMOCEM bench comprises 2 cabinets.

Control cabinet
- Mimic diagram with selection of components to be used for the relevant solution
- 1 set of 3 induction coils
- 1 set of 3 capacitors
- Variable speed drive
- Filters, compensators, induction coils, capacitors
- Measuring points

Load cabinet
- Non-linear loads: dimmer switches, bulbs, fluorescent tubes, etc.
- 1 loaded asynchronous motor
- Leads and probes

Available as an option
- 1 trolley with lockable drawer for the control cabinet and active filter
- 1 trolley for the load cabinet
- Active filter:
  - power supplied via control cabinet
  - fast connection via double-recess connectors
  - 2 A maximum compensation current
  - compensation of 2nd to 25th harmonic
- HF spectrum analyzer:
  - for frequencies from 150 kHz to 1 GHz
- Single-phase LF analyzer:
  - for measuring 2nd to 50th harmonic

Control cabinet

Loads cabinet

Benefits

- Applications in applied physics
- Safe measuring points

To order

MDG99150	HARMOCEM bench
MDG99158	Trolleys
MDG99159	Active filter
MDG99198	HF spectrum analyzer
MDG99098H	Single-phase LF analyzer

Harmonic interference
HARMOTRIS

Learning objectives

- To study problems of interference on a three-phase installation
- To analyze the phenomena of harmonics, EMC and temperature rise on the neutral conductor
- To implement appropriate solutions

Main industry

- Electrical engineering

Characteristics

Power supply	400 V/3.3 kVA
Dimensions (H x W x D)	1860 x 900 x 570 mm
Weight	230 kg

Presentation

The HARMOTRIS bench consists of an electrical cabinet and a cabinet containing the lighting loads.
The electrical architecture simulates a theatre installation.
It has 2 separate power lines to control a lighting circuit and activate motor-driven scenery.
Measurements and practical exercises require the use of a spectrum analyzer (HF) and a harmonics analyzer (LF).

Description

The HARMOTRIS bench is mounted on a frame on castors.
- The top cabinet includes:
  - 1 mimic diagram with selection of components to be used for the relevant solution
  - 1 panel for measuring and adjusting the lamp power
  - circuit breakers and RCDs
  - line reactors
  - harmonic filter reactors
  - resonance reactors
  - three-phase capacitors
  - 1 x 400/240 V 2 kVA isolating transformer
  - 1 Altivar drive for 1.5 kW motor
- The bottom cabinet includes:
  - 1 light bank with 3 x 500 W halogen lamps
  - 1 bank of fluorescent, compact fluorescent or induction lamps
  - 1 temperature monitoring sensor
  - 2 cooling fans
  - 1 set of leads and probes

Available as an option
- Active filter: see page 35
- HF spectrum analyzer: see page 35
- Three-phase LF analyzer: power and power quality (harmonics) analyzer

Inside of cabinet

Benefits

- Applicable to industrial and commercial installations
- Mobile equipment
- Safe measuring points

To order

MDG99190	HARMOTRIS bench
MDG99159	Active filter
MDG99198	HF spectrum analyzer
MDG99099H	Three-phase LF analyzer

Harmonic interference
MINHARMOTRIS

Learning objectives

- To display and interpret harmonic interference on an electrical installation
- To analyze the phenomena of 3rd order harmonics and temperature rise on the neutral conductor
- To implement the appropriate solution with a harmonic filter
- To study the influence of conductor cross-section and apply the relevant standards
- To study a lightning arrester

Main industry

- Electrical engineering

Characteristics

Power supply	400 V/1.2 kVA
Dimensions (H x W x D)	1150 x 900 x 450 mm
Weight	80 kg

Presentation

The MINHARMOTRIS bench consists of an electrical cabinet containing a power line for a lighting circuit.
It is designed to provide a simple means of demonstrating the problems associated with harmonic interference.

Description

- Electrical cabinet
- 1 bank of halogen lamps
- 1 bank of fluorescent, compact fluorescent or induction lamps
- 1 transformer
- 1 set of induction coils and 1 set of capacitors “on 2 rows”
- Circuit breakers
- Lightning protection device
- Lamp selection and adjustment panel
- A bank of measuring points
- Cabinet cooling device

Available as an option
- Trolley for the MINHARMOTRIS cabinet
- Three-phase LF analyzer: see page 36

Inside of cabinet

Benefits

- Applications in applied physics
- Simple analysis of the 3rd harmonic
- Safe measuring points

To order

MDG99195	MINHARMOTRIS cabinet
MDG99199	MINHARMOTRIS trolley
MDG99099H	Three-phase LF analyzer

Renewable energy

Renewable energy

Energy infrastructure

Renewable energy

Solar power modular offer

Learning objectives

- To learn about and identify the components
- To study, size and install solar panels
- To study the effect of shading masks

Main industries

- Electrical engineering
- Industrial technology

Characteristics

Dimensions (H x W x D)	**Frame** 1030 x 910 x 400 mm
Weight	6.5 kg
	Modules 70 x 150 x 245 mm
	0.7 kg

Presentation

This solar modular offer is designed to demonstrate the basics of energy production by solar panels.
To display the charging status, the regulator module is equipped with 2 indicators: green for battery charged and red for battery charging.

Composition

The MD1AMLSOL global offer consists of the modules below.
You can also order each module separately according to requirements.

Description	Qty	Ref.
Support frame	1	MD1AM000
Solar panel	1	MD1AMS005
Measurement module with 1 voltmeter and 1 ammeter	1	MD1AMS001
Charge regulator module equipped with 2 indicators	1	MD1AMS002
12 V battery module	1	MD1AMS003
12 VDC/230 VAC inverter module	1	MD1AMS004
15 W lamp holder module	1	MD1AMP004

Measurement module

Benefits

- Introduction to solar power
- Prototyping of an energy system
- Quick, safe setup

To order

MD1AMLSOL	Solar power modular offer

Renewable energy generation
Renewable energy bench

Nouveau

Learning objectives

- To implement different combinations of electricity generation and storage methods
- To use an electricity storage device
- To study the regulator function
- To learn about the inverter function
- To compare generation from fixed PV panels and solar tracker systems
- To learn about wind turbines

Main industry

- Electrical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	1255 x 880 x 625 mm
Weight	150 kg

Presentation

This bench is designed to aid the study and comparison of different sources of renewable energy such as photovoltaic panels and wind turbines. It is used to study the conversion of DC to AC power, with or without storage of energy by batteries.
The renewable energy sources come in the form of actual operative parts (see page 42).
They can also be simulated by a variable DC power supply to overcome weather conditions and study all possible scenarios.

Description

Basic version
- 1 PLC for managing the generation, storage and consumption sequences
- 1 display unit for displaying the electrical U/I/P values
- 1 inverter for remote sites
- 230 V and 24 V lamp loads, or external load

The versions below also include the following additional functions:

Versions with simulation
- 1 variable DC power supply controlled by PLC for simulating generation of the various renewable energies

Version with storage:
- 1 set of 24 V/27 Ah lead batteries with charger

Version with simulation and storage:
- 1 programmable power supply and storage batteries

Operative parts available as an option
See page 42

Benefits

- Operation possible in simulation mode
- Numerous different configurations
- Remote monitoring possible via app on tablet

To order

MDG99400	Basic renewable energy bench
MDG99401	Renewable energy bench with simulated power supply
MDG99402	Renewable energy bench with storage batteries
MDG99403	Renewable energy bench with simulated power supply and batteries

Operative parts for renewable energy bench

Nouveau

Learning objectives

- To implement different combinations of electricity generation and storage methods
- To use an electricity storage device
- To study the regulator function
- To learn how the inverter works
- To compare generation from fixed PV panels and solar tracker systems
- To learn how wind turbines work

Characteristics

Dimensions (H x W x D)	**Fixed PV panels**
	1360 x 2770 x 1510 mm
Weight	30 kg
	Solar tracker
	2300 x 2720 x 400 mm
	75 kg

Presentation

The operative parts available in this offer are designed to supply renewable energy for the renewable energy bench (see page 41). The solar tracker can be used independently.

Description

Fixed PV panels
- 1 fixed aluminium frame, with adjustable tilt mechanism
- 2 x 140 Wc PV panels (1360 x 1510 mm)
- Cable and connector for connection to the renewable energy bench

Solar tracker
- 1 mobile frame with stand (1200 x 1200 mm), height 2.0-2.3 m
- 2 x 140 Wc PV panels (1360 x 1510 mm)
- 1 tracker control box
- 1 PLC cabinet for control
- Cable and connector for connection to the renewable energy bench

Mechanically-driven wind turbine bench
- 1 x 24 VDC/300 W wind turbine (wind speed 2-20 m/s)
- 1 motor controlled by an Altivar variable speed drive
- Cable and connector for connection to the renewable energy bench

Wind turbine (to be mounted on a pole)
- 1 single-phase 24 VDC wind turbine, blade diameter 1 m (pole not included)

Benefits

- Mobile solar tracker with fixed mounting option
- Tracker can be used independently from the bench using its control box
- Operative parts (OP) pre-connected and detected by the bench

To order

MDG99410	OP for renewable energy bench: PV panels
MDG99420	OP for renewable energy bench: solar tracker
MDG99430	OP for renewable energy bench: wind turbine bench
MDG99440	OP for renewable energy bench: wind turbine for pole-mounting

Solar potential
Solar potential analyzer

Nouveau

Learning objectives

- To learn about the characteristics of photovoltaic solar panels: I(V), MPPT, Voc, Isc, wired in series/parallel
- To analyze a site's solar potential
- To study a site's electricity generation/ consumption
- To calculate the energy generation system
- To size a solar photovoltaic installation
- To be aware of the economic data for renewable energy
- To create a monitoring interface in LabVIEW

Main industries

- Energy engineering
- Energy engineering

Characteristics

Dimensions (H x W x D)	560 x 560 x 70 mm
Weight	7.4 kg
Recommended configuration	Windows XP, Vista, 7 32-bit and 64-bit 1 USB port

Presentation

This package combines solar potential analyzer simulation software with a case for studying the main electrical characteristics of a solar panel. It is used to provide an insight into orders of magnitude and the principles of sizing for a solar photovoltaic installation.
The equipment is made by Soleïs Technologie and marketed by Schneider Electric.

Description

Solar potential analyzer software
This software simulates electricity generation in a solar photovoltaic installation in real time and includes:
- A technical, meteorological and financial database
- Algorithms for calculating output and ROI

Case
- 1 x 25 W monocrystalline solar photovoltaic panel with MC4 connectors
- Electronic sensors:
  - tilt
  - temperature
  - compass
  - GPS
- 1 electronic data acquisition card for sensor data

Benefits

- Quick installation of equipment (in just a few minutes)
- Intuitive user interface - no training required
- LabVIEW DLL and application examples included

To order

MDGAGSLE	Solar potential analyzer software (with academic site license)
MDGAGSVAL	PV case for solar potential analysis

Micro solar power plant

Nouveau

Learning objectives

- To understand the electrical characteristics of a solar photovoltaic panel:
  - I(V) characterization
  - MPPT
  - Voc, Isc
- To optimize energy generation:
  - influence of panel position (direction, tilt, shading masks)
  - influence of panel wiring (in series/in parallel)
- To protect a micro photovoltaic power plant

Main industries

- Electrical engineering
- Energy engineering
- Energy engineering

Characteristics

Dimensions (H x W x D)	810 x 800 x 580 mm
Weight	9 kg

Presentation

The micro solar power plant is used to teach students about solar photovoltaic technologies, from understanding the electrical characteristics to how to optimize photovoltaic energy generation.
The combination of 3 micro PV power plants offers a wider range of wiring options, voltages (from 3.8 V to 23 V (Voc)) and currents (from 8.5 A to 50 A (Isc)).
The equipment is made by Soleïs Technologie and marketed by Schneider Electric.

Description

1 micro PV power plant
- 1 mobile tiltable frame
- 2 x 25 Wc crystalline silicon solar photovoltaic panels
- 1 compass
- 1 set of MC4/double-recess connector electrical leads

Set of 3 micro PV power plants
- 3 x list above
- 3 boxes of diodes for connecting the 3 micro power plants

Micro power plant x 3

Benefits

- Practical, rugged portable tool
- No infrastructure required
- Quick installation and arrangement (in just a few minutes)

To order

MDGMCPV	Micro PV power plant
MDG3MCPV	Set of 3 micro PV power plants

PV-wind turbine system for remote sites
SOLEOLIS

Nouvelle version

Learning objectives

- To identify the equipment
- To control the system and use the web pages
- To study and size a combined solar and wind turbine installation
- To study energy transfer and calculate the stored power depending on the battery configuration
- To measure and compare PV and wind turbine performance

Main industries

- Electrical engineering
- Industrial maintenance

Characteristics

Power supply	230 V/200 VA
Dimensions (H x W x D)	1320 x 770 x 1700 mm
Weight	130 kg

Presentation

This product is designed to demonstrate the renewable energy generation capability of solar panels and/or wind turbines for remote sites. The electrical energy stored in the batteries is used to power an external device (230 V/1 A maximum).
The wind turbine is driven by an asynchronous motor with a variable speed drive to simulate different wind strengths.
A PLC monitors the battery charge status and switches back to the mains power supply if necessary.

Description

- Aluminium frame on castors
- 1 electrical cabinet with mimic panel
- Multi-position PV panel approximately 1 m^2
- 1 x 450 Wc wind turbine driven by asynchronous motor
- 2 x 12 V gel cell lead acid batteries
- 1 x 24 V battery charger
- 1 regulator
- 1 x 24 V/230 V inverter for remote sites
- 1 Twido PLC
- 1 Magelis operator dialogue terminal for control and displaying measurements
- 1 Ethernet module with web server
- Control and protection components

SOLEOLIS - panels side

SOLEOLIS - cabinet side

Benefits

- Compact wind turbine and PV equipment
- Controllable locally and via school/college LAN
- Option to use the wind turbine outdoors

To order

MDG99215	SOLEOLIS system

Photovoltaic characterization bench
Solar potential analysis PRO

Nouveau

Learning objectives

- To study different solar PV panel technologies: monocrystalline, CIGS and amorphous
- To compare the performance of the different PV panel types over time (measurements taken continuously)
- To compare the efficiency of a fixed installation with that of a tracker installation
- To study the influence of solar potential (radiation, temperature, shading) for each technology

Main industries

- Electrotechnical engineering
- Automation engineering
- Vocational degrees
- Masters in renewable energies
- Engineering colleges
- Professional training centres

Characteristics

Dimensions (H x W x D)	1900 x 5000 x 1500 mm
Weight	440 kg (including 150 kg ballast)

Presentation

The solar potential analysis PRO bench is used to study and compare different solar photovoltaic panel technologies on different mountings (fixed frame and solar tracker).
Measurements (temperature, irradiance, voltage, current, etc.) are taken from each panel every second, averaged out per minute and then stored. This data is emailed through every night.
It is then formatted, analyzed and studied with the students.
The equipment is made by Soleïs Technologie and marketed by Schneider Electric.

Description

The solar potential analysis PRO bench consists of 4 monocrystalline Si, CIGS and amorphous Si panels. These types can be modified on request.
- 3 PV panels are mounted on a fixed frame.
- 1 PV panel is mounted on a tracker.
- The panels are equipped with a temperature sensor and connected to a variable load for I(V) characterization and MPPT.

The bench is equipped with:
- 1 ambient temperature sensor
- 1 irradiance sensor

Available as an option
Anemometer

Benefits

- Option to choose PV technologies on request
- Self-sufficient energy bench
- Automatic data collection and transmission via GPRS GSM link

To order

MDGAGSTRK	Solar potential analysis PRO PV bench with tracker
MDGAGSANE	Anemometer option

Solar-powered water extraction
Instrumented SOLAR WATER

Nouveau

Learning objectives

- To learn about and substantiate the concept of stand-alone solar water pumping systems
- To identify the energy flows, characterize the transformations and estimate overall system efficiency
- To size the solar panels and the variable speed drive for the system
- To set the installation parameters: define the MPPT depending on the amount of sunlight

Main industry

- Energy engineering

Characteristics

Power supply	230 V/180 W
Dimensions (H x W x D)	730 x 700 x 390 mm
Weight	40 kg no load

Presentation

The instrumented SOLAR WATER bench replicates a Schneider Electric stand-alone solar-powered water pumping solution for areas where there is no electricity supply.
Electricity is generated using photovoltaic panels to power a dedicated drive directly. The system operates without batteries, the purpose being to provide a continuous supply of water by ensuring the tank is sized correctly according to requirements and the daily amounts of sunlight.
To facilitate use for teaching purposes, this model can be powered by a PV array with 300 VDC output, by a 24 VDC laboratory power supply, or via the AC power supply.

Description

- 1 x 180 W Altivar 312 Solar variable speed drive
- 1 centrifugal pump
- 1 upper tank with level sensor
- 1 lower tank simulating the water table
- 1 pump ON/OFF switch
- 1 rotary dial to vary the voltage
- 1 pump running indicator
- 1 pump error indicator
- 1 mushroom head emergency stop button
- Circuit breakers
- 1 AC power supply lead
- 1 x 24 VDC power supply connection
- 1 x 300 VDC PV panel power supply connection
- 1 x 230 VAC main power supply connection
- 1 flow sensor
- 1 pressure sensor
- 1 LabVIEW interface for data acquisition
- 1 Modbus/Ethernet gateway

Benefits

- Compact design
- Off-grid operation possible
- Use of real-life example to illustrate sustainable energy development issues

To order

MD1BPODS	Instrumented SOLAR WATER bench

Tube solar water heater

Learning objectives

- To learn about the components of a solar water heating system
- To study heat exchanges
- To size an expansion tank
- To understand the safety issues associated with a solar water heating system
- To install, use and maintain the solar water heater
- To study temperature regulation
- To study the influence of tilt angle and sensor type

Main industries

- Energy engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

Power supply	230 V/2.1 kW
Dimensions (H x W x D)	1350 x 1180 x 670 mm
Weight	255 kg

Presentation

This solar water heater with electric boost is used to study how to implement a dual-energy solar water heating system.
The angle of the evacuated tube solar collector can be adjusted. The water circuit with hot water tank replicates a real-life installation with a thermostatic mixing valve to regulate water temperature.
The compact size of the equipment produces an inertia that is compatible with the learning activities.
Data from the temperature sensors and the solarimeter can be downloaded to a PC using a converter (software provided).

Description

- Frame on castors
- Solar collector with 6 evacuated tubes
- 1 x 15 L domestic hot water tank equipped with heating resistor
- 1 water circulation pump
- 1 manometer
- 1 expansion tank
- 1 relief valve
- 1 fill valve
- 1 drain valve
- 1 non-return valve
- Solenoid valves (for network separation purposes)
- 6 temperature sensors
- 1 thermostatic mixing valve
- 1 solarimeter
- M238 PLC with HMI display unit
- LabVIEW application software

Available as an option

- Industrial management software
- Floodlight heater bank on request

Benefits

- Fully transparent water circuit
- Ease of control via HMI
- Real-time temperature curves

To order

MD1AACHESOL	Evacuated tube solar water heater
MD1AACHEPACRV	Industrial management software

Solar water heating system

Learning objectives

- To study the physics of a solar water heating system
- To study the hydraulic circuit
- To study the electrical wiring circuit
- To carry out commissioning and maintenance operations
- To study the heating control system
- To interpret the following measurements:
  - thermal report
  - energy savings report

Main industries

- Energy engineering
- Thermal engineering

Characteristics

Power supply	230 V/16 A
Dimensions (H x W x D)	**Solar panel frame** 1600 x 1850 x 1900 mm
Weight	140 kg
	Hydraulic frame 1700 x 1750 x 1000 mm
	200 kg
	Heater bank 1200 x 1850 x 2300 mm
	120 kg

Presentation

This solar water heater with electric boost is used to study an instrumented solar water heating system.
The hydraulic circuit replicates a real-life installation with a hot water tank.
Data from the temperature sensors and the solarimeter can be downloaded to a PC using a converter (software provided).
This solar water heater can operate indoors when used with the heater bank available as an option.
The equipment is made by ELECTRONA and marketed by Schneider Electric.

Description

The tubular steel frames are mounted on locking castors.

Solar panel frame
- 2.40 m² flat panel collector, tilted at 45° angle with option to vary the angle (+5°/-15°)

Hydraulic circuit frame
- 200 L dual heat exchanger domestic hot water tank with 2 kW boost resistor
- Hydraulic circuit with circulation unit and expansion tank
- Electronic regulation system
- Data acquisition with communication via Internet
- Operating software

Accessories
- Set of 20 m industrial hoses
- Heat transfer fluid (water + glycol)
- Filling pump

Available as an option
Heater bank mounted on a frame:
- 3 x 1500 W floodlights (mounting adapted to the solar collector)
- Dimmer control for floodlights
- Protected by lockable wire mesh
- Tilting system to go through door 1.40 m x 2.10 m

Benefits

- Actual solar water heating system with electric boost
- Mobile system in 2 parts
- Can be used indoors with the heater bank

To order

MD1AA775	Solar water heating system
MD1AA776	Heater bank

Hydroelectric power bench
HYDROLIS

Learning objectives

- To study the conversion of hydropower into electricity
- To determine the yield
- To operate an industrial multi-technology system

Main industries

- Electrical engineering
- Energy engineering
- Industrial maintenance

Characteristics

Power supply	400 V/5 kVA
Dimensions (H x W x D)	1750 x 1500 x 750 mm
Weight	200 kg empty/350 kg full

Presentation

The HYDROLIS bench replicates a hydroelectric power plant. It is designed to demonstrate and control the generation of electricity using hydropower.
The water head can be varied from 10 to 25 m using a pump driven by a variable speed drive.
A Twido or M340 PLC is used to manage the control system.
The equipment is made by BEMA and marketed by Schneider Electric.

Description

Water storage and water head system
- 1 x 150 L (approx.) tank
- 1 stainless steel motor-driven pump
- 1 electrical cabinet with an Altivar 312 variable speed drive on CANopen bus with protection device
- Hydraulic circuit with drain valve

Hydropower plant
- 1 TURGO turbine with 20 buckets
- 2 water injection nozzles with flow valves
- 1 asynchronous generator with encoder for speed control
- Hydraulic circuit with analog flow and pressure sensors

Electrical cabinet
- 1 user socket
- 1 controllable capacitor bank
- 1 PM750 power meter with 3 CTs
- 1 Twido or M340 PLC with TCP/IP and CANopen
- 1 Magelis XBTGT touchscreen graphic operator dialogue terminal
- 1 voltage regulator (for energy recovery and creation of three-phase supply)
- Components required for correct, safe operation
- PCVUE monitoring of 25 variables

Available as an option
- PCVUE monitoring of 250 variables
- EDF metering solution comprising 2 meters for generation and non-consumption data

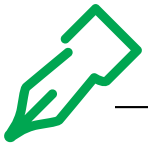
Benefits

- Display of turbine operation
- Separation of the electric pumping/ turbine sections
- Measurement and control by HMI and power meter

To order

MD1HYDROTW	HYDROLIS with Twido PLC
MD1HYDROM340	HYDROLIS with M340 PLC
MD1HYDSPV25	HYDROLIS monitoring of 250 variables
MD1HYDCPTEDF	EDF meter
MD1HYDFORM	HYDROLIS on-site customer training day

Notes



Electric vehicles

Electric vehicles

Energy infrastructure

Electric vehicles

EV charging station adapted for training purposes

Learning objectives

- To learn about the different EV charging methods
- To learn about the different types of connection
- To learn about the standards relating to EV charging stations
- To conduct a SysML study of the functions of a charging station
- To study the public infrastructure required
- To work in the LabVIEW application when connected to the charging station or in accelerated simulation mode to:
  - analyze the charging cycle (time, cost, energy)
  - analyze the voltage/current phase shift
  - analyze the harmonics
  - analyze the PWM signals to control charging

Main industries

- Sustainable development and environment engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/3 kW
Dimensions (H x W x D)	1500 x 400 x 300 mm
Weight	50 kg

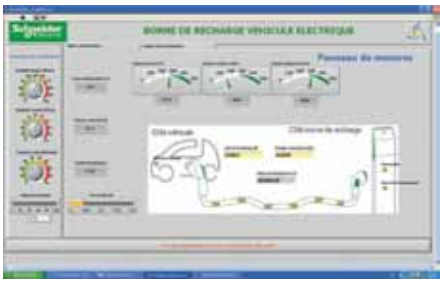
Presentation

This 3 kW charging station has been adapted for training purposes and is used to demonstrate the specifics of charging electric vehicles (EV). The charging station is equipped with a T3 connector and can therefore operate with a real EV, however it can also be used to charge a light EV such as the Renault Twizy, or an electric bike, or even to take a payment.
It features a protection unit and a vehicle presence simulation unit.
A data acquisition module is used to feed information back to the LabVIEW application.

Description

- 3 kW floor standing EV charging station equipped with:
  - aluminium frame on castors
  - 1 T3 connector
  - 1 RFID badge reader with set of 10 badges
  - voltage and current sensors
  - 1 National Instrument data acquisition module
  - 1 protection unit with circuit breakers (for protecting the power meter and Ethernet gateway-web server connections)
  - 1 vehicle presence simulation unit
  - 1 T1 connector
  - 3 x 16 A + E sockets
- Mains cable provided with industrial 32 A socket
- Charging cable with T1 and T3 connectors
- LabVIEW self-extracting executable file
- POWER LOGIC software for the power meter

Available as an option
Biometric switch for mini sustainable development engineering design project



LabVIEW view

Benefits

- Actual charging of an electric vehicle
- Simulation of charging station operation on a PC
- Analysis of charging infrastructure norms and standards

To order

MDGVE100	EV charging station adapted for training purposes
MDGVE100BM	Biometric switch

Installing an EV charging station

Nouveau

Learning objectives

- To learn about the equipment
- To install a charging station and apply the relevant installation guidelines
- To size the protection devices
- To calculate the size of the power cables
- To commission the equipment
- To set the PLC IP address
- To install the monitoring display unit in an LV switchboard

Main industry

- Electrical engineering

Characteristics

Power supply	230 V/3 kW
Dimensions (H x W x D)	1175 x 360 x 222 mm
Weight	35 kg

Presentation

This EV charging station is supplied ready for installation and connection as part of an educational project with the students.
It is a floor standing model with a T3 connector and a 3 kW power rating. The protection unit and circuit breakers are to be mounted and wired. An RFID badge is used to access the charging station.
An EV presence simulation unit is available as an option.

Description

- 1 x 3 kW floor standing charging station with 1 T3 connector
- 1 set of 10 RFID badges
- 1 KAEDRA weatherproof enclosure comprising:
  - 2 rows of 12 modules
  - 3 functional plates
- 1 x 2 A circuit breaker + Vigi control circuit
- 1 x 20 A circuit breaker + Vigi + MNx power circuit
- 1 x 32 A isolator with handle

Available as an option

- Frame on castors
- Professional test case with T3/T1 charging cable
- EV presence simulation unit
- STU855 operator dialogue terminal (see page 136)

Benefits

- Connection and monitoring with an LV switchboard adapted for teaching purposes
- Actual installation of a charging station
- Can be used to charge an actual EV

To order

MDGVE050	Charging station (teaching version)
MDGVE050CH	Frame on castors
MDGVE050SIM	Test case + T3/T1 cable
MDGVE050SIMVE	EV presence simulation unit

EV charging station (automotive disciplines)

Nouveau

Learning objectives

- To learn about the charging station installation process and the responsibilities
- To understand the different types of charging: slow, normal, accelerated and fast
- To learn about the different types of connectors and charging stations
- To connect a vehicle and run a charging cycle
- To determine the causes and solutions and perform first level maintenance when charging fails

Main industries

- Vehicle maintenance
- Electrotechnical engineering

Characteristics

Power supply	230 V single-phase/7 kW
Dimensions (H x W x D)	430 x 330 x 165 mm
Weight	26 kg

Presentation

This wall mounted charging station for automotive disciplines is designed for charging an electric vehicle (EV) that has been adapted for teaching purposes.
It allows students to familiarize themselves with the connection procedure, the charging cycle and any possible malfunctions. A heavy-duty domestic socket is also provided for connecting plug-in hybrids.

Description

- 1 x 7 kW wall mounted charging station with 1 T3 connector
- 1 x 14 A heavy-duty domestic socket with circuit breaker
- 1 KAEDRA weatherproof enclosure
- 1 row of 18 modules
- Power, control and protection circuit breakers to be mounted and wired
- Charging station technical documentation including mounting and wiring diagrams
- All components required for the installation are supplied with the charging station

Benefits

- Equipment sized for use with electric vehicles adapted for teaching purposes
- Kit ready to be installed
- Option to carry out electrotechnical engineering project

To order

MDGVE010MVA	Wall mounted EV charging station (automotive disciplines)

Notes

Building management & energy efficiency

Contents

Chapter 3

Building management & energy efficiency

Building management

Building management

Building management & energy efficiency

Building management

KNX case

Training @

Learning objectives

- To understand and master management of lighting and roller blinds with the KNX bus:
  - on-off lighting function
  - lighting control with dimming
  - centralized control
  - control of electric roller blinds
- To learn about the ETS 4 software tool for designing and commissioning a KNX project

Main industries

- Energy engineering
- Electrotechnical engineering
- Home automation

Characteristics

Power supply	230 V/15 VA
Dimensions (H x W x D)	150 x 460 x 340 mm
Weight	5 kg

Presentation

The KNX case is used to configure the basic functions of a KNX installation. The mimic diagram in the case represents an apartment with two lighting zones, and a roller blind simulated by LEDs.

Description

- 1 on-off lighting control actuator module
- 1 lighting dimmer module
- 1 roller blind module
- 1 USB/PC interface module
- 1 TCP IP interface module
- ETS5 software: 1 Lite license provided

Benefits

- Introduction to KNX
- Quick wireless setup
- KNX application preloaded

To order

MD1AVKNX	KNX case

KNX panels

Training @

Learning objectives

- To study the KNX bus
- To commission the equipment
- To set up functions: lighting, switching, dimming, DALI bus, presence detection, heating, blind control
- To create scenarios by combining functions
- To measure energy consumption

Main industries

- Electrical engineering
- Energy engineering
- Energy engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	800 x 1450 x 690 mm
Weight	35 kg

Presentation

KNX panels can be used to set up a KNX installation in a commercial building. The entry-level panel represents a meeting room equipped with standard lighting and heating applications (radiator adapted for training available as an option). The expert panel represents a relaxation area with advanced KNX functions, lighting controlled via a DALI bus, presence and light level detection, blind control, and weather-related functions.

Description

Entry-level panel
- Simple lighting and LED dimming
- Heating regulation (on socket outlet)
- Motion sensing
- Access control
- ETS5 software: 1 Lite license provided

Expert panel
The expert panel needs the entry-level panel or the KNX bench in order to work.
- Simple lighting and dimming with DALI bus
- Lighting and blind regulation based on presence and light level detection
- Weather station

Available as an option
- 2 kW radiator adapted for training purposes, for connection to the entry-level panel

Benefits

- The entry-level panel can be used on its own
- Remote control using a smartphone or tablet app
- Equipment can be combined with the bench in the KNX modular offer (see pages 65 and 66)

To order

MDGDOMKNXECA	Entry-level KNX panel
MDGDOMKNXGSV	Expert KNX panel
MD1AMP010	2 kW radiator adapted for training

KNX mini building
MINIBAT

Training @

Learning objectives

- To learn about KNX communication (address, frame, group of functions)
- To set up temperature and light level control
- To learn how to do a SysML analysis on a system
- To demonstrate the improvement the KNX network brings to lighting and heating
- To assess the power and electrical energy consumed in different scenarios

Main industries

- Energy engineering
- Electrotechnical engineering
- Automation engineering
- Electrical engineering

Characteristics

Power supply	230 V/1.75 kVA
Dimensions (H x W x D)	580 x 1010 x 570 mm
Weight	47 kg

Presentation

The MINIBAT bench is designed for implementing lighting and heating functions in a commercial building.
The lobby area is equipped with a roller blind controlled to ensure constant lighting. The meeting room area is equipped with a controlled fan and radiator.
A touch screen allows students to work on different operating scenarios and measure energy consumption.

Description

- Roller blind
- Halogen spotlight
- KNX light sensor
- KNX switch with 4 buttons
- 100 W radiator
- Fan
- KNX thermostat with separate probe
- KNX control buttons
- External lighting
- KNX external switch
- Switchboard with protection devices
- USB connection for PC
- Wi-Fi router
- KNX connections on double-recess plugs
- 7” KNX touch screen
- ETS5 software: 1 Lite license provided

Front view, doors open

Rear view

Benefits

- A single system for studying simple functions and KNX regulation
- Remote control using a tablet
- Possible expansion of the KNX bus to create mini improvement projects

To order

MDG993EBMB	MINIBAT bench

CI/PRO KNX modular offer
CI/PRO KNX benches

Nouvelle version

Training @

Learning objectives

- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Support frame** 1030 x 910 x 400 mm
Weight	6.5 kg
	Modules 70 x 150 x 245 mm
	0.7 kg

Presentation

These benches are made up of a set of KNX modules adapted for training purposes. They are designed for controlling functions such as lighting, heating, blinds and sockets in commercial buildings.
The KNX CI solution is a standard familiarization package for the most common functions. The KNX PRO solution can be used to highlight how much easier it is to set up compared to traditional wiring.
These packages can be complemented by actual operative parts such as the roller blind offered as an option.

Composition

The 2 global offers, KNX CI and KNX PRO, consist of the modules below. You can also order each module separately according to requirements.

Description	KNX CI	KNX PRO	Ref.
Support frame	1	1	MD1AM000
Single-phase protection module	1	1	MD1AM2001
Module with 4 outputs	1	1	MD1AM3003
Module with 4 x 230 V inputs		1	MD1AM3004
Dimmer module	1	1	MD1AM3005
0-10 V dimmer module		1	MD1AM3042
USB interface module	1	1	MD1AM3007
Smartphone IP router module	1		MD1AM3044
IP controller module		1	MD1AM3049
Roller blind actuator module	1	1	MD1AM3008
Artec double pushbutton module	1	1	MD1AM3009
Artec IR MF8 pushbutton module		1	MD1AM3010
Artec MF4 pushbutton module		1	MD1AM3011
Argus motion sensor module		1	MD1AM3013
Mplan pushbutton module with 4 thermostats	1	1	MD1AM3017
24 V power supply module	1	1	MD1AM3032
Hotel card reader		1	MD1AM6031
3-channel KNX energy metering module		1	MD1AM3046
3 x 50/5 A CT module		1	MD1AM2004
Traditional pushbutton		1	MD1AM6007
15 W lamp	2	2	MD1AMP004
Electric blind	1	1	MD1AMP007
Wireless router module	1		MD1AM2010
42 W halogen or LED lamp		1	MD1AMP009
Lamp + dimmer		1	MD1AMP022
ETS5 Lite software (1 station)	1	1	-
ETS5 PRO software (academic site)		1	-

Output module

Benefits

- Use of digital tools to control a home automation application
- Quick, safe setup
- Rugged wiring on safety sockets

To order

MD1AMLKNXCI	Entry-level KNX modular offer
MD1AMLKNXPRO	Professional KNX modular offer
MD1AAVOLETR	Roller blind adapted for training

Energy efficiency KNX modular offer
EE KNX bench

Nouvelle version

Training @

Learning objectives

- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

Main industries

- Electrotechnical engineering
- Energy engineering
- Electronic engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Support frame**
	1030 x 910 x 400 mm
Weight	6.5 kg
	Modules
	70 x 150 x 245 mm
	0.7 kg

Presentation

This bench is used to explore KNX solutions complying with the requirements of the RT2012 standard, in other words ensuring active energy efficiency and comfort. It consists of the most commonly used functions, which will generate energy savings as a result of being controlled by the KNX protocol. The components are adapted for training purposes in boxes to be installed on a stand, and connected using safety leads. This package can be complemented by actual operative parts such as the roller blind offered as an option.

Composition

The KNX EE global offer consists of the modules below. You can also order each module separately according to requirements.

Description	KNXEE	Ref.
Support frame	1	MD1AM000
Single-phase protection module	1	MD1AM2001
Bus power supply module	1	MD1AM3001
Module with 2 outputs	2	MD1AM3045
4-channel dimmer module	1	MD1AM3042
USB interface module	1	MD1AM3007
Roller blind actuator module	1	MD1AM3008
Double pushbutton module	1	MD1AM3009
8-button + IR pushbutton module	1	MD1AM3010
4-button pushbutton module	1	MD1AM3011
IR occupancy and light level module	1	MD1AM3014
Pushbutton module with 4 thermostats	1	MD1AM3017
24 V power supply module	1	MD1AM3032
Ethernet and controller module	1	MD1AM3049
Weather station	1	MD1AM3047
Servo motor module for valve	1	MD1AM3021
Remote control	1	MTN5761-0000
15 W lamp module	2	MD1AMP004
50 W lamp module	2	MD1AMP009
Electric blind	1	MD1AMP007
Multi-address DALI lighting	1	MD1AMP025
Wireless router module	1	MD1AM2010
PM power meter module	1	MD1AM2003
3-channel KNX energy metering module	1	MD1AM3046
3 x 50/5 A CT module	1	MD1AM2004
ETS5 Lite software (1 station)	1	No ref.
ETS5 PRO software (academic site)	1	No ref.

Benefits

- Use of digital tools to control a home automation application
- Multifunction: pilot control, programming, telemetry, video
- Multiprotocol: KNX, Modbus, DALI, BACnet

To order

MD1AMLKNXEE	EE KNX modular offer
MD1AAVOLETR	Roller blind adapted for training

HOME I/O software plus interface
3D smart home

Nouveau

Learning objectives

- To discover the advantages of home automation over conventional wired solutions
- To set up a KNX installation
- To control the installation remotely using InSideControl
- To optimize energy consumption
- To study the data circuit
- To create a remotely-controlled home automation project

Main industries

- Energy engineering
- Energy engineering
- Electrotechnical engineering

Characteristics

Power supply	24 VDC
Dimensions (H x W x D)	245 x 150 x 70 mm
Weight	0.7 kg (interface module)
Recommended configuration	Operating system from Windows XP SP2 onwards

Presentation

The HOME I/O software with its 8I/8O interface unit can be used to create a 3D virtual home that can be remotely controlled by an external device. The package replaces the actual operative parts very effectively, while retaining the connections to sensors and home automation actuators. Energy consumption varies according to how the home is controlled and the climatic conditions. Time can be speeded up to model real-life operation.
Developed in partnership with the University of Reims and the Real Games company, the HOME I/O software is marketed by Schneider Electric.
This software was endorsed by the French Ministry of Education in 2014.
A KNX bench can be used for external control purposes
(see pages 65 and 66).
A KNX connection module is offered as an option.

Description

- 1 license for the HOME I/O software
- 1 interface unit with 8 discrete inputs and 8 discrete outputs

Optional for connection on a KNX bench
- KNX module with 8 inputs

Benefits

- Use of 3D tools
- Combination of real-life and virtual scenarios
- Gradual implementation of the automated building

To order

MD1AM0029	Home I/O software and interface unit
MD1AM3051	KNX module with 8 inputs

KNX packs

Nouvelle version

Learning objectives

- To analyze the functions and the principle of a home automation installation on a KNX bus
- To install and connect components
- To configure the system according to various scenarios
- To grasp the concepts of energy efficiency

Main industries

- Electrical engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

Power supply	230 V

Presentation

The packs included in this offer allow you to create training versions of KNX installations on your premises, and to set them up in your 3D training cubicles.
These can be complemented by functions such as a weather sensor, clock, CO2 sensor, energy meter, Modbus gateway, web module or smartphone access.

Composition

The KNXD pack is designed to demonstrate the KNX system.
The KNXVR teaching pack will help students gain greater expertise. Its 7" touch screen and dedicated actuator for roller blinds or awnings facilitate understanding of all the functions of the KNX bus as well as the principles of energy efficiency.

Description	KNXD	KNXVR
KNX bus power supply	1	1
USB interface	1	1
IP router		1
Switch with 2 buttons	1	1
Switch with 8 buttons	1	1
Infrared presence sensor	1	1
7" screen		1
4-channel switching actuator	1	1
4-channel dimming actuator	1	1
KNX/DALI gateway		1
Roller blind actuator		1
Opale cabinet, 3 rows	1	1
30 mA/10 A RCBO	1	1
ETS5 Lite software (1 license)	1	1

Benefits

- Low-cost solution
- Predefined package
- Actual KNX installation wiring

To order

MD1AAKNXD	Entry-level KNX pack
MD1AAKNXVR	Upgrade KNX pack

Commercial building energy management 3D cubicle

Commercial SMART HOME

Nouvelle version

Training @

Learning objectives

- To commission, connect, configure, alter an installation
- To manage scenarios
- To apply the SEEN aspects of the RT2012 standard:
  - data displayed via web browser in tandem with the IRIO energy controller
  - metering of main uses: sockets, heating, lighting, water meter
- To apply the ACTION aspects of RT2012 via a KNX bus:
  - standard lighting management
  - electric heating management
  - shutter and lighting management

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/700 VA
Dimensions (H x W x D)	**1 module** 2400 x 1375 x 1625 mm
Weight	400 kg
	2 modules 2400 x 2750 x 1625 mm
	800 kg

Presentation

The SMART HOME 3D cubicle developed in partnership with BEMA is designed to study and learn how to set up a commercial building type installation. The installation is controlled via a KNX bus.
Energy management via IRIO can be used to illustrate applications of the RT2012 energy efficiency standard.
Various configurations are possible for this equipment.

Description

- Mechanically-welded structure, external partitions made of FERMACEL, internal partitions made of laminate
- Window with controllable roller blind, double-glazed with Securit glass
- Floor consisting of a 3-ply plywood laminate panel (washable)
- 2 x 50 W halogen spotlights:
  - 1 spotlight for dimming
  - 1 spotlight connected to terminal block for wiring
- 2 x 300 W halogen spotlights with local control via display unit
- 1 x 1500 W radiant convection heater
- 1 motion and presence sensor, 4 zones
- 1 IRIO energy controller
- Acquisition and servocontrol of light level
- Water meter outdoors
- Modbus, Ethernet energy meters
- KNX bus
- 7” touch screen
- ETS5 Lite software: 1 Lite license provided

Benefits

- Different types of lighting possible on request (halogen, LED, etc.)
- Practical exercises available in digital file format to allow students to work independently
- Openness to fibre optics

To order

UEHGSHT	Please consult us to define the configuration

Building energy telemetry modular offer
IRIO modular offer

Learning objectives

- To set up a remote building management solution
- To view the breakdown of consumption by use: fluids, electricity, etc.
- To grasp the concepts of energy efficiency in the housing sector
- To understand the constraints of the RT2012 energy efficiency standard
- To configure a remote management installation to optimize energy consumption

Main industries

- Energy engineering
- Energy engineering
- Electrical engineering
- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Support frame** 1030 x 910 x 400 mm
Weight	6.5 kg
	Single module 245 x 150 x 70 mm 0.7 kg
	Double module 245 x 300 x 70 mm 1.4 kg

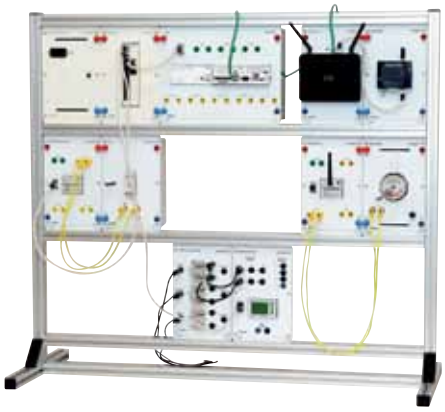
Presentation

The central element of the telemetry modular offer is an IRIO energy controller, which collects and stores the data generated by energy and fluid meters, temperature or pressure sensors.
Using a simple web browser, the IRIO energy controller can be used to operate and manage an installation remotely via a single, easy-to-use interface.

Composition

The MD1AMLIRIO global offer consists of the modules below.
You can also order each module separately according to requirements.

Description	Qty	Ref.
Support frame	1	MD1AM000
IRIO double controller module	1	MD1AM2006
24 VDC power supply module	1	MD1AM4001
Modbus SIM module	1	MD1AM2007
Zigbee SIM module	1	MD1AM2008
Ethernet gateway/Zigbee module	1	MD1AM2009
Modbus splitter box module	1	MD1AM0011
PM3250 power meter module	1	MD1AM2003
Module with 3 current transformers	1	MD1AM2004
Wi-Fi router module	1	MD1AM2010
Water meter operative part module	1	MD1AMP017
Transmitter + temperature sensor module	1	MD1AMP018



iRIO module

Benefits

- Quick, safe setup
- Safe, rugged wiring

To order

MD1AMLIRIO	IRIO telemetry modular offer

Energy efficiency cabinet

Learning objectives

- To set up energy monitoring of devices
- To use and configure a power meter:
  - create a power consumption table
  - implement optimization solutions
  - monitor the results of energy-saving actions over time
  - ascertain the status of an installation

Main industries

- Electrical engineering
- Energy engineering

Characteristics

Power supply	230 V or 400 V
Dimensions (H x W x D)	720 x 570 x 400 mm
Weight	17 kg

Presentation

This electrical distribution cabinet is used to monitor electricity consumption in order to determine how energy-efficient a device is. It is connected to the AC power supply and can be used to supply a training device or an actual device with single-phase or three-phase current. A switch is used to select one of three operating modes:
- on a 16 A single-phase industrial socket
- on a 32 A three-phase industrial socket
- in remote reading mode, connected with cables and busbar grips

The consumption data can be accessed on the EGX300 gateway via an Ethernet socket located on the front of the cabinet.

Description

The cabinet incorporates:
- Circuit breakers
- Circuit switching contactors
- 3 clamp ammeters
- 4 cables with insulated grips
- 3 power supply cables with:
  - 1 x 16 A domestic socket
  - 1 x 16 A single-phase industrial socket
  - 1 x 32 A three-phase industrial socket
  - adaptor for domestic socket provided
- 1 PM9c power meter
- 1 EGX300 gateway with web pages

Benefits

- Mobile equipment
- Ease of setup between the AC power supply and the device to be measured
- Rugged equipment

To order

MDG99140	Energy efficiency cabinet

Electrical distribution software

Nouveau

Learning objectives

- To calculate electrical installations
- To select equipment
- To create technical files

Main industry

- Electrical engineering

Characteristics

Recommended configuration	Windows XP, Vista or Windows 7

Presentation

This free software can be used to calculate electrical distribution installations, and to configure and cost switchboards for the residential or commercial sector.
It can be downloaded from the Schneider Electric website.
For some software, you need to register first in the PRO zone.

Description

Rapsody
For designing and costing a residential or commercial switchboard. This software prints out the switchboard front panel, the single-line diagram and a costing.

ProClima*
For making thermal calculations of electrical cabinets

MyEcodial *
For designing and calculating low voltage electrical installations

VarSet Pro *
For sizing a capacitor bank

Bâti-Résí Suite
For designing and costing low power and high power electrical equipment in residential and commercial buildings (new-build or refurbishment)

SunEsy Design*
For designing a photovoltaic installation

Universal enclosures selection guide
For selecting enclosures and their accessories.

CanBRASS
For costing prefabricated busbar trunking

* Requires registration in the PRO zone.

Benefits

- Free professional software
- Help for training projects

To order

Download links
http://www.schneider-electric.com/fr/fr/download/
http://www.schneider-electric.fr/sites/france/fr/support/logitheque/logiciels.page

Notes

Building communication

Building communication

Building management & energy efficiency

Building communication

FTTH fibre optic packs

Nouveau

Learning objectives

- To lay and establish fibre optic connections
- To test continuity
- To maintain them in working condition
- To make repairs

Main industries

- Electrical engineering
- Electronic engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**FTTH column** 700 x 700 x 500 mm
Weight	2 kg **Service case** 360 x 228 x 90 mm 0.8 kg

Presentation

These FTTH fibre optic hardware architecture packs should be set up in your 3D cubicles, or on a BA13 stand.
An FO service case contains all the tools needed to prepare the fibre.

Description

FTTH riser fibre optic kit
- 1 building shared access point cabinet with operator zone and customer zone
- 1 operator splicing unit
- 1 cassette with 12 fusion-spliced SC-APC pigtails
- 2 fibre optic shared access points with splice tray
- 4 fibre optic terminations for use in homes
- 100 m of ITU-G657A 1x4FO fibre optic cables for indoor connections
- 50 m of 12-fibre ITU-G652D cable for outdoor connections
- 1 x 6 m riser duct
- 2 RJ/fibre optic converters

Service ducting kit
- OPALE cabinet
- Power distribution part: 1 residual current circuit breaker, 6 circuit breakers, RT2012-compliant WISER energy meter, RJ45 Ultra and fibre optic terminals
- Communication part: grade 4 manual communication cabinet

Fibre optic service case
- 1 EXFO fibre optic power meter
- 1 pen-type fibre optic tester (850 nm)
- 1 complete set for cleaning connectors: IBC pen 1.25 mm-2.5 mm, wipes, etc.
- 1 Miller fibre optic stripper
- 1 Kabifix fibre optic cable stripper

Fibre optic service case

Benefits

- Installation in 3D cubicle
- Energy metering solution on embedded Ethernet
- Grade 4 communication cabinet

To order

MD1ALFOFTTHM	FTTH riser
MD1ALFOGTL1	Service ducting kit
MD1ALFOBVAL	Fibre optic service case

LAN-FTTO fibre optic packs

Nouveau

Learning objectives

- To learn about the components of an FO architecture and the various types of fibre and connectors
- To learn how to handle and prepare the fibre: cleaning, stripping and cleaving
- To lay FO cables and check their routing
- To connect connectors on LC fibre
- To find any mechanical stress (VFL)
- To measure the power and attenuation with a photometer and light source

Main industries

- Electrical engineering
- Electronic engineering
- Electrical engineering

Characteristics

Dimensions (H x W x D)	Pack of FO connectors 1000 x 1000 x 1000 mm
Weight	7 kg
	Pack of FO splicers 1000 x 1000 x 1000 mm
	7 kg

Presentation

This offer includes two packs that can be used to create FO connections between two communicating systems in the workshop:
- The prefibred connector technique is used by electricians and gives a fast, efficient result.
- The mechanical splicing technique, which is simple and efficient, has replaced fusion splicing. It is used for repair and maintenance.

Description

Equipment common to both packs
- 1 x 525 m drum of tight-buffered 6-strand OM3 multimode fibre
- 1 9U VDI OPB swing-rack cabinet
- 1 technical logbook with samples of the various connector types
- 2 fibre optic drawers for cabinet and rack
- 2 Cat. 6A copper 12-port copper drawers with a core
- 2 copper/FO transceivers (1 x 19” commercial and 1 industrial for DIN rail)
- 1 VFL for viewing faults with a light effect
- 1 multi-mode photometer with 850 nm light source

Pack of prefibred FO connectors
- 1 special tools case including a cleaver and a VFL
- 1 set of 50 prefibred connectors

Pack of mechanical FO splicers
- 1 special tools case including a cleaver
- 1 set of 24 pigtails + 24 mechanical splicers
- 1 tester

FFTO starter kit
- 100 m of preterminated tight-buffered 6-fibre cable
- 2 fibre optic drawers for cabinet and 19” rack
- 2 copper/fibre optic transceivers
- 1 tool for mechanical splicing
- 12 OM3 SC pigtails
- 6 reusable mechanical splicers
- 1 complete connector cleaning set
- 1 Miller fibre optic stripper
- 1 Kabifix fibre optic cable stripper

Tools case with cleaver

Benefits

- Integrated in the communicating LV switchboard scenario
- Bespoke solution based on local architectures

To order

MD1ALFOP	Pack of prefibred FO connectors
MD1ALFOE	Pack of mechanical FO splicers
MD1ALFOEMN	FTTO starter kit
MD1ALFOCP	Prefibred connector consumables
MD1ALFOCE	Mechanical splicer consumables

Fibre optic training bench

Nouveau

Learning objectives

- To lay and connect optical fibres, coaxial cable and Cat. 6/7 Ethernet cable:
  - fibre optic and copper patch cables
- To see how RJ45 and coaxial cables perform compared to fibre optics
- To select technologies according to the type of project
- To mark up circuits
- To test level 1 continuity: VFL
- To compile a fibre optics evaluation report:
  - photometry
  - reflectometry
  - acceptance document
- To study the reception and transmission of OFDM signals (DTTV)
- To learn about video streaming over IP
- To analyze IP streams

Main industries

- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	2030 x 1250 x 1000 mm
Weight	320 kg

Presentation

The FO training bench incorporates all the FTTO/FTTH architectures of a complete network installation with the active equipment. One side represents the NRO operator side. The other side represents the building side.
The entry-level bench is equipped with a number of physical structures (coaxial, copper and fibre optic) and can be used to highlight the advantages of fibre optics. A number of packages are offered on the next page to make up the equipment with the IPTV, coaxial and server options. This equipment, developed by MTFibertech, is marketed by Schneider Electric.

Description

Entry-level FO bench

- 1 cupboard on castors with 2 sides, 8 lockable doors
- 1 interior lighting system on each side
- 1 modular distribution board with 40 A/30 mA residual current circuit breaker, 2 x 16 A circuit breakers, equipotentially bonded and earthed by an aluminium grille
- 1 set of connecting cable ducts
- 1 set of hard-wired 230 VAC sockets
- 4 GBE media converters with 4 x 1550/1310 nm bi-directional SFP
- 1 holder and operator splicing cassette (OMDF) with 12 fusion-spliced SC-APC pigtails + bushings
- 1 cable slack spool for storing excess lengths
- 2 SM G652D FO reels (1000 m/2000 m), SC-APC connectors
- 4 LCPC/SCAPC fibre optic patches, 8 SCAPC/SCAPC patches
- 1 x 12FO ITU-G652D fibre optic network cable (50 m)
- 1 network operator building shared access point with splicing cassette, 1:4 splitter, 12 SCAPC pigtails, 24 SCAPC bushings
- 1 building operator building shared access point with splicing cassette, 8 pigtails, 12 SCAPC bushings
- 1 connected FO cable for indoor use ITU-G657A 1x4FO (shared access point-termination) + 50 m in reserve
- 1 Home Premium LexCom VDI cabinet
- 2 fibre optic terminations with 4 SC-APC pigtails
- 2 double RJ45 sockets with S-One connector
- 2 single RJ45 sockets with S-One connector
- 1 x 10/100/1000 switch with 5 ports (VDI cabinet)

Building side

Benefits

- Comprehensive training, gradual method, fun content (TV, Internet, IPTV)
- Allows several groups of students to work simultaneously
- Lockable cupboard with storage areas

To order

MD1ALFOBFTT	Entry-level fibre optic bench
MD1ALFOBOIPTV	IPTV option
MD1ALFOBOCX	Coaxial option
MD1ALFOBOSV	Server option
MD1ALFOBMES	FO bench commissioning

Fibre optic training bench

Nouveau

Learning objectives

- To lay and connect optical fibres, coaxial cable and Cat. 6/7 Ethernet cable:
  - fibre optic and copper patch cables
- To see how RJ45 and coaxial cables perform compared to fibre optics
- To select technologies according to the type of project
- To mark up circuits
- To test level 1 continuity: VFL
- To compile a fibre optics evaluation report:
  - photometry
  - reflectometry
  - acceptance document
- To study the reception and transmission of OFDM signals (DTTV)
- To learn about video streaming over IP
- To analyze IP streams

Main industries

- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	2030 x 1250 x 1000 mm
Weight	320 kg

Presentation

The entry-level FO bench on the previous page incorporates all the FTTO/FTTH architectures of a network installation with the active equipment. The packages shown on this page allow you to add IPTV, coaxial and server options to the basic equipment.
This equipment, developed by MTFibertech, is marketed by Schneider Electric.

Description

IPTV option
- 1 manageable L2 switch (Vlan, QoS, port mirroring, IGMP, etc) with 8 x 10/100/1000 ports
- 1 amplified indoor/outdoor DTTV aerial
- 1 DTTV/IPTV streamer
- 2 IPTV decoder receivers
- 2 x 19" LED TVs with stand
- 1 single RJ45 socket with S-One connector
- 1 RJ45 patching system
- 3 reels of Cat. 6 or 7 flexible cable (90 m, 30 m, 20 m)
- 6 RJ45-RJ45 shielded connectors

Coaxial option
- 1 boosted indoor/outdoor DTTV aerial
- 1 x 1310 nm/6 dBm fibre optic converter transmitter (48-860 MHz)
- 1 analog DTTV-PAL converter
- 1 set of HF splitter boxes
- 2 x 19" LED TVs with stand (if IPTV option not present)
- 1 TV/radio coaxial connector
- 1 coaxial patching terminal block
- 3 reels of 75 Ohm coaxial cable (3 x 100 m)
- 1 R-TV booster splitter module for Grade 3 wiring with 6 x RJ45 (5-860 MHz)
- 1 RJ45-IEC TV cable
- 1 x 1310-1550 nm fibre optic receiver (VDI cabinet)

Server option
- 1 PC with Linux operating system
- 1 USB stick with configurations and installation manual for creating and configuring a DHCP/FTP/SIP server
- VLC used in streaming/reception mode
- Wireshark used to analyze streams

Benefits

- Comprehensive training, gradual method, fun content (TV, Internet, IPTV)
- Allows several groups of students to work simultaneously
- Lockable cupboard with storage areas

To order

MD1ALFOBFTT	Entry-level fibre optic bench
MD1ALFOBOIPTV	IPTV option
MD1ALFOBCX	Coaxial option
MD1ALFOBSV	Server option
MD1ALFOBMES	FO bench commissioning

Fibre optic accessories
Fusion splicers

Nouveau

Learning objectives

- To prepare the optical fibre
- To test a fibre optic network
- To maintain it in working condition
- To establish connections

Main industries

- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	Core alignment fusion splicer 137 x 130 x 155 mm
Weight	1.8 kg
	Sheath-type fusion splicer 60 x 110 x 140 mm
	0.65 kg

Presentation

These accessories are offered alongside FO packs for creating and checking your work on the fibre optic bench, the communicating LV switchboard and 3D cubicles.

Description

Core alignment fusion splicer + cleaver
- 1 fusion splicer + 1 cleaver in rigid case
- 1 x 4.1" (10.4 cm) LCD touch screen
- 7 s splice time, 28 s dual-oven heat shrink cycle, IP52 protection
- 1 pair of replacement electrodes (6000 splices)
- USB2
- Built-in video devices (2.1 kg) with battery
- 1 automatic rotary blade (48,000 cutting operations)
- 1 lid for fibre scrap collector

Eco sheath-type fusion splicer + cleaver
- 1 touch screen fusion splicer in flexible case
- FHS-025 removable clamps
- 1 ADC-1340A power supply
- ER-11 replacement electrodes
- 1 FCT-201 splice protection sleeve tray
- 1 fixing strap
- 1 precision cleaver (video output)
- 1 manual on CD

Drive kit for fusion splicer
- 200 heat shrink splice protection sleeves
- 20 m of 12FO cable, 24 x 2 m pigtails, 2 cassettes

Benefits

- Professional tools
- Equipment selected for Schneider Electric FO offers

To order

MD1ALFOSD15	Core alignment fusion splicer + cleaver
MD1ALFOSDG	Sheath-type fusion splicer + cleaver
MD1ALFOENT	Drive kit for fusion splicer

Fibre optic accessories
FO measuring equipment

Nouveau

Learning objectives

- To prepare the optical fibre
- To test a fibre optic network
- To maintain it in working condition
- To establish connections

Main industries

- Electronic engineering
- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Telecommunications engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Certifier**
Weight	80 x 80 x175 mm
	0.4 kg
	Reflectometer
	130 x 252 x 56 mm
	1 kg

Presentation

These accessories are offered alongside FO packs for creating and checking your work on the fibre optic bench, the communicating LV switchboard and 3D cubicles.

Description

Certifier
- Qualifier of active and passive networks
- Copper and fibre optic via universal SFPs
- Load test via active devices (switches) for web applications, VoIP, IP camera and IP video

Reflectometer
- Fibre optic link mapping
- dB attenuation and length of fibre
- Event location and qualification:
  - cutting operations
  - connectors and fittings
  - seams, splices, fittings
  - mechanical stress

Photometer, inspection probe
Available on request

Certifier

Reflectometer

Benefits

- Professional tools
- Equipment selected for Schneider Electric FO offers

To order

MD1ALFAI4	Certifier
MD1ALFODTR	Reflectometer

19” VDI pack

Learning objectives

- To identify and select equipment (UPS, switches, sockets)
- To set up VDI racks, wire RJ45 connectors
- To address the IP switch
- To mark up, patch and test the installation
- To study different VDI networks depending on the office location

Main industries

- Electrical engineering
- Electronic engineering
- Electrotechnical engineering
- Electronic engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	800 x 600 x 600 mm
Weight	12 kg

Presentation

The 19” VDI pack is designed for studying VDI functions encountered in industrial or commercial installations. It highlights the general organization of a VDI network.
Instruction is based on an actual specification: the STS for an office block.

Description

The VDI pack consists of:

- 1 x 12U 19” fixed chassis OPB cabinet, 646 x 600 x 500, glazed door
- 1 backplate for 12U 19” OPB cabinet
- 1 blanking plate with ventilation louvres at the top
- 1 blanking plate with brush seal at the bottom
- 1 sliding panel equipped with 24 FTP STP RJ45 ports
- 1 TELECOM sliding panel with 50 ports on 2 rows
- 1 panel with 8 230 V/16 A FR sockets, protected illuminated switch
- 2 cable guide panels with 4 rings
- 2 rack pack kits for UPS
- 1 fixed shelf 250 mm deep 15 kg load
- 3 metal spacer panels
- 3 panels for vertical cable organization
- 1 DLINK switch with 24 x 10/100 BASE-TX managed Ethernet ports
- 1 x 1500 VA APC Smart-UPS
- 1 pack of 24 blue RJ45 dust covers
- 1 pack of 24 green RJ45 panel dust covers
- 1 pack of 10 earthing kits for 19” panel
- 1 stripping tool for connecting LSA connectors
- 24 x 1 m cables, Category 6 RJ45/RJ45, F/UTP shielding
- 24 FTP Category 6 RJ45 connectors

Benefits

- Complete predefined package
- Low-cost solution

To order

MD1ALVDIC19	19” VDI pack

Notes

Energy efficiency

Energy efficiency

Building management & energy efficiency

Energy efficiency

Greenhouse management system
SERRALIS

Nouveau

Learning objectives

- To develop EE activities:
  - studying heat transfer by convection, radiation and conduction
  - studying energy performance, free heat gains, metering
- To develop AC activities:
  - studying insulating materials
  - studying ventilation
- To develop Innovation & Ecodesign activities:
  - working on INVENTOR and SOLIDWORK
  - studying the opening mechanism

Main industry

- Energy engineering

Characteristics

Power supply	230 V/300 VA
Dimensions (H x W x D)	**Operative part** 430 x 630 x 365 mm
Weight	13 kg
	Control part 255 x 560 x 460 mm
	11 kg

Presentation

The SERRALIS system reproduces the functions of a greenhouse with heating, lighting and ventilation. It allows students to work on three different elements of Sustainable Development technology: energy, communication and materials.

Description

Operative part
- Wooden frame with transparent removable partitions and access flap at the top
- 1 x 15 W grow light bulb
- 1 x 50 W heater cable
- 1 x 15 W infrared bulb
- 1 temperature sensor
- 1 x 1.3 W extractor fan
- 1 flap position sensor

Control part
- 1 case with Zelio PLC, discrete and analog I/O
- 1 GSM module
- 1 energy meter
- 1 Modbus module
- 1 measuring point
- 1 supervision application provided to control the functions of the operative part, with Excel charts

Available as an option
A LabVIEW kit to make use of the temperature measurements

SERRALIS with cabinet for LabVIEW option

Benefits

- 50 hrs of practical exercises offered in energy, materials, communication topics
- 3D digital modelling
- Tools offered: INVENTOR, LabVIEW and SOLIDWORKS

To order

MD1AEMS	SERRALIS system
MD1AEMSLV	LabVIEW option

Ventilation energy efficiency case

Learning objectives

- To highlight an energy efficiency solution
- To measure AC power supply and motor U/I depending on the power circuit
- To use a power meter:
  - energy measurements
  - comparison of consumption levels
- To configure the drive in energy-saving profile

Main industries

- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Energy engineering

Characteristics

Power supply	230 V/0.18 kW
Dimensions (H x W x D)	830 x 500 x 390 mm
Weight	27 kg

Presentation

This case can be used to highlight the energy savings that can be achieved in a pumping or ventilation installation.
A comparison is made between electromechanical control via contactor and electronic control with variable speed drive.
The ventilation flow is set via an IRIS damper or variable speed control.

Description

The case comprises:
- 1 PM3250 power meter
- 1 direct circuit breaker-contactor feeder
- 1 feeder via 0.18 kW Altivar 312
- 1 direct/variable speed switch
- 1 x 0.18 kW fan
- Measuring points on safety sockets
- 1 EGX300 Ethernet gateway with web server
- 1 USB/RJ45 cable for connecting to the drive
- 1 USB/RJ45 cable for connecting to the gateway
- PowerSuite parameter-setting software supplied on CD-ROM

Benefits

- Quiet ventilation equipment
- Understanding of the advantages of variable speed control
- Operating data downloaded to a PC

To order

MD1ATVEE	Ventilation energy efficiency case

Ventilation energy efficiency modular offer

Learning objectives

- To highlight an energy efficiency solution
- To measure AC power supply and motor U/I depending on the power circuit
- To use a power meter:
  - energy measurements
  - comparison of consumption
- To configure the drive in energy-saving profile

Main industries

- Energy engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

Power supply	230 V/0.18 kW
Dimensions (H x W x D)	**Support frame**
	910 x 1030 x 400 mm
Weight	6.5 kg
	Modules
	245 x 150 x 70 mm
	0.7 kg

Presentation

This equipment is designed to create the equivalent of the energy efficiency case as a mock-up and prototype.
The mock-up can be used to highlight the energy savings that can be achieved in a pumping or ventilation installation.
A comparison is made between electromechanical control via contactor and electronic control with variable speed drive.
The ventilation flow is set via an IRIS damper or variable speed control.

Composition

The MD1AMLATVEE kit consists of the modules listed in the table below.
The set is supplied with:
- 1 USB/RJ45 cable for connecting to the drive
- 1 USB/RJ45 cable for connecting to the gateway
- PowerSuite parameter-setting software supplied on CD-ROM

You can also order each module separately according to requirements.

Description	Qty	Ref.
Support frame	1	MD1AM000
Magnetic protection module	1	MD1AM1004
Thermal overload relay module	1	MD1AM1007
Contactor module	1	MD1AM1008
PM power meter module	1	MD1AM2003
3 x 50/5 A CT module	1	MD1AM2004
EGX300 gateway module	1	MD1AM2005
Altivar 312 module	1	MD1AM5001
Variable speed drive control module	1	MD1AM7001
Motor starter control module	1	MD1AM7004
24 VDC power supply module	1	MD1AM4001
Motorized fan with column and ball	1	MD1AMP014

Benefits

- Designed for a mock-up and prototype exercise
- Quiet ventilation equipment
- Operating data downloaded to a PC

To order

MD1AMLATVEE	Ventilation energy efficiency modular offer

Ventilation bench with variable speed control

Learning objectives

- To study the properties of a centrifugal fan
- To measure flows and power consumption
- To study the motor starter functions
- To demonstrate how variable speed control contributes to energy savings
- To study an AHU with energy recovery
- To calculate load losses
- To check the installation EMC levels
- To use the ECO8 software to:
  - compare the performance of DOL starting/ ATV61 drive
  - calculate the economic data

Main industry

- Electrotechnical engineering

Characteristics

Power supply	400 V/0.75 kVA
Dimensions (H x W x D)	2500 x 1200 x 850 mm Height of chimney: 1850 mm
Weight	133 kg

Presentation

This bench is used to study the ventilation installation in a commercial building, and to calculate the return on investment of a drive using the ECO8 software.
The bench chimney can be removed for ease of handling.
Two drive modules are available: ATV21 which has a digital display, and ATV61 which has an LCD display.
The fan is controlled by an electromechanical sequence or by a variable speed drive dedicated to pump and fan applications. The flow is regulated mechanically using a valve. An air flow sensor at the top of the chimney can be used to compare the various settings.

Description

- Bench mounted on a frame with locking castors
- 1 x 0.75 kW motorized fan with noise attenuation filter
- 1 electrical cabinet with protection sequence
- 1 ATV21 or 61 HVAC drive with remote display
- 1 power meter with its CTs
- 1 pressure controller with its IRIS-controlled probes
- PowerSuite software for configuring the drive
- ECO8 software for calculating depreciation

Benefits

- Mobile equipment
- Equipment with realistic proportions
- Air flow study

To order

MD1AA750A2	Ventilation bench with Altivar 21
MD1AA750A6	Ventilation bench with Altivar 61

Air handling unit
AHU system

Learning objectives

- To study the functions of an air handling unit:
  - refrigeration, air flow and electrical circuits
- To commission, configure and maintain the installation
- To study building management PLCs and communication networks
- To calculate energy consumption and performance coefficients

Main industries

- Electrical engineering
- Electrotechnical engineering
- Energy engineering

Characteristics

Power supply	400 V/3 to 12 kW depending on options
Dimensions (H x W x D)	Dep. on configuration
Weight	Dep. on configuration

Presentation

The AHU system is used to learn about and commission a single-flow air handling unit with filtration, heating, cooling, humidification and dehumidification.
Several variants of AHU are available as options. A customized metering compartment can be included.
The control part controls and monitors operation of the AHU remotely. Interaction between the management PLC and the sensors/actuators is via a LonWorks fieldbus.
The equipment is made by ERM and marketed by Schneider Electric.

Description

Standard version

- Pre-filtration and filtration compartment
- Supply air compartment with sound trap
- Control cabinet with centralized building management, TAC Xenta 721 PLC, web server
- Portable operator console
- Supervisory software
- Measuring points on all the compartments

Options

- Water-cooling battery compartment
- Electrical heater battery compartment
- Water-heating battery compartment
- Humidifier compartment
- Heat pump for heater battery or cooling battery
- Metering compartment:
  - 1 differential pressure sensor
  - 1 temperature sensor
  - 1 relative humidity sensor
- Measuring instrument kit:
  - 1 thermometer/hygrometer
  - 1 thermometer/anemometer
  - 1 micromanometer
- Recording kit:
  - 1 reader/recorder of pressure, flow, relative humidity and temperature

Benefits

- Real system adapted for training with HVAC PLC
- Remote control and monitoring via web server
- Flexible composition depending on compartments selected

To order

MD1ERMSF	Single-flow air handling unit
MD1ERMWT00	Water-cooling battery compartment
MD1ERMWT01	Electrical heater battery compartment
MD1ERMWT02	Water-heating battery compartment
MD1ERMWH00	Steam humidifier compartment
MD1ERMWT05	Heat pump for cooling or heater battery
MD1ERMWM00	Metering compartment
MD1ERMWM01	Measuring instrument kit
MD1ERMWM02	Recording kit

Heating control bench

Learning objectives

- To understand how regulation works
- To make use of and program the control functions of a Premium PLC

Main industries

- Electrotechnical engineering
- Automation engineering
- Energy engineering

Characteristics

Power supply	230 V/2.4 kVA
Dimensions (H x W x D)	1930 x 680 x 630 mm
Weight	120 kg no-load

Presentation

The operational side of this bench represents a scaled-down central heating installation. The control side consists of a TSX57 PLC and an HMI terminal for controlling the system.
An Ethernet connection is used to control the bench remotely.
The PID loops have been designed in the following configurations:
- Central heating with indoor temperature sensor and analog action on the three-way valve
- Central heating with indoor temperature sensor and discrete action on the three-way valve
- Central heating with outdoor temperature sensor and heat curve (acting on the three-way valve)

Description

The bench is mounted on a frame with locking castors.
- Operative part:
  - 15 L storage water heater
  - expansion tank with safety unit
  - 3-way motorized proportional action valve
  - circulator controlled by a drive
  - 500 W radiator disturbed by 3 fans
  - 6 temperature sensors
  - circulator voltage-current measuring points
  - SP, PV, OV analog measuring points
- Control part:
  - 1 protection and control sequence
  - 1 x 0.18 kW variable speed drive
  - 1 TSX57 Premium Ethernet PLC with 8 inputs/16 outputs (discrete) and 8 inputs/8 outputs (analog)
  - 1 x 10.4” colour touchscreen graphic terminal

Front view

Rear view

Benefits

- Industrial control system
- Quick reaction time
- All the control loops are represented

To order

MD1AE895PR	Heating control bench

Air/air heat pump bench

Learning objectives

- To learn how an air/air heat pump works
- To study heat exchanges
- To study the main components: compressor, condenser, expansion valve, evaporator
- To size the evaporator and the condenser using the technical documentation
- To configure the regulator, optimization
- To test the fluid charge, influence on performance
- To study the energy consumption, T/P refrigeration cycle
- To calculate the hot/cool air/fluid COPs
- To demonstrate the energy savings achieved with a heat pump

Main industries

- Energy engineering
- Electrical engineering
- Energy engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/3.2 kW
Dimensions (H x W x D)	1350 x 1180 x 670 mm
Weight	232 kg

Presentation

This air/air heat pump adapted for training purposes is created from commercially-available standard components.
The heat pump is controlled by a controller. It is supplied with a building management system to acquire readings. An HMI on the front face can be used to monitor temperatures, automatic defrosting and alarms.

Description

The bench is mounted on a frame with locking castors.
It consists of the following equipment:

- 2 fixed-speed fans, 160 m^3/h
- Compressor, condenser, expansion valve, evaporator
- R134a refrigerant
- 2 air flowmeters
- 2 low and high pressure manometers
- 2 low and high pressure sensors
- 1 defrost solenoid valve
- 1 LED for checking the presence of gas
- 1 suction line accumulator
- 1 dehydrator on a gas supply
- 4 gas temperature sensors
- 6 air temperature sensors
- 1 evaporator defrost temperature sensor
- 1 M238 programmable controller
- 1 STU655 3.5” HMI terminal
- 1 LabVIEW application

Option
Building management software for data acquisition and processing

Benefits

- Transparent equipment allowing components to be seen
- Numerous measuring points
- 2 different operating modes: dynamic and standard

To order

MD1AAPACAA238	Air/air heat pump with M238 pilot control
MD1AACHEPACRV	Building management software

Twin-flow ventilation bench

Nouveau

Learning objectives

- To study how ventilation affects air quality
- To learn about the passive exchanger and its function
- To study heat exchanges in standard mode and dynamic mode:
  - exchanger efficiency calculation
  - power consumption
- To demonstrate the influence of the extracted air temperature and the new air temperature
- To study regulation: standard mode, regulation mode
- To compare single-flow/twin-flow operation

Main industries

- Electrical engineering
- Energy engineering
- Energy engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/0.1 kW
Dimensions (H x W x D)	1350 x 1180 x 670 mm
Weight	195 kg

Presentation

With this twin-flow ventilation bench, both air flows which exchange their heat energy in the passive exchanger can be viewed.
Different types of sensor are installed on each air flow, indicating the incoming and outgoing air temperatures and the flow rate.
The air flows are variable and controlled independently (twin-flow or single-flow operation).
All this information can be found on the HMI terminal.

Description

The bench is mounted on a trolley with braked castors. It consists of:
- 2 x 0-90 m^3/h variable-speed fans controlled by the HMI
- 1 passive exchanger conforming to RT2012
- 2 air flowmeters
- 4 temperature sensors
- 1 CO2 sensor
- 1 M238 programmable controller
- 1 STU655 3.5” HMI terminal
- 1 LabVIEW application

Option
Building management software for data acquisition and processing

Benefits

- Transparent equipment allowing components to be seen
- Intuitive control and interactivity of practical exercises
- Ventilation bench can be connected to the air/air heat pump bench

To order

MD1AAVMC	Twin-flow ventilation system
MD1AACHEPACRV	Building management software

Residential

Residential

Building management & energy efficiency

Residential

Residential VDI LEXHOME case
ALVIDIS case

Learning objectives

- To distribute various media (telephone, television, Internet) on RJ45 terminal ports with the aid of a concrete specification
- To configure the system according to various scenarios
- To study and configure an IP camera

Main industries

- Electronic engineering
- Electrical engineering
- Energy engineering

Characteristics

Power supply	230 V/20 VA
Dimensions (H x W x D)	195 x 503 x 602 mm
Weight	14 kg

Presentation

This case is designed to demonstrate the various media distribution solutions in a residential or small business environment.
It is equipped with an IP camera which can be used to create a network and remote access via a web browser.

Description

- 1 automatic Alvidis with 8 ports
- 2 RJ45 connectors on holders
- 1 switch with 4 + 1 ports
- 1 ITD (end of line)
- 1 tripler
- 1 telephone filter
- 1 IP camera
- Cables for connecting a telephone, a television and a PC

Benefits

- Compact equipment
- Numerous wiring combinations
- Can be integrated in a training VDI installation

To order

MD1ALVIDISA	ALVIDIS case

Residential and small business equipment pack

Learning objectives

- To be able to read a wiring diagram, a layout drawing, manufacturer data sheets
- To be able to analyze an installation in accordance with standard NFC 15-100
- To install and wire components (professional skills)
- To adjust components, timers
- To test the installation
- To create an electrical wiring file with the BatiResi software:
  - switchboard front panel
  - composition of feeders, etc.

Main industries

- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

Power supply	230 V
Dimensions (H x W x D)	990 x 1000 x 1000 mm
Weight	3 kg

Presentation

The residential and small business equipment pack can be used to create an electrical installation for the residential or small business sector.
The switchboard, sockets and switches should be installed on partitions or in a 3D cubicle.

Description

- 1 single-phase DB90 incoming circuit breaker
- 1 EDF subscriber meter
- 1 meter and circuit breaker control panel
- 1 switchboard with 3 rows of 13 modules
- 4 x 16 A 30 mA RCBOs
- 2 x 20 A 30 mA RCBOs
- 5 x 10 A circuit breakers, 6 x 16 A circuit breakers
- 1 impulse relay
- 1 impulse relay with central control
- 1 central control auxiliary
- 1 programmable timer switch
- 2 timers
- 1 switch-off warning
- 1 light-sensitive switch
- 1 load shedder (2 channels)
- 5 CT contactors (2 NO)
- 7 two-way switches
- 6 pushbutton switches
- 3 illuminated pushbutton switches
- 1 double pushbutton switch
- 6 x 2P+E 10/16 A domestic sockets
- 10 x 20 A cable outputs
- 50 airtight boxes 67 mm diam, 40 mm deep
- 10 ceiling boxes with lighting appliance socket
- 10 2P+E lighting appliance plugs + E27 screw-in lampholders

Benefits

- Low-cost offer
- Predefined package
- Free software

To order

MDG99120	Residential and small business pack

Residential modular offer

Nouvelle version

Learning objectives

- To set up a distribution switchboard
- To study and wire components in the 1 to 2-room housing kit:
  - 1-pole and 2-pole one-way switches, two-way switches, power socket
  - series/parallel connections
- To study and wire components in the 3 to 4-room housing kit:
  - impulse relay
  - programmable timer switch

Main industries

- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

Power supply	230 V
Dimensions (H x W x D) Weight	**Frame** 1030 x 910 x 400 mm 6.5 kg
	Modules 245 x 150 x 70 mm 0.7 kg

Presentation

The residential modular offer can be used to study and quickly install the components of a residential electrical installation.
The kits are complementary, ranging from the simplest functions in a home to the most complex.
They can be complemented by the small business and energy efficiency kits described on the next page.

Composition

The kits consist of the modules below. You can also order each module separately according to requirements.

Description	1/2-rm kit	3/4-rm kit	Ref.
Support frame	1	1	MD1AM000
Circuit breaker + meter module	1		MD1AM6001
10 A circuit breaker module	3	1	MD1AM6002
16 A circuit breaker module	1	1	MD1AM6003
16 A/30 mA residual current CB module	2	2	MD1AM6004
20 A/30 mA residual current CB module	1		MD1AM6005
Impulse relay module		1	MD1AM6006
Impulse relay module (central ctrl)		1	MD1AM6007
Prog. timer switch module		1	MD1AM6008
Modular contactor module		1	MD1AM6009
Two-way switch module	5	2	MD1AM6014
Pushbutton module		6	MD1AM6015
Double PB module		1	MD1AM6017
16 A power socket module	4	2	MD1AM6018
15 W lampholder module	4	5	MD1AMP004

Benefits

- Quick, safe setup
- Rugged wiring on safety sockets
- Option of adding the modules described on page 99

To order

MD1AM6121	1/2-room housing modular offer
MD1AM6122	3/4-room housing modular offer

Residential and small business offer
Energy efficiency

Nouvelle version

Learning objectives

- To optimize energy consumption through the use of suitable products:
  - programmer
  - light-sensitive switch
  - timer
  - timer switch, etc.
- To grasp the concepts of energy efficiency
- To study and wire components in the residential and business kit:
  - impulse relay with PB with LED
  - timer with switch-off warning
  - light-sensitive switch
- To study and wire components in the EE residential and small business kit:
  - motion sensor
  - thermostat with remote probe

Main industries

- Electrotechnical engineering
- Electrical engineering
- Electrical engineering in the building sector

Characteristics

Power supply	230 V/2 kVA
Dimensions (H x W x D)	**Frame**
	1030 x 910 x 400 mm
Weight	6.5 kg
	Modules
	245 x 150 x 70 mm
	0.7 kg

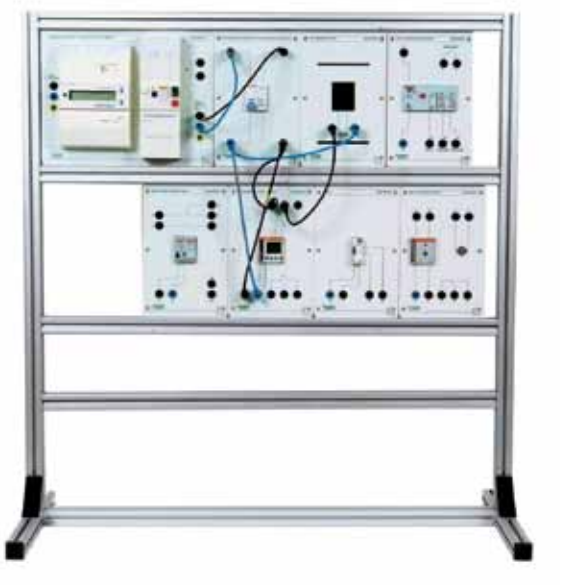
Presentation

The energy efficiency residential and small business modular offer can be used to study energy management in a relatively complex electrical installation, either residential or small business type.
The energy saving and optimization aspects can be illustrated on the heating and lighting functions.

Composition

The residential and small business (RSB) and energy efficiency (EE) kits consist of the modules below.
You can also order each module separately according to requirements.

Description	RSB kit	EE RSB kit	Ref.
Support frame	1	1	MD1AM000
Circuit breaker + meter module		1	MD1AM6001
10 A circuit breaker module	1	2	MD1AM6002
16 A circuit breaker module	4	2	MD1AM6003
16 A/30 mA residual current CB module		1	MD1AM6004
Prog. timer switch module		1	MD1AM6008
Modular contactor module	4	2	MD1AM6009
Timer module	2	2	MD1AM6010
Light-sensitive switch module	1	1	MD1AM6012
Load shedder module, 1 channel	1	1	MD1AM6013
Two-way switch module		2	MD1AM6014
Pushbutton module		2	MD1AM6015
Illuminated PB module	3	3	MD1AM6016
16 A power socket module		2	MD1AM6018
Motion sensor module		1	MD1AM6019
Timer module with switch-off warning	1		MD1AM6020
Room temperature sensor module		1	MD1AM6029
Thermostat module		1	MD1AM6030
15 W lampholder module		4	MD1AMP004
Radiator adapted for training (OP)		1	MD1AMP010



Benefits

- Quick, safe setup
- Rugged wiring on safety sockets
- Option of adding modules from the Modular Offer catalogue

To order

MD1AM6123	Residential-small business modular offer
MD1AM6130	EE residential-small business modular offer

Energy management 3D cubicle
Residential SMART HOME

Nouveau

Training @

Learning objectives

- To establish connections and commission a home automation installation
- To configure the installation
- To manage different scenarios
- To apply the SEEN aspects of the RT2012 energy efficiency standard:
  - To measure and display data on a WISER screen
  - metering on the various feeders: heating, lighting, water
- To apply the ACTION aspects of RT2012 via WISER:
  - electric heating and hot water cylinder
  - shutters and lighting

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/700 VA
Dimensions (H x W x D)	**1 module** 2400 x 1375 x 1625 mm
Weight	400 k
	2 modules 2400 x 2750 x 1625 mm
	800 kg

Presentation

The energy management 3D cubicle reproduces a residential environment so students can study and install home automation and energy management functions in accordance with the RT2012 energy efficiency standard.
2 modules can be combined to expand the possible activities.
The 3D cubicle has been developed in partnership with BEMA and is marketed by Schneider Electric.

Description

- Mechanically-welded structure, external partitions made of FERMACEL, internal partitions made of laminate
- Window with controllable roller blind, Securit double glazing
- Metering on the main feeders via WISER LINK
- LexComHome automatic VDI patching system
- Housing service duct with the various protection devices and components needed for it to work properly
- Indoor/outdoor lighting management using radio frequency (ODACE RF and/or ODACE and/or WISER SMART)
- 1 or 2 x 750 W-1500 W radiant convection heaters
- Electric heating and hot water cylinder managed by load shedder or WISER SMART
- 1 indoor and outdoor door entry phone
- 1 presence sensor

Benefits

- Mock-up upgraded from a wired solution to a wireless solution
- Practical exercises available in digital file format to allow students to work independently
- Openness to fibre optics

To order

UEHGSHR	Please consult us to define the configuration

Energy management in the home according to RT2012
WISER pack

Learning objectives

- To set up and configure the pack in the context of a teaching project simulating a home
- To study the requirements of the RT2012 energy efficiency standard
- To find solutions for reducing energy consumption
- To control the installation remotely in order to optimize consumption
- To understand the ZIGBEE protocol

Main industries

- Electrical engineering
- Electronic engineering
- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	400 x 600 x 600 mm
Weight	6 kg
Recommended configuration	Internet connection

Presentation

The WISER pack is used to measure electricity consumption and control the most energy-intensive functions in a home conforming to RT2012:
- electric heating
- domestic hot water tank
- controlled sockets (lighting, electronic or household appliances, etc.)

It helps ensure compliance with article 23 of RT2012 concerning keeping occupants informed.
The components communicate with one another via the ZIGBEE protocol. The controller needs to be connected to the Internet so it can be controlled remotely.
A smartphone or tablet app can be downloaded free of charge. Data is stored in the cloud and updates are sent automatically.

Description

- 1 WISER controller with web server
- 2 electric heating actuators
- 2 thermostats
- 1 hot water tank actuator
- 2 controlled sockets
- 1 measurement module with 3 open CTs

Benefits

- Installation in a 3D cubicle
- Ease of installation with video tutorials
- Free firmware and app

To order

MDG99WISER	WISER pack

Energy management in the home
WISER bench

Nouveau

Learning objectives

- To analyze the energy context and the challenges of RT2012
- To size a WISER configuration to suit the home
- To set up WISER components
- To control the DHW and heating
- To measure energy consumption
- To control a power socket: possible savings and overload cut-off
- To study the ZIGBEE protocol

Main industries

- Electrical engineering
- Electronic engineering
- Energy engineering
- Electrotechnical engineering
- Energy engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Main panel** 630 x 560 x 400 mm
Weight	8 kg
	Heating panel 600 x 450 x 400 mm
	5 kg
	DHW panel 400 x 350 x 400 mm
	3 kg

Presentation

The WISER bench helps ensure compliance with articles 23 and 24 of the RT2012 energy efficiency standard, and allows students to study controlling a home using the WISER energy management home automation solution. It can be used to measure, view and control heating, domestic hot water and power sockets.
The settings are entered locally on the WISER controller with a PC. Remote control is possible via the app on a tablet or smartphone, after connecting the controller to the school/college network.

Description

The WISER bench consists of 3 panels with a cascaded power supply, comprising the following devices:
- Main panel:
  - 1 WISER controller (on the front)
  - 2 controlled sockets
  - Wi-Fi router
  - 1 spotlight
  - 1 home switchboard (on the rear)
  - 1 hub for measuring the feeders
- Heating panel:
  - 1 x 500 W electric radiator
  - 1 actuator
  - 1 thermostat
- DHW panel:
  - 1 x 100 W immersion tank
  - 1 actuator

Note
A second heating panel can be added to the bench.

Benefits

- Ease of installation with video tutorials
- Free app for smartphone or tablet
- Remote control via the school/college network

To order

MDGWISERTPR	WISER main panel
MDGWISERCHF	WISER heating panel
MDGWISERCHE	WISER DHW panel

Notes

Industry & machines

Contents

Chapter 4
Industry & machines

Industrial control

Industrial control

Industry & machines

Industrial control

Containment cabinet

Learning objectives

- To set up an electromechanical control panel in a safe environment
- To conduct electrical tests without coming into direct contact with live parts

Main industry

- Electrical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	1470 x 700 x 350 mm
Weight	70 kg

Presentation

Specially designed for the prototype area in electrical engineering production workshops, this cabinet can be used to apply power to panels wired by the students safely.
The test voltages (400 V and 24 VDC) are only delivered if the cabinet door is closed.

Description

- Key-operated switch for maintenance interventions
- Removable protection and control block
- Student panels powered by safety sockets
- Quick connection to the student control panel
- Connections to the outside via safety sockets (two motor outputs)

The containment cabinet is supplied with:
- 4 sets of Telequick plates
- 4 PVC gland plates (to be drilled) for feeding cables through, dimensions: 295 x 200 x 3 mm
- 24 removable terminals, 5-pole, female

Detailed view of control panel

Benefits

- Safe, rugged wiring
- Student control panel accessible with the door closed
- Pre-wired for TSX PLC

To order

MD1AA685	Containment cabinet

Industrial component wiring bench

Learning objectives

- To set up an electromechanical control panel in a safe environment
- To link up this panel to an operative part
- To conduct tests in complete safety

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	400 V/2.2 kVA
Dimensions (H x W x D)	1900 x 1050 x 750 mm
Weight	140 kg

Presentation

This bench is made up of an electrical cabinet designed to receive a control panel created by the student, which can then be connected to various operative parts (compressor unit, fan, heaters) using industrial connectors.
The assembly is used to replicate the electrical installation in an agricultural greenhouse.
It can be powered up safely. A hinged side grille can be used to create a second control panel.
A hardware kit is available as an option for creating a control panel.

Description

The bench is mounted on a frame with locking castors.
- Test cabinet at top:
  - equipped with a transparent door
  - pre-equipped with buttons, indicators and selector switches for controlling panels created by students
- 1 hinged panel that folds back on itself
- Lower part that takes the pre-wired operative parts

Available as an option: Hardware kit to be wired
- 1 Telequick plate
- 7 contactors and auxiliary contact blocks
- 1 thermal overload relay
- 8 thermal-magnetic circuit breakers
- 1 switch disconnector
- Cylinders
- Valves
- Electrical and pneumatic wiring accessories
- Wiring terminals

Detailed view of operative parts

Benefits

- Mobile equipment
- 3 operative parts integrated in the bench
- Rear panel for creating the electro-pneumatics
- Works without compressed air

To order

MD1AA200	Industrial component wiring bench
MD1AA209	Hardware kit to be wired

Motor starter packs

Learning objectives

- To study and create the various motor starter diagrams:
  - separation or isolation
  - control or switching
  - short-circuit protection
  - overload protection
- To learn about the control gear and the different ways to set it up
- To create power switching equipment

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	400 x 600 x 800 mm
Weight	15 kg

Presentation

This assembly allows electromechanical engineering students to design, mount, wire and repair power control equipment.

Description

Basic pack
- 1 kit comprising the plate and wiring accessories
- 1 x 24 VDC power supply kit
- 1 set of protection devices and contactors to create:
  - DOL starter
  - DOL reversing starter
  - non-reversing or reversing star-delta starter

TeSys U add-on pack
- 1 kit to create a DOL starter
- 1 integrated DOL reversing starter, modular with minimal setup

Variable speed control add-on pack
- 1 Altivar drive
- 1 soft starter
- PowerSuite software

Basic pack

TeSys U add-on

Benefits

- Complete predefined package for all types of motor starter
- Low-cost solution

To order

MD1AA740	Basic motor starter pack
MD1AA740T	TeSys U add-on motor starter pack
MD1AA740V	Variable speed control add-on motor starter pack

Motor starter modular offer

Learning objectives

- To study and create the various motor starter diagrams
- To learn about the control gear and the different ways to set it up

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	230 V/400 V 0.18 kW
Control circuits	24 VDC
Dimensions (H x W x D)	**Frame** 1030 x 400 x 910 mm
Weight	6.5 kg
	Modules 70 x 150 x 245 mm
	0.7 kg

Presentation

The motor starter modular offer can be used to set up the components of a power switching device quickly, and to study electromechanical or electronic control of starter motors.
The components are mounted on boxes and connected on double-recess plugs.

Composition

Two kits are offered: motor starter and variable speed control
Two asynchronous motors adapted for training purposes are available as an option:
- for the electrical engineering motor starter kit, the 230 V/400 V motor
- for the variable speed control kit, the 400 V/690 V motor

You can also order each module separately according to requirements.

Electrical engineering motor starter modular offer		MD1AMLDM
Support frame	1	MD1AM000
TeSys U starter module	1	MD1AM1001
Magnetic circuit breaker module	1	MD1AM1002
Thermal-magnetic circuit breaker module	1	MD1AM1003
Switch disconnector module	1	MD1AM1005
Fused (off-load) isolator module	1	MD1AM1006
Thermal overload relay module	1	MD1AM1007
Contactor module	3	MD1AM1008
Reversing contactor module	1	MD1AM1009
Soft starter module	1	MD1AM1010
Time-delay auxiliary module	1	MD1AM1012
Machine control module	1	MD1AM7002

Variable speed control modular offer		MD1AMLA-TV312SM
Support frame	1	MD1AM000
0.18 kW Altivar 312 module	1	MD1AM5001
Thermal-magnetic protection module	1	MD1AM1004
Variable speed drive control module	1	MD1AM7001

Example installation

Benefits

- Quick, safe setup
- No risk of damage to control system components

To order

MD1AMLDM	Electrical engineering motor starter modular offer
MD1AMP001	230/400 V training asynchronous motor
MD1AMLATV312SM	Variable speed control motor starter modular offer
MD1AMP013	400/690 V training asynchronous motor

Training motors

Learning objectives

- To learn about the asynchronous electric motor
- To study on-load current and power
- To set up and connect the motor to the various protection and control components

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	230 V/400 V or 400 V/690 V - 180 W or 750 W
Dimensions (H x W x D) **Weight**	**Model on castors** 465 x 465 x 750 mm 35 kg
	Table-top model 500 x 290 x 400 mm 20 kg
	Plinth-mounted model 250 x 390 x 205 mm 7 kg

Presentation

Four motor models adapted for training purposes are offered to simulate different types of electromechanical equipment (blower fan, electric pump, hoisting winch, etc.).
The 0.75 kW three-phase 230 V model offers the advantage of a conventional connection behind a drive powered by a single-phase 230 V supply.
The powder brake allows a variable torque to be applied.
The 0.75 kW three-phase 400 V model allows star-delta starting from an AC supply voltage of 400 V, also with a powder brake.
The 0.18 kW three-phase 400 V models are particularly suitable for the motor starter modular offer (see page 111).

Description

0.75 kW three-phase 230 V/400 V asynchronous electric motor
- Model on castors
- Powder brake
- Windings mounted on double-recess plugs

0.75 kW three-phase 400 V/690 V asynchronous electric motor
- Table-top model
- Powder brake
- Windings mounted on double-recess plugs

0.18 kW three-phase 230 V/400 V asynchronous electric motor
- Plinth-mounted model
- Windings mounted on terminal box with double-recess plugs

0.18 kW three-phase 400 V/690 V asynchronous electric motor
- Plinth-mounted model
- Windings mounted on terminal box with double-recess plugs

0.75 kW 230 V/400 V motor

0.18 kW 230 V/400 V motor

Benefits

- Quick, safe setup
- Safe, rugged wiring

To order

MD1AA529	0.75 kW 230 V/400 V training motor on castors
MD1AA529LT	Table-top 0.75 kW 400 V/690 V training motor
MD1AMP001	Plinth-mounted 0.18 kW 230 V/400 V training motor
MD1AMP013	Plinth-mounted 0.18 kW 400 V/690 V training motor

Motor starter bench

Learning objectives

- To implement the most commonly used diagrams:
  - DOL starting
  - star-delta starting
  - reversing starting
  - starting with electronic starter
- To connect the power switching components:
  - switch
  - isolator
  - contactor
  - thermal overload relay
  - compact TeSys U starter
- To measure the circuit voltages and currents
- To calculate the torque, power and energy involved
- To connect the power switching components
- To study protection devices

Main industries

- Electrical engineering
- Electromechanical engineering

Characteristics

Power supply	400 V/2 kVA
Dimensions (H x W x D)	1950 x 700 x 700 mm
Weight	190 kg

Presentation

This bench can be used to study the various electromechanical and electronic motor starter diagrams.
Motor starters are made up of basic functions such as the Vario switch, LS1D isolator, LC1/LC2 contactors, class 10 LRD thermal overload relay; or alternatively multiple or integrated functions such as the GV2 circuit breaker, Integral 18, TeSys U motor starter or ATS01 starter.

Description

The bench is mounted on a frame with locking castors and consists of two separate autonomous working sides, with industrial components connected to safety sockets:
- 1 side for analyzing and connecting the power circuit
- 1 side for analyzing and connecting the power and control circuits

The lower part contains:
- 2 groups (230 VAC - 185 W motor/190 VDC - 280 W generator)
- 2 controllable load rheostats
- 1 voltmeter
- Ammeters on each motor phase and for the load
- 1 set of safety leads

Power side

Power + control side

Benefits

- Mobile equipment
- Both sides can be used at the same time
- Safe, rugged wiring

To order

MD1AA540	Motor starter bench

Industrial sensors
Detection workshop

Learning objectives

- To learn about the different technologies used in industrial detection:
  - photoelectric sensors (thru-beam, reflex, fibre optic, background suppression, etc.)
  - inductive and capacitive sensors for detecting different materials
  - detection of linear or rotary movement by limit switches
- To set up sensors
- To make adjustments
- To debug a detection system

Main industries

- Electrotechnical engineering
- Mechanical engineering
- Industrial maintenance

Characteristics

Power supply	230 V
Dimensions (H x W x D) **Weight**	**Power supply unit** 170 x 260 x 230 mm 5 kg
	Grooved plate 80 x 760 x 460 mm 8 kg
	Accessory and target case 130 x 420 x 380 mm 8 kg

Presentation

This detection workshop is designed to study the principles of industrial detection. The different types of sensor and target offered are typical of devices found in industry. The power supply unit is equipped with indicators to display the sensor status.
The grooved plate and accessories case are used to mount, dismantle and position the sensors and targets quickly, as well as to measure sensing distances and detection angles.

Description

Grooved plate
- Aluminium grooved support plate:
  - X axis: 600 mm stroke
  - Y axis: 460 mm long

Accessories case
- 2 quick-release vices with finely adjustable screw tightening
- 2 vice-raising supports (for the reflectors)
- 1 vice with a 75 opening and screw tightening (to hold the targets)
- 1 x 15°, 30°, 45°, 90° cam
- 1 set of steel, aluminium and brass targets for inductive sensors
- 1 set of colour-reflecting targets made of aluminium, cardboard, reflecting strip, glass, mirror, neutral
- 1 set of cylindrical reflectors and targets
- 1 set of coloured labels

Pre-wired sensor case
- 1 set of photoelectric sensors (proximity, reflex, thru-beam)
- 1 set of inductive and capacitive sensors (2/3-wire technology)
- 1 set of limit switches

Regulated power supply unit
- 0-24 V variable DC voltage (sensor power supply)
- Sensors connected to safety sockets
- Indicators-loads (actual loads for 100 mA/24 V and 20 mA/24 V)

Sensor kit
- 3 photoelectric sensors (for reading marks and labels and detecting colours)

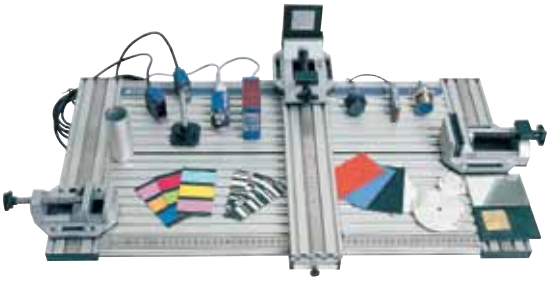


Plate + accessories + sensors

24 V power supply unit

Benefits

- Study of the main detection technologies
- Dedicated detection 24 V power supply unit
- Safe, rugged wiring

To order

MD1AA500	Grooved plate and accessories case
MD1AA502	Sensor case
MD1ACAVR	Power supply unit
MD1AA509	Sensor kit

Analog sensors and process control
Measurement and process control case

Learning objectives

- To study and set up various analog measurement sensors
- To analyze the associated electrical and electronic assemblies
- To study analog/digital and digital/analog conversions
- To understand PID control

Main industries

- Electronic engineering
- Automation engineering

Characteristics

Power supply	230 V/130 VA
Dimensions (H x W x D)	560 x 470 x 330 mm
Weight	20 kg

Presentation

The measurement and process control case incorporates five practice workstations:
- weight measurement (plastic, aluminium or steel)
- contactless distance measurement
- contact distance measurement
- speed control
- heat control

A TSX Micro PLC is used to manage and run the workstations.
The PLC discrete inputs and outputs and the various measuring points can also be used on using safety sockets.
An application program provided allows the speed and temperature trend curves to be displayed on a PC.

Description

- 1 strain gauge
- 1 industrial analog photoelectric sensor
- 1 linear potentiometer
- 1 variable speed motor mechanically connected to a tachogenerator
- 1 mini-enclosing guard equipped with:
  - lamp heating system
  - fan
  - temperature measurement via PT100 probe and transmitter
- 1 TSX Micro PLC with 16 inputs/12 outputs (discrete), 8 inputs/2 outputs (analog)
- Measuring points and discrete I/O routed via safety sockets
- 1 Magelis-type terminal
- Predefined PL7 runtime screens
- Ethernet connection with ETZ510 module and HTML pages
- PC application program for viewing speed and temperature curves

Benefits

- Complete analog measurement subsystem for control systems
- Compact equipment
- Quick installation

To order

MD1AA620	Measurement and process control case

Wireless industrial control
Biometric ZIGBEE case

Learning objectives

- To study systems that communicate using ZIGBEE protocol
- To set up an industrial ZIGBEE solution
- To compare wired and wireless solutions
- To study biometric control

Main industries

- Sustainable development and environment engineering
- Electrotechnical engineering
- Industrial maintenance
- Electronic engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	130 x 350 x 380 mm
Weight	3.5 kg

Presentation

This training case can be used to practise setting up communicating industrial products with a ZIGBEE greenpower compatible protocol operating wirelessly and without a battery.
A dongle is provided to analyze the ZIGBEE frames transmitted by the ZIGBEE buttons to the receiver on a PC.
A biometric enable button authorizes operation of the key press represented on the diagram.

Description

- 4 mimic diagrams animated by wired or wireless ZIGBEE solutions
- Receiver boxes
- ZIGBEE PB
- Wired PBs
- 1 parameter-setting simulator

Benefits

- Comparison of control technologies

To order

MD1AAVZIGBEEB	Biometric ZIGBEE case

Pneumatic and electro-pneumatic panels
DIDAFLEX panelboards

Learning objectives

- To study pneumatic and electro-pneumatic technologies
- To set up and control pneumatic automation system functions
- To wire up electro-pneumatic components

Main industries

- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

Characteristics

Power supply	24 VDC/230 V
Dimensions (H x W x D)	600 x 450 x 250 mm
Weight	25 kg
Compressed air	6 bar

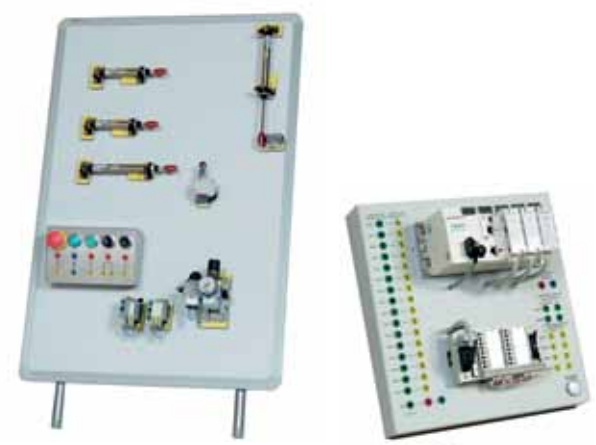
Presentation

The DIDAFLEX offer consists of a magnetic panelboard with illustrations for the pneumatic functions, and pneumatic components on magnetic material. This makes it easy to switch from studying the schematic diagram to actually creating a pneumatic circuit.
DIDAFLEX can be used to study and set up single-acting and double-acting cylinders, monostable or bistable solenoid valves, all controlled by an industrial PLC.
Two DIDAFLEX kits are provided for working with the panel-mounted PLCs illustrated on page 143: Zelio and Twido or TSX37, TSX57 and M340.
The equipment is made by PARKER and marketed by Schneider Electric.

Composition

The composition of both DIDAFLEX kits is described in the table below.

Description	MD1PMXZTW	MD1PMXTSX
Pneumatic-electric interface	2	2
Pneumatic limit switch sensor with rollers	2	2
Electric limit switch sensor with rollers	2	2
Magnetic cylinder position sensor	2	5
Monostable 3/2 solenoid valve	1	1
Monostable 4/2 solenoid valve	1	1
Bistable 4/2 solenoid valve	2	2
Single-acting cylinder D16-C50 mm	1	1
Double-acting cylinder D16-C100 with 2 sensors	1	1
Double-acting cylinder 16-C100 mm	2	3
Magnetic panelboard with stand	1	1
Control station 1ES-2PB-1C3P + 1 green indicator	1	1
Isolating valve + regulator	1	1
Double 3/2 solenoid valve	-	1



M340 panel

Benefits

- Combination of electro-pneumatic functions and components
- Flexible use
- No mechanical risk of trapping fingers

To order

MD1PMXZTW	DIDAFLEX for use with Zelio and Twido training PLCs
MD1PMXTSX	DIDAFLEX for use with TSX Micro, Premium and M340 training PLCs

Variable speed control & motion control

Variable speed control & motion control

Industry & machines

Variable speed control & motion control

Electronic starter packs

Learning objectives

- To study and set up electronic motor starters
- To configure an electronic starter
- To set up Modbus or Ethernet industrial communication

Main industries

- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 or 400 V
Dimensions (H x W x D)	600 x 600 x 600 mm
Weight	8 kg

Presentation

These three packs can be used to familiarize students with the various types of electronic starter: Altistart 01, 22 and 48.
The ATS01 is designed for simple conveying applications.
It controls the motor on 2 phases and can start and decelerate the equipment.
The ATS22 is designed for pumping, ventilation and compression applications. It controls the motor on 3 phases. It incorporates the Bypass control sequence, and a motor protection device. It communicates via Modbus.
The ATS48 is designed for pumping, ventilation, compression and high-torque applications. It controls the motor on 3 phases. It incorporates numerous sophisticated functions such as catch on the fly, smoke extraction, automatic restarting, etc. It communicates via Modbus.

Description

The packs consist of:

Altistart 01
- 1 x 6 A/230-400 V starter
- 1 TeSys U motor starter with protection unit for a 1.1 to 4 kW motor

Altistart 22
- 1 x 15 A/230-400 V starter
- 1 GV3 L magnetic circuit breaker
- 1 line contactor
- 1 SoMove software program
- 1 PC connecting cable

Altistart 48
- 1 x 17 A/230-400 V starter
- 1 GV3L magnetic circuit breaker
- 1 line contactor
- 1 Ethernet gateway
- 1 Modbus drop cable
- 1 PowerSuite software pack

Altistart 01

Altistart 22

Benefits

- Low-cost solution
- Complete predefined package

To order

MD1APATS01	Altistart 01 soft starter pack
MD1APATS22	Altistart 22 soft start-soft stop pack
MD1APATS48	Altistart 48 soft start-soft stop pack

Variable speed control packs

Learning objectives

- To study and set up electronic motor starters
- To configure an electronic drive
- To use SoMove software
- To set up Modbus or Ethernet industrial communication

Main industries

- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V/400 V
Dimensions (H x W x D)	400 x 400 x 400 mm
Weight	6 kg

Presentation

The ATV12 is a compact drive for controlling simple applications. It is powered by a single-phase or three-phase 230 V supply. It communicates via serial Modbus link.
The ATV312 is a compact drive for controlling a motor with sophisticated functions such as auto-tuning. It is powered by a single-phase 230 V or three-phase 400 V supply. It communicates via Modbus and CANopen.
The ATV71 is a high-end drive with graphic interface, powered by a single-phase 230 V or three-phase 400 V supply and communicates via Modbus, CANopen and Ethernet.
The ATV32 is a drive in book format which incorporates safety functions. It is powered by a single-phase 230 V or three-phase 400 V supply. It communicates via Modbus, CANopen and EtherCAT.

Description

The packs consist of:

Altivar 12
- 1 x 1.5 kW single-phase or three-phase drive
- 1 DVD containing the technical documentation and SoMove Lite software
- 1 PC connecting cable

Altivar 312
- 1 x 1.5 kW single-phase or three-phase drive
- 1 DVD containing the technical documentation and SoMove Lite software
- 1 PC connecting cable
- 1 Ethernet gateway
- 1 Modbus drop cable

Altivar 71
- 1 x 1.5 kW single-phase or three-phase drive
- 1 Ethernet.card
- 1 RJ45 cable and 1 RS232/RS485 converter

Altivar 32
- 1 x 1.5 kW single-phase or three-phase drive
- 1 Ethernet.card
- 1 Ethernet cable
- 1 USB Bluetooth adaptor

Altivar 12

Altivar 312

To order

MD1APATV12M	Altivar 12 single-phase 230 V drive pack
MD1APATV12T	Altivar 12 three-phase 230 V drive pack
MD1APATV312M	Altivar 312 single-phase 230 V drive pack
MD1APATV312T	Altivar 312 three-phase 400 V drive pack
MD1APATVM	Altivar 71 single-phase 230 V drive pack
MD1APATVT	Altivar 71 three-phase 400 V drive pack
MD1APATV32M	Altivar 32 single-phase 230 V drive pack
MD1APATV32T	Altivar 32 three-phase 400 V drive pack

Benefits

- Low-cost solution
- Complete predefined package
- Guided introduction

Servo motor packs

Nouveau

Learning objectives

- To make technical choices concerning velocity/position control/dimensions
- To study mechanical calculation of an axis
- To set up products
- To configure the axis with SoMove
- To set up the CANopen bus

Main industries

- Automation engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V or 400 V
Dimensions (H x W x D)	400 x 400 x 600 mm
Weight	7 kg

Presentation

These packs are used to create a project involving an axis control application. Two types of pack are offered: either with a flux vector drive for velocity control, or with a servo drive for position control.
The packs can be combined with a brushless servo motor.
A solution with the drive integrated in the motor is also available.

Description

The packs consist of:

LEXIUM 32 servo drive
- 1 x 6 A single-phase or three-phase LEXIUM 32
- 1 CANopen communication card
- 1 set of power and control cables
- 1 PC/ATV32 programming cable

ALTIVAR 32 with motor
- 1 x 0.75 kW single-phase ALTIVAR 32
- 1 CANopen communication card
- 1 BMH motor 1.4 N.m 350 W, 2500 rpm max.
- 1 set of cables

LEXIUM 32 with motor
- 1 x 9 A single-phase LEXIUM 32
- 1 CANopen communication card
- 1 BSH motor 0.8 N.m 250 W, 3000 rpm
- 1 set of cables

LEXIUM 32i integrated in the motor
- 1 BMI motor 2.2 N.m 700 W, 3200 rpm with LEXIUM 32i
- 1 CANopen communication card
- 1 set of cables and accessories

ATV32 + BMH motor

LEXIUM 32 + BSH motor

Benefits

- Low-cost solutions
- Predefined packages
- Free SoMove software

To order

MD1APLX32M	Single-phase LEXIUM 32 pack
MD1APLX32T	Three-phase LEXIUM 32 pack
MD1APMTATV32	Single-phase ALTIVAR 32 with motor pack
MD1APMTLX32	Single-phase LEXIUM 32 with motor pack
MD1APMTLXI	LEXIUM 32i integrated in the motor pack

Linear axis packs

Nouveau

Learning objectives

- To make technical choices concerning velocity/position control/dimensions
- To study mechanical calculation of an axis
- To set up products
- To configure axes with SoMove
- To set up the CANopen bus
- To manage limit switch safety interlocks
- To create a reference point and perform a jog type manual command
- To learn about automated control of movements and synchronize axes

Main industries

- Automation engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	400 x 600 x 1200 mm
Weight	10 kg

Presentation

Packs with one or two axes can be used to build a machine with robotic movements. They consist of one or more linear motion axes, with the carriage driven by a notched belt and guided by rollers.
The packs are supplied with brushless motors already mounted.

Description

The packs consist of:

Linear axis with motor
- 40 x 40 mm mounting rail
- 1000 mm stroke, 2 PNP limit switch sensors
- Payload 4 kg, velocity 2 m/s, acc. 15 m/s2
- BSH05 motor, 400 W, 6000 rpm, 0.8 N.m constant torque
- 1:3 planetary gearbox
- Motor mounted on the right, can be reversed on the left

Linear axis with motor and drive
Same as above with LEXIUM 32M communicating via CANopen 0.35-0.4 kW 1.8-1.5 A

Robot with 2 XY axes with motors
- 40 x 40 mm mounting rail
- 350 x 350 mm stroke (can be adapted on request)
- 4 PNP limit switch sensors
- Payload 5 kg, velocity 2 m/s, acc. 15 m/s2
- BSH motors mounted on the right

Robot with 2 XY axes with motors and drives
- 1.5 A/230 V single-phase and Lexium Motion Controllers

1 axis

2 axes

Benefits

- Predefined packages
- Pre-installed solutions
- Free SoMove software

To order

MD1APMTPAS	Linear axis with motor
MD1APMT32PAS	Linear axis with motor and drive
MD1APMTMAX2	2-axis robot with motors
MD1APMT32MAX2	2-axis robot with motors and drives

Variable speed drive training cabinets

Learning objectives

- To learn how a variable speed drive works in principle
- To study and set up a variable speed drive
- To use the terminal and drive functions:
  - display
  - adjustment
  - configuration, etc.

Main industry

- Electrotechnical engineering

Characteristics

Power supply	240 V single-phase or three-phase, or 400 V three-phase
Dimensions (H x W x D)	**ATV312 cabinet**
Weight	330 x 320 x 220 mm
	5 kg
	ATV71 cabinet
	430 x 400 x 250 mm
	8 kg

Presentation

Enclosed variable speed drives adapted for teaching purposes are designed for connection to teaching motor benches, or to the load testing bench of an asynchronous motor (see page 126). They are available in ATV312 and ATV71 versions.

Description

ATV312 cabinet
- A 0.37 kW/230 V or 1.5 kW/400 V drive
- A set of safety leads
- PowerSuite parameter-setting software with cables

ATV71 cabinet
- A 0.37 kW/400 V or 1.5 kW/400 V drive
- A set of safety leads
- PowerSuite parameter-setting software with cables

It is possible to change the drive range, depending on the quantity required.

Benefits

- Ready-to-use drive
- Safe, rugged wiring
- Can be used with the MD1AA595 bench

To order

MD1AA31W03M2	Training Altivar 312, 0.37 kW, 230 V single-phase
MD1AA31W15N4	Training Altivar 312, 1.5 kW, 400 V three-phase
MD1AA71W03M3	Training Altivar 71, 0.37 kW, 230 V three-phase
MD1AA71W15N4	Training Altivar 71, 1.5 kW, 400 V three-phase

ALTIVAR 32 case
ATV32 case

Learning objectives

- To learn how a frequency inverter for three-phase asynchronous and synchronous motors works in principle
- To study and set up a variable speed drive
- To examine standard or user-defined configurations in greater depth
- To explore factory or manufacturer settings
- To optimize servo control, by adjusting the switching frequency
- To study the application-specific functions:
  - conveying
  - cutting
  - hoisting, etc.
- To use the SoMove setup and runtime software:
  - preparing configurations
  - commissioning the installation
  - maintenance

Main industries

- Energy engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/180 W
Dimensions (H x W x D)	275 x 430 x 400 mm
Weight	16.5 kg

Presentation

The ATV 32 case can be used to set up the drive with a motor. Two versions are available, with an asynchronous or permanent magnet synchronous motor. The ATV32 drive can control both types of motor. It has a Bluetooth port and can be controlled by adding kit VW3A8115. SoMove software is used in the practical exercises to configure the drive.

Description

Both versions of the case contain:
- 1 tilting panel with an 0.18 kW ATV32
- 1 protection sequence
- Control inputs on switches and potentiometers
- 2 indicators: drive ready and speed reached
- Connection points for external motor
- SoMove parameter-setting software

Benefits

- Drive set up in book format
- Compact equipment
- Teaching based on SoMove software

To order

MD2ATV32FA	ATV32 case for asynchronous motor
MD2ATV32FS	ATV32 case for synchronous motor

Load testing bench with asynchronous motors
Load testing bench

Learning objectives

- To learn about the various types of mechanical load: pump, fan, hoist, conveyor, etc.
- To work on the various types of torque: constant, linear, quadratic, hyperbolic, manual

Main industry

- Electrotechnical engineering

Characteristics

Power supply	230 V/400 VA
Dimensions (H x W x D)	600 x 850 x 550 mm
Weight	55 kg

Presentation

The load testing bench is used to study the various types of torque found in specific applications, in particular constant, linear, quadratic and hyperbolic torque. It can be used to control resistive torque manually. The bench incorporates two motors connected opposite one another. One is controlled by the internal drive, the other by a drive external to the bench. This drive should be rated between 0.18 kW and 0.37 kW. It is possible to use the enclosed drives on page 124.

Description

- 1 x 370 W motor with encoder, controlled by the ATV71 internal drive with Controller Inside card
- 1 x 180 W/230-400 V motor with encoder, controlled by an external drive, or an enclosed drive
- 1 braking resistor
- 1 mechanical brake
- 1 mimic diagram with:
  - measuring points
  - 6 fault switches
  - control inputs
  - selector switches and potentiometers

Load testing bench with Altivar cabinet (to be ordered separately)

Benefits

- Study of all types of drive torque
- Compatible with all types of drive

To order

MD1AA595	Load testing bench

Variable speed bench with motor

Learning objectives

- To control an asynchronous motor
- To learn how a drive works
- To set up an electronic drive:
  - wiring the motor part
  - wiring the control part
  - standard settings

Main industry

- Electrotechnical engineering

Characteristics

Power supply	230 V/500 VA
Dimensions (H x W x D)	500 x 790 x 480 mm
Weight	40 kg

Presentation

This bench can be used to study and set up control of an asynchronous motor with brake. The mimic diagram includes measuring points upstream and downstream of the drive, and internal points on the DC bus. The power and control sequence is pre-wired on double-recess plugs. Safety leads are supplied with the bench.

Description

- 1 Altivar 312 drive
- 1 x 0.37 kW asynchronous motor
- 1 module with powder brake
- Pre-wired master control and protection sequences
- 1 mimic diagram with measuring points
- 1 set of safety leads

Benefits

- Access to the drive internal measuring points
- Rugged wiring on safety sockets
- Adjustable brake for resistive torque

To order

MD1AA580FP	Variable speed bench with motor

Variable speed bench with powder brake

Learning objectives

- To control an asynchronous motor with a frequency inverter
- To configure a drive
- To study thermal protection
- To study the torque/speed profiles by simulating various mechanical loads
- To analyze behaviour in the braking phase

Main industry

- Electrotechnical engineering

Characteristics

Power supply	400 V/2 kVA
Dimensions (H x W x D)	1460 x 675 x 775 mm
Weight	143 kg

Presentation

This bench can be used to study a drive solution for an asynchronous motor, by simulating various types of mechanical load called constant, proportional or quadratic torque (pump, fan, hoist etc.).
A switch can be used to simulate simple breakdowns to make use of the Altivar diagnostic information.

Description

The bench is mounted on a frame with locking castors.
It consists of:
- 1 x 1.5 kW asynchronous motor with inertia wheel and powder brake
- 1 x 1.5 kW 400 V Altivar 71 drive with braking resistor
- 1 TSX Micro PLC for controlling various types of load
- 1 drive control sequence (selector switches and indicator lights)
- Measuring points on safety sockets for reading the following information:
  - AC supply voltage and current
  - motor voltage and current
  - motor temperature (PT100 probe)
  - speed feedback voltage
  - powder brake torque

Benefits

- Complete mobile package: motor, brake, drive
- Safe, rugged wiring
- Study of the various mechanical torques

To order

MD1AA570	Altivar bench with powder brake

Brushless training case

Learning objectives

- To analyze a system incorporating a brushless motor
- To study and configure servo control
- in terms of position control
- To study and configure servo control
- in terms of speed control

Main industries

- Energy engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/610 VA
Dimensions (H x W x D)	270 x 650 x 400 mm
Weight	25 kg

Presentation

This case can be used to observe and study a motion system.
It consists of a linear motion axis and a fixed brushless motor-drive.
The aim is to control a movement in open loop and then in closed loop mode.
A laser pointing system can be used to highlight any problems and performance issues in the axis control positioning. An HMI is used to display the motion curves, which can be transferred to a spreadsheet.

Description

- 1 x 100 mm linear axis with a notched belt and rollers
- 1 x 5 A, 0.26 Nm brushless motor with integrated Lexium drive, planetary gearbox and single-turn encoder (16,384 points)
- 1 x 3.5” touchscreen graphic terminal
- 1 Twido PLC with CANopen communication card
- 1 RJ45 cable for PC connection

Benefits

- Compact brushless training case
- Teaching based on industrial applications
- Data can be viewed on display unit and PC

To order

MD1AAVBRUSH	Brushless training case

Mini-hoisting bench with cable winch
ML03 bench

Learning objectives

- To study a movement made by a cable winch, with the load suspended directly overhead
- To create control panels
- To run tests and make adjustments
- To analyze motor current and voltage measurements, depending on the load being hoisted

Main industries

- Electrotechnical engineering
- Electrical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	1870 x 750 x 900 mm
Weight	220 kg

Presentation

This bench is designed for panel wiring exercises that can be performed by the students, as per the diagrams supplied by the manufacturer.
It can be used to show how the winch drive chain works, as well as its limit switch and overtravel system and the role of a rope drive in hoisting.
The control cabinet is ready-assembled for a DOL starting sequence.
The variant with M221 PLC can be used to connect an LV switchboard via the Ethernet network.
The equipment is made by LEDENT and marketed by Schneider Electric.

Description

Industrial type cable winch, stroke 1 m, speed 10 m/mm
- 1 x 250 W asynchronous motor, velocity 1450 rpm
- 1 gearbox with reversible parallel shafts
- 1 holding brake certified for hoisting
- System of top and bottom limit switches
- Top and bottom safety overtravel limit
- Grooved winch drum with:
  - 1 anti-twist cable equipped with a safety hook
  - 1 basket with safety latch
  - 5 x 10 kg weights
- Rope drive
- Mechanically-welded steel frame
- Steel protection unit

Control cabinet
- Equipped at the top with a safety loop that the students cannot access:
device containing the operative part power supply, connection to the overtravel limits, the PREVENTA safety module, the emergency stop, the 30 mA circuit breaker and the phase controller
- Equipped at the bottom with a 550 x 450 mm panel wired for DOL starting via a terminal block
- 1 overhead crane type pendant control station

Variant
A panel wired with the ATV312 drive (certified for hoisting), an M221 PLC for communicating via Ethernet with an LV switchboard.

Benefits

- Safety management via limit switches, overtravel limit and hoisting brake
- System can be used for wiring operations
- Separate safety and power parts for compliance with safety standards

To order

MD1AA400ML03M	Mini-hoisting bench with DOL starting
MD1AA400ML03TAM	Mini-hoisting bench with PLC and drive

Hoisting bench with vector control
SL71 bench

Learning objectives

- To study dynamics, torque, inertia, elongation and the bounce effect
- To select a motor, define a duty factor, analyze the network and consumption
- To measure, configure and study communication and connection to the LV switchboard
- To study the system architecture, programming and human-machine interface
- To change a configuration with/without rope drive, send a command directly or with a load sensor
- To study a hoist, calculation and selection of components, sizing and construction rules
- To analyze safety, calculation of protections, associated directives and standards

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	2400 x 1400 x 1400 mm
Weight	750 kg

Presentation

This winch hoisting bench is designed to assess the behaviour of an asynchronous motor in a load hoisting scenario.
The system highlights the advantage of using a flux vector drive configured in open loop mode, as compared to an open loop drive (unstable at zero setpoint).
The bench is available in 2 versions:
- DOL starting and open loop variable speed control to compare the two solutions
- Closed loop variable speed control with load sensor and rope drive

The load sensor is used to compare the load measurement with that calculated by the drive. Thanks to the rope drive, the user has more time to record the measurements.
The equipment is made by LEDENT and marketed by Schneider Electric.

Description

Operative part stroke 1.6 m, velocity from 0 to 33 m/mm
- 1 x 1.5 kW geared motor with brake, 1500 rpm, PTC probes, 1024-point encoder
- Winch with 150 kg capacity with steel cable and safety hook
- System of limit switches and overtravel limits
- 100-point incremental encoder for measuring the load velocity and displacement
- 1 basket with a capacity of 7 x 20 kg weights, protected by a steel cage

Control part
- 1 cabinet with transparent door, incorporating the safety system at the top and the control panel at the bottom:
  - 1 x 1.5 kW ATV 71
  - 1 braking resistor
- 1 control desk on the cabinet side, comprising:
  - 1 speed display and 1 load display
  - the drive and motor voltage and current measuring points
  - the encoder and motor temperature measuring points

Variant
- Bench with load sensors, rope drive and forced ventilation

Benefits

- Highly dynamic operation
- Advantage of flux vector control
- Safe for students to use

To order

MD1AA400SL71DM	ATV71 hoisting bench with DOL starting and drive, plus commissioning
MD1AA400SL71CVM	ATV71 hoisting bench with drive, load sensor, forced ventilation and rope drive, plus commissioning

X and Z axis bench

Learning objectives

- To analyze dynamics, torque, inertia, electrical and mechanical measurements
- To study motor selection, duty factors and consumption
- To measure, configure, communicate and connect to an LV switchboard
- To study the system architecture, programming and the human-machine interface
- To learn about calculation and selection of components, sizing and construction rules
- To study safety, calculation of protections, associated directives and standards

Main industry

- Electrotechnical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D) **Weight**	**Operative part** 2150 x 1780 x 800 mm 300 kg
	Control part 1788 x 800 x 600 mm 80 kg

Presentation

This system is typical of industrial machines whose load varies during the operating cycle. It can be used for a comparative study of servo loop commands between an asynchronous motor with flux vector control and a brushless motor. Depending on the position of the beam, horizontal, tilted or vertical, the motor needs to adapt its duty factor to drive the motor platform. The system operates in open loop or closed loop mode (velocity and position).
The equipment is made by LEDENT and marketed by Schneider Electric.

Description

Operative part stroke 1.5 m, speed from 0 to 20 m/min
- 1 x 0.37 kW geared motor with brake and 1024-point encoder
- 1 moving motor platform, turning on a ball-bearing runner and mounted on a tilting beam. The platform can be loaded with up to 60 kg.
- Rack and pinion drive system with:
  - 1 x 20 N.m torque meter
  - 1 x 2048-point incremental encoder

Control part
- A cabinet with transparent door incorporating the safety system at the top and the control panel at the bottom
- 1 ATV71 drive with encoder card, Ethernet card and controller card
- 1 control desk on the cabinet side, comprising:
  - 1 speed display and 1 load display
  - command buttons and indicators
  - drive and motor voltage and current measuring points
  - encoder measuring points and drive setpoint
- Data read on BNC plugs:
  - speed and distance from the 2048-point encoder
  - force from the torque meter

Benefits

- Highly dynamic operation
- Comparison of process control commands
- Safe for students to use

To order

MD1AA410AXZ01M	X and Z axis bench
MD1AA410AZ02AM	FVC version of Z axis bench with commissioning
MD1AA410AZ02BM	Brushless version of Z axis bench with commissioning

Winch hoisting crane

Nouvelle version

Learning objectives

- To study dynamics, acceleration or deceleration during travel, the sway effect and the rope drive
- To create control panels and perform wiring
- To program a communicating PLC, configure a variable frequency drive
- To describe a drive chain, service and repair it
- To analyze the structure, sizing and construction rules, selection of components
- To study sway, construction standards, associated directives and accreditations

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	**Operative part** 2150 x 3750 x 1000 mm
Weight	370 kg
	Control part 1000 x 800 x 300 mm
	80 kg

Presentation

The winch hoisting crane is typical of handling applications with associated motors. Its height and length mean it can be used to test the problem of sway without risking knocking into the frame.
A containment cabinet is used to mount interchangeable panels, pre-wired or for wiring by the students.
The equipment is made by LEDENT and marketed by Schneider Electric.

Description

Operative part stroke 1.80 x 2.50 m, speed 20 m/min

- Removable mechanically-welded steel frame, epoxy paint
- Winch with 100 kg capacity, stroke with hook 1.5 m, with weight 1.2 m. Driven by 0.37 kW geared motor with brake, reversible parallel shafts, equipped with two limit switches and two overtravel limits. Encoder adaptation.

Load hoisted directly or by rope drive. Supplied with 1 basket and 8 x 10 kg weights.

- Translational movement on a carriage with 0.25 kW geared brake motor. Rack and pinion system and guide rail. System of 2 limit switches and 2 overtravel limits
- Safety cabinet:

AC power supply incomer, padlockable isolating switch, 30 mA RCBO, phase control, safety relay, emergency stop and indicators 30 mA, phase control, safety relay, emergency stop and indicators

Control part

- Manual control via overhead crane type pendant control station
- Control cabinet to be wired, powered from the safety cabinet via multi-pin industrial sockets
- Operator control panel pre-wired on a terminal block
- DOL starting panel, which should be replaced with the one built by the students

Variant

Hoisting crane with an automated control panel consisting of a PLC, drive and display. Load sensors and encoder on the frame

Benefits

- Study of sway
- Wiring activities
- Safe equipment

To order

MD1AA400SLT01DM	Hoisting crane with DOL starting control panel, and commissioning
MD1AA400SLT01CM	Hoisting crane with panel automated control and commissioning

Automation & industrial communication

Automation & industrial communication

Industry & machines

Automation & industrial communication

Automation software packs reserved for teaching

Nouvelle version

Learning objectives

- To find technical documentation
- To find resolutions and application solutions

Main industries

- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

Dimensions (H x W x D)	20 x 160 x 140 mm
Weight	0.1 kg
Recommended configuration	Windows XP, Vista, Windows 7

Presentation

These software packs allow teaching and training institutions to obtain Schneider Electric automation software at preferential rates.
Purchasing a pack corresponds to a one-year subscription to the software and to the Schneider Electric website software services.
Before the subscription expires, we will send an email inviting institutions to resubscribe to software updates and to the site.
If your subscription expires, simply purchase the update to receive a DVD containing all the software.

Description

XL functions pack
- UNITY PRO XL (DVD)
- UNITY DIF application comparator (download)
- Advantys STB I/O configurator (DVD)
- PL7 PRO V4.5 (DVD)
- SoMachine
- SoMachine Basic (download)
- SoMove
- TwidoSuite (download)
- Zelio Soft (download)
- Network drivers (Ethernet, Modbus, etc.)
- Access to the Schneider Electric XSL online service website resources (technical files, utilities, documentation, support, forum)
- Academic site license with one-year subscription
- Vijeo Designer pack

Update
Purchasing an update includes a one-year subscription (software and site)

Vijeo Designer software pack
- With 5.7” HMI display
- PC programming cable/display

To access the Schneider Electric XSL site
http://xsl.schneider-electric.com/accueilInit.do

Benefits

- Academic site software licenses
- One-off installation code for the XL pack
- Access to the Schneider Electric XSL site resources

To order

MD1ABCDENS	XL functions software pack + VJD pack
MD1ABRCDENS	XL functions pack update + VJD pack
VJDEDUSTU855	Vijeo Designer software pack

PLC introductory packs

Learning objectives

- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries

- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Twido pack**
	110 x 230 x 345 mm
Weight	1.3 kg
	M221 pack
	200 x 300 x 500 mm
	5 kg
	M221 pack with display
	300 x 400 x 500 mm
	6 kg

Presentation

This offer covers the Twido and M221 programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet). Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

Description

Twido pack
- 1 Twido Compact PLC with 24 inputs/16 outputs (discrete) + Ethernet port
- 1 PC to PLC converter (USB/mini DIN)
- 1 data backup battery
- 1 TwidoSuite program

M221 pack
- 1 M221 PLC with 24 inputs/16 outputs (discrete), 2 analog inputs + Ethernet port
- 1 Ethernet cable
- 1 PC/PLC USB cable
- 1 simulation terminal block
- 1 SoMachine Basic program + tutorial on USB stick

M221 pack with display, machine safety module and motor starter
- 1 M221 PLC with 24 inputs/16 outputs (discrete) and Ethernet port
- 1 module with 4 inputs/2 outputs (analog)
- 1 Ethernet cable
- 1 motor starter module + 9 A contactor and motor circuit breaker
- 1 safety module + 1 emergency stop PB
- 1 x 3.5” Ethernet colour touch screen display
- 1 x 24 VDC/3 A power supply
- 1 input simulation terminal block

Add-on pack
- 1 module with 4 inputs/2 outputs (analog)
- 1 motor starter module, 9 A contactor and motor circuit breaker
- 1 machine safety module with emergency stop PB
- 1 x 3.5” Ethernet colour touch screen display
- 1 Wi-Fi switch

Twido PLC

M221 PLC

Benefits

- Low-cost solution
- Predefined bundle
- Guided introduction

To order

MD1APTW	Twido pack
MD1AP21	M221 PLC pack
MD1AP21C	M221 pack with display, safety module and motor starter
MD1AP21P	M221/M241 add-on pack

Machine PLC packs

Learning objectives

- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries

- Electrical engineering
- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**M241 pack**
Weight	100 x 200 x 300 mm
	2 kg
	M241 pack with display
	300 x 400 x 500 mm
	6 kg
	M258 pack with display
	300 x 300 x 400 mm
	11 kg

Presentation

This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet).
Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.
In addition to the automation and drive packs, communication kits using different protocols are offered on page 152.

Description

M241 controller pack with analog I/O
- 1 M241 PLC with 14 inputs/10 outputs (discrete), Ethernet port, CANopen port
- 1 module with 4 inputs/2 outputs (analog)
- 1 programming cable
- 1 Ethernet cable
- 1 SoMachine Basic program

M241 controller pack with display and drive
- 1 M241 PLC with 14 inputs/10 outputs (discrete), Ethernet port, CANopen port
- 1 x 5.7” colour touch screen terminal
- 1 x 24 VDC 3 A power supply
- 1 x 0.18 kW 230 V drive
- 1 CANopen tap junction + CANopen cable
- 1 programming cable
- 1 display/PLC cable
- 1 drive/PLC cable
- 1 SoMachine Basic program

M258 performance controller pack with display and drive
- 1 M258 PLC with 26 inputs/16 outputs, master CANopen port, Ethernet port
- 1 x 5.7” colour touch screen terminal
- 1 x 24 VDC 3 A power supply
- 1 x 0.18 kW 230 V drive
- 1 CANopen tap junction + CANopen cable
- 1 programming cable
- 1 display/PLC cable
- 1 drive/PLC cable

M241 PLC

M258 PLC

Benefits

- Predefined bundle
- Low-cost solution

To order

MD1AP41A	M241 controller pack with analog I/O
MD1AP241STU	M241 controller pack with display and drive
MD1AP258STU	M258 controller pack with display and drive

Machine PLC packs (continued)

Learning objectives

- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries

- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V	
Dimensions (H x W x D)	LMC058 pack	300 x 400 x 600 mm
Weight		8 kg
	HMI pack	300 x 400 x 600 mm
		10 kg
	RFID pack	300 x 300 x 400 mm
		2.5 kg

Presentation

This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet).
Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.
In addition to the automation and drive packs, communication kits using different protocols are offered on page 152.

Description

LMC058 motion controller pack and Lexium 32 servo motors
- 1 LMC058 motion controller 26 inputs/16 outputs (discrete), Ethernet port, 2 CANopen ports
- 1 x 7.5” colour graphic terminal
- 1 x 24 VDC 3 A power supply
- 2 x 500 W 3A Lexium 32 servo drives
- 1 programming cable
- 2 CANopen cables
- 2 drive cables

Controller HMI pack with drive
- 1 x 5.7” controller terminal with 8 inputs/8 outputs (discrete), 4 inputs/2 outputs (analog)
- 1 x 24 VDC 3 A power supply
- 1 module with 20 remote I/O on CANopen
- 1 x 0.18 kW 230 V drive
- 1 SubD/RJ45 CANopen cable
- 1 programming cable
- 1 drive/display cable
- 1 tower light

RFID tracking pack
- Set of 2 RFID read/write stations
- 1 Ethernet splitter box with 3 channels
- 1 Ethernet switch with 5 ports
- 10 labels
- 1 set of cables

Vision pack
- 1 XUV vision sensor
- 1 red circular light
- 1 ball joint and mounting brackets
- 1 configuration program
- 1 set of cables

LMC058 PLC

Controller display

Benefits

- Predefined bundle
- Low-cost solution

To order

MD1AP058LX	LMC058 motion controller pack with LEXIUM 32
MD1APHMISCU	Controller HMI pack with drive
MD1APPFRFID	RFID tracking pack
MD1APPFCV	Vision pack for quality control

Machine PLC packs (continued)

Learning objectives

- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries

- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D) **Weight**	**Modbus pack** 300 x 300 x 400 mm 1.5 kg
	CANopen pack 300 x 300 x 400 mm 1.5 kg
	Ethernet pack 300 x 300 x 400 mm 1.5 kg

Presentation

This offer (over 3 pages) covers the M241, M238, M258 and LMC programmable controllers, as well as industrial buses and networks (Modbus, CANopen, ASI, Ethernet).
Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.
In addition to the automation and drive packs, this page offers you communication kits using different protocols.

Description

Modbus connections
- 1 module with 12 inputs/8 outputs (remote) on Modbus
- 1 Modbus splitter box with 8 channels
- 4 x 1 m Modbus cables
- 1 TeSys U motor starter on Modbus
- 1 x 24 VDC 1.2 A power supply
- 1 energy meter on Modbus
- 1 ADVANTYS configuration program

CANopen connections
- 1 module with 12 inputs/8 outputs (remote) on CANopen
- 1 CANopen splitter box with 4 channels
- 5 x 1 m CANopen cables
- 1 SubD/RJ45 CANopen cable
- 1 x 24 VDC 1.2 A power supply
- 1 x 0.18 kW 230 V drive
- 1 programming cable
- 1 ADVANTYS configuration program

Ethernet connections
- 1 module with 12 inputs/8 outputs (remote) on Ethernet
- 1 switch with 5 ports
- 4 RJ45/RJ45 cables
- 1 x 24 VDC 1.2 A power supply
- 1 x 0.75 kW drive with Ethernet card
- 1 programming cable
- 1 Modbus/Ethernet gateway
- 1 ADVANTYS configuration program

Remote OTB I/O on bus

Benefits

- Predefined bundle
- Low-cost solution

To order

MD1APCM	Modbus communication add-on
MD1APCC	CANopen communication add-on
MD1APCE	Ethernet communication add-on

Industrial PLC packs

Learning objectives

- To study and set up various types of PLC
- To program a PLC
- To set up industrial communication

Main industries

- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Basic M340 pack**
	300 x 300 x 400 mm
Weight	2.5 kg
	M340 Modbus pack
	300 x 300 x 300 mm
	6 kg
	M340 Modbus Eth pack
	300 x 300 x 300 mm
	6 kg

Presentation

This offer covers the M340 programmable controller as well as industrial buses and networks (Modbus, CANopen, ASI and Ethernet). Depending on the chosen modules, the user will be able to find out about the different programming types, and the various communication and control functions.

Description

The first pack below corresponds to the basic offer.
The next packs offer specific extra components.

Basic M340 Modbus pack
- 1 M340 Modbus processor + USB
- 1 x 230 V power supply
- 1 x 16-input module with screw terminals
- 1 x 16-relay output module with screw terminals
- 1 expandable rack with 4 slots
- 1 PC to PLC USB cable

M340 Modbus pack
- 2 (instead of 1) 16-input modules with screw terminals
- 1 expandable rack with 8 slots (instead of 4)

M340 Modbus Ethernet pack
- 1 M340 Modbus CPU + USB + Ethernet FTP + 1 x 8 MB memory card
- 1 expandable rack with 8 slots (instead of 4)

M340 Modbus Ethernet CANopen pack (3 networks + web)
- 1 M340 Modbus and CANopen CPU + USB + 1 Ethernet FTP module and web, 1 x 8 MB memory card
- 1 expandable rack with 8 slots (instead of 4)

Add-ons
- Process control add-on:
  - 1 module with 4 isolated analog inputs + terminals
  - 1 module with 2 isolated outputs + terminals
- AS-i add-on:
  - 1 AS-i module
  - 1 addressing pocket terminal
  - 1 module with 4 inputs/4 outputs + connection accessory
  - 1 control station with pilot lights + connection accessory
  - 1 AS-i bus power supply
  - 1 AS-i cable, 20 m long

M340 PLC

Benefits

- Predefined bundle
- Low-cost solution

To order

MD1AP34MN	Basic M340 Modbus pack
MD1AP34M	M340 Modbus pack
MD1AP34ME	M340 Modbus Ethernet pack
MD1AP34MEC	M340 Ethernet CANopen pack
MD1AP34R	Process control add-on for M340 pack
MD1AP34ASI	AS-i add-on for M340 pack

Introduction to programmed logic
ZELIO case

Learning objectives
- To understand programmed logic
- To program an automation system

Main industries
- Electrical engineering
- Civil engineering
- Industrial maintenance
- Automation engineering

Characteristics

Power supply	230 V/30 VA
Dimensions (H x W x D)	130 x 350 x 380 mm
Weight	3.5 kg

Presentation
This case is designed to introduce students to programmed logic. It provides a complete gradual teaching method for students to learn how the Zelio module performs, using various programming languages (Ladder, FBD).

Description
The Zelio case comprises:
- 1 Zelio module with 10 I/O
- Zelio Soft programming software
- 1 EEPROM backup memory
- 6 illuminated selector switches for the inputs
- 4 indicator lights for the outputs
- 1 PC/USB cable

Bluetooth variant
The programming cable has a Bluetooth interface which can be used to program the Zelio module from the PC.

Benefits
- Very easy to learn
- Examples of commercial and industrial applications
- Low-cost equipment

To order

MD1ZELIO	Zelio case
MD1ZELIOB	Zelio Bluetooth case

Panel-mounted training PLCs

Learning objectives

- Zelio: To program in Ladder (LD) or Function Block Diagram (FBD) language with Zelio Soft 2 software
- Twido: To program in Instruction List (IL) or Ladder (LD) language with TwidoSuite software
- TSX37 Micro and TSX57 Premium: To program in Grafcet (SFC), Ladder (LD), Structured Text (ST), Instruction List (IL) language with PL7 Micro or PL7 Pro software
- TSX57 Premium and M340: To program in LD, FBD, SFC, ST and IL language with Unity Pro software

Main industries

- Automation engineering

Characteristics

Power supply	230 V/30-100 VA
Dimensions (H x W x D) **Weight**	**Zelio** 130 x 290 x 300 mm 2 kg
	Twido 150 x 290 x 300 mm 3 kg
	TSX37 Micro 250 x 400 x 410 mm 5 kg

Presentation

These panels are designed for studying PLC programming and creating programs in specific languages.
They can be used for debugging automation systems of increasing complexity, working with various functions (time delay, comparator, register, calculations, process control, communication, etc.).
For the M340 and Premium panels, the I/O cards or smart modules can be adapted on request.
Programming software is only provided for Zelio and Twido modules.

Description

All the panels consist of the basic composition, complemented by the specific devices described below.

Basic composition
- 1 PLC
- 1 simulator for the inputs (except on the Zelio panel)
- 1 x 24 VDC/3 A power supply
- 1 PC/PLC cable
- Safety sockets connected to the I/O

Zelio panel
- Zelio module with 12 inputs/8 outputs (discrete) (without simulator)
- Zelio Soft programming software

Twido panel
- Twido compact PLC with 14 inputs/10 outputs (discrete)
- TwidoSuite programming software

TSX37 Micro panel
- TSX3722 Micro PLC with 16 inputs/16 outputs (discrete) + 3 inputs/1 output (analog)

TSX57 Premium panel
- 1 Ethernet Premium CPU (PL7 or Unity) with 16 inputs/16 outputs (discrete) + 4 inputs/4 outputs (analog)
- 1 rack with 8 slots

M340 panel
- 1 M340 Ethernet/Modbus CPU with 16 inputs/16 outputs (discrete) + 4 inputs/2 outputs (analog)
- 1 rack with 6 slots

Zelio panel

M340 panel

Benefits

- Ready-to-use PLCs
- Safe, rugged wiring

To order

MD1AE125	Zelio panel
MD1AE120	Twido panel
MD1AE110	TSX37 Micro panel
MD1AE130	TSX57 Premium panel
MD1AE130UTY	TSX57 Premium panel in Unity
MD1AE150	M340 panel

PLC and display unit on control desk
TSXBT control desk

Nouvelle version

Learning objectives

- To program a PLC with Unity Pro
- To study the display unit
- To program the HMI terminal with Vijeo Designer
- To operate the terminal
- To manage breakdowns via feedback from the terminal

Main industries

- Electrical engineering
- Automation engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/120 VA
Dimensions (H x W x D)	620 x 625 x 380 mm
Weight	21 kg

Presentation

The TSXBT control desk consists of an M340 PLC whose discrete I/O are remotely located in the form of switches and sockets.
A switch is used to select either the control desk inputs or the inputs of an external operative part. The analog I/O are remotely located in the form of female connectors. The male connectors are pre-wired. A MAGELIS terminal acts as a human-machine interface which can be used in run mode or programming mode by means of a selector switch.

Description

- 1 M340 Ethernet PLC
- 16 discrete inputs hardwired on switches and on JAEGER 27-pin connectors
- 16 discrete outputs hardwired on double-recess plugs and on JAEGER 19-pin connectors
- 4 analog inputs on JAEGER 4 and 8-pin connectors
- 1 voltage and current analog output, on JAEGER 4-pin connectors
- 1 voltage and current analog output, on double-recess sockets
- 1 x 5.7” HMISTU Ethernet colour touch screen terminal
- 1 x 24 VDC 4 A power supply on sockets
- 1 set of programming cables for the PLC and display unit
- 1 set of cables with round male connectors and flying leads

Benefits

- Can be used on its own or as a PC to control an operational part
- Safe system

To order

MD1AE170	M340 control desk + STU HMI

Automation modular offer

Learning objectives

- To study and set up various types of PLC (Twido, M340):
  - programming
  - communication with variable speed drives, networked motor starters, etc.
  - process control functions
- To learn about industrial communication networks and buses (Modbus, CANopen, ASi, Ethernet)
- To study human-machine interface terminals

Main industries

- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V/150 VA
Dimensions (H x W x D)	**Frame**
	942 x 950 x 400 mm
Weight	6.5 kg
	Single module
	245 x 150 x 70 mm
	0.7 kg
	Double module
	245 x 300 x 70 mm
	1.4 kg

Presentation

This offer can be used to build automation system architectures, using the most commonly used components and communication networks. It can be used to learn about Twido and M340 PLCs, communication between PLCs and industrial devices, and also human-machine interface terminals.

Composition

Two basic offers are available, with Twido or M340 PLCs.
They include the modules below.
You can also order each module separately according to requirements.

Twido entry-level modular offer		MD1AMLTW
Support frame	1	MD1AM000
Twido module with 24 inputs and 16 outputs	1	MD1AM0002
Module with 16 discrete inputs with ribbon cables	1	MD1AM0005
Module with 16 discrete outputs with ribbon cables	1	MD1AM0006
24 VDC/2.5 A power supply module with cable	1	MD1AM4001
Display module	1	MD1AM0008
Machine control module	1	MD1AM7002

M340 entry-level modular offer		MD1AMLMR
Support frame	1	MD1AM000
M340 module with 1 card with 16 inputs and 16 outputs	1	MD1AM0003
Module with 16 discrete inputs with ribbon cables	1	MD1AM0005
Module with 16 discrete outputs with ribbon cables	1	MD1AM0006
24 VDC/2.5 A power supply module with cable	1	MD1AM4001
Display module	1	MD1AM0008
Machine control module	1	MD1AM7002

XBTR411 module

Benefits

- Quick, safe setup
- Rugged wiring on safety sockets

To order

MD1AMLTW	Twido entry-level modular offer
MD1AMLMR	M340 entry-level modular offer

Automation operative part modular offer

Learning objectives

- To apply commands from a PLC to a single operative part
- To control discrete elements or variations on a reversing or non-reversing motor
- To control temperature
- To control barrier or traffic light control systems
- To control a press sequence

Main industries

- Automation engineering
- Industrial maintenance

Characteristics

Power supply Dimensions (H x W x D) Weight	**Motor** 230 V/400 V - 0.18 kW 250 x 390 x 205 mm 7 kg
	Conveyor belt 230 V/400 V - 0.18 kW 330 x 1050 x 350 mm 10 kg 330 x 2050 x 350 mm 15 kg
	Modules 24 VDC/48 VDC 250 x 110 x 70 mm 0.7 kg

Presentation

The operative parts (OP) included in this offer are designed for totally safe connection to modules in the motor starter and automation modular offers (see pages 111 and 145).
They are used to display correct operation of an automation sequence created in a modular offer.
The operative parts in the modular offer can also be used with other PCs.

Description

- Plinth-mounted 180 W 230/400 V asynchronous motor
- Plinth-mounted 180 W 400/690 V asynchronous motor
- 180 W 230/400 V motorized fan unit with vent stack (see page 88)
- 1 m or 2 m tabletop conveyor equipped with:
  - 2 photoelectric sensors
  - 180 W 230/400 V asynchronous motor
- Traffic management module representing traffic lights at a crossroads
- Automatic barrier, taking safety features into account
- Temperature controller, for studying process control:
  - oven heated by incandescent lamp (0-10 V)
  - PT100 probe
  - measurement transmitter
- Process control module: simulates a punching system

1 m conveyor

Traffic management

Benefits

- Quick, safe setup
- Rugged wiring on safety sockets
- Compact operative parts

To order

MD1AMP001	180 W 230/400 V motor
MD1AMP013	180 W 400/690 V motor
MD1AMP014	180 W 230/400 V motorized fan with stack and ball
MD1AMP002	1 m conveyor
MD1AMP024	2 m conveyor
MD1AMP003	Traffic management
MD1AMP005	Automatic barrier
MD1AMP006	Temperature controller
MD1AMP008	Process control

HMI packs

Learning objectives

- To understand and use HMI functions
- To tackle supervision functions
- To study and set up various types of touch screen terminal
- To learn about Vijeo Designer software

Main industries

- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V/6 to 20 W
Dimensions (H x W x D)	**HMI655 pack**
	300 x 300 x 400 mm
Weight	7 kg
	HMI855 pack
	300 x 300 x 400 mm
	7 kg
	HMI07 pack
	300 x 300 x 300 mm
	7 kg

Presentation

This offer discusses the various types of touchscreen graphic display terminal in the MAGELIS range (HMISTU, XBTGTO, HMISCU) and the Vijeo Designer programming software.
Depending on the chosen modules, the user will be able to find out about the different programming options, and the various communication functions.

Description

HMISTU Small panel display pack
- 1 HMISTU655/HMISTU855 terminal, 3.5”/5.7” TFT screen, 32 MB memory, 1 RS 232/485 com port, 1 Ethernet port, 2 USB ports, 22 mm diam fixing holes
- 1 x 1.8 m HMI/PC programming cable
- 1 HMI/M340 PLC cable
- 1 HMI/TSX PLC cable
- 1 x 24 VDC 1.2 A power supply
- 1 Vijeo Designer Lite software for STO and STU HMI display

HMIGTO Advanced panel Optimum display pack
- 1 HMIGTO3510/HMIGTO4310/HMIGTO5310 terminal, 96 MB memory, 1 RS232 com port, 1 RS485 com port, 2 USB ports, 1 Ethernet port
- 1 x 24 VDC 3A power supply
- 1 HMI/M340 PLC cable
- 1 HMI/TSX PLC cable
- 1 tower light on USB (GTO4310, GTO5310)
- 1 x 4 GB memory card (GTO3510, GTO5310)

HMI Controller display pack
- 1 x 5.7” controller terminal with 8 inputs/8 outputs (discrete), 4 inputs/2 outputs (analog)
- 1 x 180 W 230 V drive
- 1 x 24 VDC 3 A power supply
- 1 module with 20 remote I/O on CANopen
- 1 SubD/RJ45 CANopen cable
- 1 programming cable
- 1 tower light

Benefits

- Low-cost solution
- Predefined package

To order

MD1APHMI655	Ethernet colour 3.5” HMI pack
MD1APHMI855	Ethernet colour 5.7” HMI pack
MD1APHMI07V2	Web server colour 7.5” XBT pack
MD1APHMI10V2	Web server colour 10.4” XBT pack
MD1APHMISCU	Magelis HMI SCU HMI controller pack

Touchscreen HMI mobile cabinet

Learning objectives

- To understand and master the fundamental principles of communication
- To set up exchanges between an HMI and a communicating system
- To learn the basics of supervision

Main industries

- Electrical engineering
- Industrial maintenance
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V/20 W
Dimensions (H x W x D)	291 x 341 x 128 mm
Weight	3 kg

Presentation

This cabinet can be used to view the data in a teaching system without affecting its integrity.
Screens can easily be developed using the Vijeo Designer configuration software (not supplied). The interface with the teaching system is via an RJ45 connection.

Description

- 5.7” colour touchscreen display
- 24 VDC power supply for the display
- Industrial Ethernet switch with 4 ports
- USB, Ethernet and RS485 connections

Benefits

- Creation of screens for a teaching project
- Vijeo Designer tutorials available on the Internet
- External display of system data

To order

MD1AEHMI85	Touchscreen HMI mobile cabinet

RFID pack

Learning objectives

- To understand RFID data transmission technology
- To set up products and configure the station numbers
- To set up Modbus/TCP communication between the stations and the PLC

Main industries

- Electronic engineering
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V/60 VA
Dimensions (H x W x D)	400 x 600 x 600 mm
Weight	6 kg

Presentation

The RFID pack can be used to study and set up an access control, identification and tracking application.
Each station has an address in the network with read/write access. Addressing is very easy to do, using a special badge provided. Data is stored in the badge or in the label illustrated.

Description

This RFID pack comprises:
- 1 Twido PLC with 40 I/O, Ethernet port
- 1 Ethernet concentrator box for 3 read stations
- 2 read/write stations
- 2 x 2 m extension cables for the stations
- 1 x 24 VDC power supply, 1.2 A with cable for the concentrator box
- 1 Ethernet switch with 5 ports
- 1 x 2 m Ethernet cable for the concentrator box/switch
- 2 switch/PC and switch/PLC Ethernet cables
- 1 set of 10 RFID badges
- 2 station configuration badges
- 1 set of 5 RFID round labels
- 1 PLC programming cable
- 1 TwidoSuite software

Benefits

- Low-cost solution
- Complete predefined package
- Creation of a mini-project

To order

MD1PACKRFID	RFID pack

RFID card game modular offer

Learning objectives

- To understand RFID data transmission technology
- To learn about the communication mechanisms between Modbus/TCP IT equipment:
  - addressing a read/write station
  - calculating a data item, 16-bit encoding
  - writing data encoded in a badge
  - reading an encoded badge
  - analysis of a 16-bit response
- To display Modbus frames
- To use interactive card games
- Programming in Windows and JavaScript on Magelis

Main industries

- Electronic engineering
- Sustainable development and environment engineering
- Electrotechnical engineering
- Electronic engineering

Characteristics

Power supply	230 V/10 W
Dimensions (H x W x D)	**Support frame** 1030 x 910 x 400 mm
Weight	6.5 kg
	Single module 244 x 150 x 70 mm
	0.7 kg
	Double module 244 x 300 x 70 mm
	1.4 kg

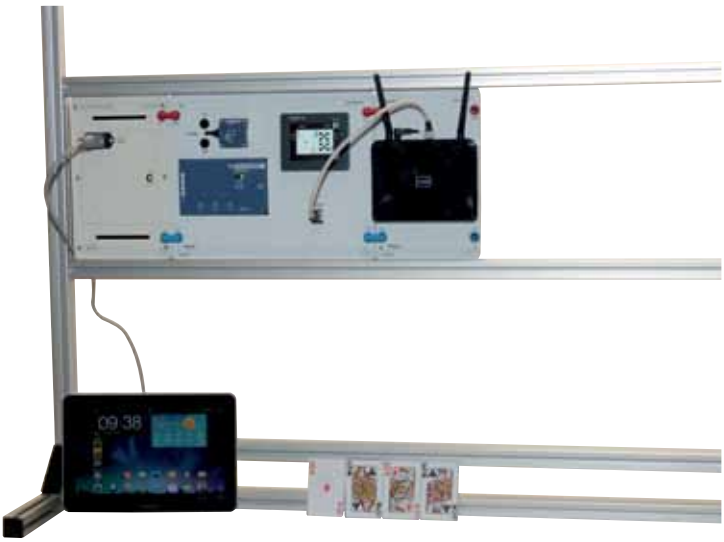
Presentation

This offer is used to learn about RFID transmission technology, based on an interactive card game.
It can also be used to introduce students to communication between Modbus/TCP IT equipment.
A computer can be connected either with a wired connection, or wirelessly, to display the frames and data transmitted on the bus.

Composition

The basic offer consists of the elements below.
The games and teaching applications are supplied on CD, as well as an Android app for tablets.
You can also order each module separately according to requirements.

RFID card game modular offer		MD1AMLRFID
RFID module	1	MD1AMP016
24 VDC power supply module	1	MD1AM4001
Wi-Fi router module	1	MD1AM2010



Benefits

- Frame reading app on a tablet
- Quick, safe setup
- Fun aspect to the equipment

To order

MD1AMLRFID	RFID card game modular offer

RFID case

Learning objectives

- To understand RFID data transmission technology
- To configure the station numbers
- To set up Modbus/TCP communication between the stations and the PLC

Main industries

- Electronic engineering
- Electrotechnical engineering
- Automation engineering
- Industrial maintenance
- Electronic engineering

Characteristics

Power supply	230 V/60 VA
Dimensions (H x W x D)	260 x 555 x 465 mm
Weight	8 kg

Presentation

The RFID case can be used to study and set up an access control, identification and tracking application.
It comprises a programmable logic controller connected to two compact read/write stations, via an Ethernet box.
Each station has an address in the network with read/write access.
Addressing is very easy to do, using a special badge provided. Data is stored in the badge or in the label illustrated.

Description

The case comprises:
- 1 Twido PLC with 40 I/O, Ethernet port
- 1 HMI terminal
- 1 Ethernet concentrator box for 3 read stations
- 2 read/write stations
- 1 x 24 VDC power supply
- 2 circuit breakers
- 1 Ethernet switch with 5 ports
- 1 set of 10 RFID badges
- 2 station configuration badges
- 1 set of 5 RFID round labels
- 1 PLC programming cable
- 1 TwidoSuite program

Benefits

- Case is quick to set up
- Ethernet/Modbus/RFID communication setup
- RFID communication diagnostics

To order

MD1AAVRFID	RFID case

Industrial communication modular offer

Nouveau

Learning objectives

- To configure an industrial fieldbus network
- To diagnose a communication fault
- To program an exchange using Unity Pro
- To define a communication architecture
- To choose a communication medium

Main industries

- Electrotechnical engineering
- Electronic engineering
- Industrial maintenance
- Automation engineering
- Electrical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D)	**Frame**
Weight	1030 x 910 x 400 mm
	6.5 kg
	Modules
	244 x 150 x 70 mm
	0.7 kg

Presentation

Industrial automation solutions rely increasingly on communication networks and fieldbuses.
This modular offer can be used to quickly create a communication configuration with the most common protocols: Ethernet TCP IP, CANopen, MODBUS serial, etc.
Inter-PLC exchanges are possible by adding the modules illustrated in our “Modular Offer” catalogue to your configuration.

Composition

The MD1AMLCOM global offer consists of the modules below.
You can also order each module separately according to requirements.

Industrial communication modular offer		MD1AMLCOM
Support frame	1	MD1AM000
24 VDC 2.5 A power supply module	1	MD1AM4001
Multi-communication M340 PLC module	1	MD1AM0024
5.7” touchscreen graphic terminal module	1	MD1AM0016
Ethernet switch module	1	MD1AM0025
Ethernet router module	1	MD1AM0026
Modbus hub module	1	MD1AM0011
Ethernet/Modbus gateway module	1	MD1AM0022
Power meter module connected via Modbus	1	MD1AM2003
Module with 3 current sensors, 50/5 A	1	MD1AM2004
Ethernet remote I/O module	1	MD1AM0023
CANopen remote I/O module	1	MD1AM0028
Modbus RFID sensor module	1	MD1AM0021
Modbus CANopen variable speed drive module	1	MD1AM5001
Thermal-magnetic protection module	1	MD1AM1004

Benefits

- Quick, safe setup
- Rugged wiring on safety sockets
- Scalable solution

To order

MD1AMLCOM	Industrial communication modular offer

Industrial communication on pre-wired grid

Nouveau

Learning objectives

- To connect a bus or network
- To configure an industrial fieldbus network
- To diagnose a communication fault
- To program an exchange using Unity Pro
- To define a communication architecture
- To choose a communication medium

Main industries

- Electrotechnical engineering
- Automation engineering
- Automation engineering
- Electrical engineering

Characteristics

Power supply	230 V
Dimensions (H x W x D) Weight	**Modbus+Ethernet version** 800 x 600 x 250 10 kg
	Ethernet version 800 x 600 x 250 10 kg

Presentation

Automation solutions rely increasingly on communication networks and fieldbuses. These configurations can be used to learn about the most common protocols: Ethernet, CANopen, Modbus, etc.
The pre-wired grid solution can be used to replicate an industrial control system installation with the different types of communication between sensors, PLCs and actuators.

Description

Two pre-wired grid versions are available:

Modbus + CANopen version
- 1 Modbus CANopen M340 PLC
- 1 Modbus hub
- 1 set of CANopen connections
- 1 colour touchscreen display
- 1 Modbus power meter
- 1 CANopen remote I/O module
- 1 Modbus CANopen communicating drive

Ethernet version
- 1 M340 Ethernet PLC
- 1 I/O simulator
- 1 M221 PLC
- 1 switch
- 1 colour touchscreen display
- 1 Ethernet remote I/O module
- 1 Ethernet communicating drive
- 1 Ethernet RFID sensor

Benefits

- Ready-to-use solution
- Scalable solution

To order

MD1AE34MC	Modbus CANopen communication grid
MD1AE34E	Ethernet communication grid

Communication case

Learning objectives

● To communicate on RS232 point-to-point LAN: ASCII character, format, bitrate, control, PC and PLC configuration
● To study the concepts of master/slave, addressing, polling
● To study the concepts of protocol, transparency and system requests
● To communicate in conversational mode between PC and PLC
● To study web technology on an Ethernet LAN:
○ PC and web browser configuration
○ site update
○ creation of HTML pages
OFS, OPC Factory Server: object concept which allows IT applications (VB, C++) to access the PLC memory
● To set up remote access to a PLC via a LAN:
○ Xway, IP addressing
○ using the XIP driver on Ethernet
● To set up an exchange between PLCs via an Ethernet LAN
○ IP addressing, subnet mask
○ SNTP server
● To set up remote management and remote programming:
○ with HTML pages
○ with PL7 Pro software and XIP driver

Main industries

● Electrotechnical engineering
● Automation engineering
● Electronic engineering
● Industrial maintenance
● Electrical engineering
● Mechanical engineering

Characteristics

Power supply	230 V/850 VA
Dimensions (H x W x D)	560 x 470 x 330 mm
Weight	20 kg

Presentation

The communication case can be used to study and set up different industrial communication networks and buses. It features a multi-protocol Premium PLC, a Twido PLC and a MAGELIS HMI terminal.

Description

The case comprises:
● 1 TSX57 Premium PLC, with:
○ 1 Ethernet TCP/IP module
○ 1 ASI module
○ 1 RS232/485 and Modbus serial link module
○ 1 Unitelway channel
● 1 Modbus splitter box
● 1 ASI bus power supply and an ASI bus with ASI control station
● 1 XBT R HMI terminal
● 1 Twido PLC with Ethernet port and I/O on 25-way SubD connectors

Benefits

● Quick, safe setup
● Existing control system network
● Measuring points provided for analyzing exchange frames

To order

MD1AE845TW	Communication case

Communication case for teaching

Teaching com case

Learning objectives

- To understand and master the fundamental principles of communication
- To set up exchanges between PLCs and display units
- To act as basic equipment for academic training on the communicating LV switchboard

Main industries

- Electrical engineering
- Electrotechnical engineering

Characteristics

Power supply	230 V/130 VA
Dimensions (H x W x D)	500 x 450 x 270 mm
Weight	12 kg

Presentation

This case contains LV switchboard communication solutions for teaching purposes. It can be used to experiment and exchange data via Modbus between subsystems, characterized by a Zelio or a Twido to a TSX37 Micro. This information can be viewed on a display unit or supervision system.

Description

- 1 TSX37 PLC with Modbus card
- 1 Modbus cable splitter box
- 1 Zelio PLC with 10 I/O with Modbus module
- 1 Twido PLC with 40 I/O with 14-input simulator, and 1 RS 485 port for Modbus
- 1 x 24 VDC power supply
- 1 x 3.5” touchscreen terminal
- 3 projecting communication sockets (USB, Ethernet, RS 485)
- 1 Zelio programming cable
- 1 Twido/TSX37 programming cable
- 1 PLC/terminal cable
- 1 slot provided for the TSXETZ510 Ethernet module (not supplied)

Benefits

- Quick, safe setup
- Introduction to industrial communication
- Communication between 3 different types of PLC

To order

MD1AE845BP	Communication case for teaching

Systems & subsystems

Systems & subsystems

Industry & machines

Systems & subsystems

3D operative parts of industrial machines
FACTORY I/O

Nouveau

Learning objectives

- To understand how to program a control system (M340 or M221 PLCs)
- To simulate operative parts interactively
- To diagnose malfunctions

Main industries

- Industrial maintenance
- Electrotechnical engineering
- Automation engineering
- Automation engineering

Characteristics

Recommended configuration	FACTORY I/O compatible from Windows XP onwards

Presentation

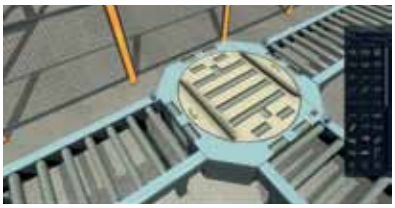
FACTORY I/O is an educational software tool for teaching users how to program M340 and M221 industrial PLCs.
The virtual environments proposed are realistic because of the total interactivity offered and the quality of real-time 3D graphic animations, dynamics and sounds.
It can be used to build, simulate and repair breakdowns on virtual industrial systems. The systems are connected electrically to the PLCs.
The simulator provides access to an operator panel with an AUTO mode, an emergency stop and 3 pushbuttons (START, STOP, RESET).
This software was developed by the University of Reims Champagne Ardennes and the REAL GAMES company. It is marketed by Schneider Electric with an interface unit.

Description

Each reference consists of:
- 1 FACTORY I/O software program
- 1 interface unit
- 1 complete PLC with pre-wired terminals or pre-wired terminals only (PLC must already be owned in this case)

FACTORY I/O software
- Software access rights via a code
- Virtual machines configured easily using 60 elementary objects
- 6 preconfigured mock-ups:
  - 3 case sorting systems
  - 1 Pick & Place system
  - 1 automated vertical magazine feed

FACTORY I/O can also be combined with other PLCs.
In this case, use the modular offer reference with safety socket unit.



Benefits

- New version with configurable operative part
- I/O wired connections for maintenance
- Possible to create faults

To order

MD1S3DM340APF	FACTORY I/O software + M340
MD1S3DM340BF	FACTORY I/O software + terminals for M340
MD1S3DM221APF	FACTORY I/O software + M221
MD1AM0030	FACTORY I/O software + modular offer unit

Mock-up for introduction to the traffic management automation system
Traffic management

Learning objectives

- To study and configure operation of signals at a crossroads:
  - manage a barrier with vehicle present
  - program a normal and flashing operating cycle
  - manage a pedestrian call
- To grasp the concepts of the following automation systems:
  - switch from wired logic to programmed logic
  - study of GRAFCET cycles
  - study of upcounters and downcounters
  - study of time delays and monostables
  - study of run modes (jog, manual, automatic)

Main industry

- Automation engineering

Characteristics

Power supply	230 V/80 VA
Dimensions (H x W x D)	**Operative part**
	270 x 350 x 80 mm
Weight	2 kg
	Zelio control part
	130 x 290 x 310 mm
	2 kg
	Twido control part
	130 x 380 x 350 mm
	3 kg
	TSX37 control part Micro
	220 x 380 x 350 mm
	4 kg
	M340 control part
	220 x 380 x 350 mm
	4 kg

Presentation

The traffic management mock-up can be used for familiarization with the control system on an easily understandable application.
The languages used, depending on the type of PLC, are LADDER, GRAFCET or FBD (Function Block Diagram).

Description

Operative part
- Traffic light management
- Pedestrian call
- Priority choices, etc.

Control part
- 1 PLC on a control desk, from the following:
  - Zelio
  - Twido
  - TSX37 Micro
  - M340
- I/O on connectors
- 2 ribbon cables

Benefits

- Introduction to the control system

To order

MD1AE214	Traffic management operative part
MD1AE713ZL	Zelio traffic control part
MD1AE713TW	Twido traffic control part
MD1AE216	TSX Micro traffic control part
MD1AE216MR	M340 traffic control part

Mock-up for introduction to the lift automation system
Lift mock-up

Learning objectives

- To study how a lift works:
  - car floor calling
  - car return journey with and without stopping
  - locking operation, up/down collective
- To grasp the concepts of the following control systems:
  - switch from wired logic to programmed logic
  - study of GRAFCET cycles
  - time delay function
  - working on words and bits
  - using an animation table
  - program section organization

Main industries

- Automation engineering

Characteristics

Power supply	230 V/50 VA to 130 VA
Dimensions (H x W x D) **Weight**	**Operative part** 800 x 440 x 440 mm 12 kg
	Twido control part 160 x 290 x 310 mm 3 kg
	TSX37 Micro control part 210 x 290 x 310 mm 4.5 kg
	M340 control part 200 x 290 x 310 mm 3.8 kg

Presentation

The lift mock-up can be used for familiarization with the control system on an application including numerous conditions to be managed.
The languages used, depending on the type of PLC, are LADDER, GRAFCET or FBD (Function Block Diagram).

Description

Operative part
- Lift with five floors
- Landing door contact
- Floor control in car
- Landing call buttons
- Car arrival sensors

Control part
- 1 PLC on a control desk, from the following:
  - Twido,
  - TSX37 Micro
  - M340
- I/O on connectors
- 2 ribbon cables

Benefits

- Control system expertise

To order

MD1AE254	Lift operative part
MD1AE256TW	Twido lift control part
MD1AE256	TSX Micro lift control part
MD1AE256MR	M340 lift control part

Mock-up for introduction to the surface treatment system control system
TS1

Learning objectives

- To study how surface treatment works:
  - manual control of the cage
  - cage return journey with stopping
  - semi-automatic cage travel
  - cyclic programming
  - cage return journey automatic cycle with passage through the tanks
- To grasp the concepts of the following automation systems:
  - sequential programming
  - managing run and stop modes (GEMMA)
  - study of a linear GRAFCET
  - programming in LADDER
  - using monostable and bistable blocks
  - using time delay blocks
  - using comparison blocks

Main industries

- Automation engineering

Characteristics

Power supply	230 V/80 VA to 120 VA
Dimensions (H x W x D)	**Operative part** 400 x 700 x 350 mm
Weight	18 kg
	Twido control part 170 x 290 x 310 mm
	2 kg
	TSX37 Micro control part 210 x 380 x 350 mm
	5 kg
	M340 control part 230 x 290 x 310 mm
	4 kg

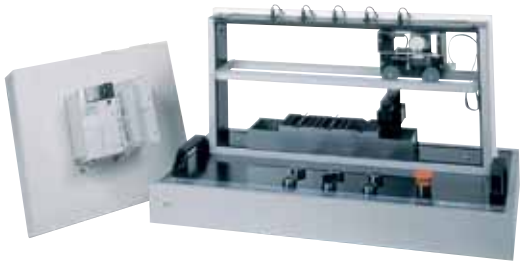
Presentation

The surface treatment mock-up can be used for familiarization with the control system on a sequential application with run mode management. The languages used are LADDER, GRAFCET or FBD (Function Block Diagram), depending on the type of PLC used.

Description

Operative part
- 1 hanging cage
- 5 sensors along the line of travel
- 2 up/down sensors
- 3 surface treatment tanks
- 3 treatment stations
- 2 loading/unloading stations
- 4 buttons (up/down/left/right)
- 1 selector switch (man/zero/auto)
- 1 Start cycle button
- 1 emergency stop button

Control part
- 1 PLC on control desk with I/O on connectors with ribbon cables:
  - Twido
  - TSX37 Micro
  - M340
- I/O on connectors
- 2 ribbon cables



Benefits

- Introduction to the control system

To order

MD1AE224	Surface treatment operative part
MD1AE226TW	Twido surface treatment control part
MD1AE226	TSX Micro surface treatment control part
MD1AE226MR	M340 surface treatment control part

Wiring panel for intermediate certification

Learning objectives

- To configure the power meter
- To load the test program in the PLC
- To test general operation
- With the non-wired version, you can:
  - install components as per the drawing
  - wire up the power and control components
  - wire up the Ethernet components
  - configure the power meter
  - load the test program in the PLC
  - test general operation

Main industry

- Electrical engineering

Characteristics

Power supply	400 V
Dimensions (H x W x D)	660 x 535 x 200 mm
Weight	15 kg

Presentation

This wiring panel replicates the power and control circuits of a conveyor system with 2 carriers.
It is part of the teaching material for intermediate certification in two units of the French professional baccalaureate: UP1 (preparation for creating an electrical installation) and UP2 (verification of the operation of an electrical installation).
The panel is available in 2 versions:

- Non-wired panel (kit supplied as separate components)
- Panel wired and assembled

Description

The panel kit comprises:

- 1 wiring panel
- 1 power incomer terminal block
- 1 x 24 VAC transformer
- 1 x 24 VDC power supply
- 1 set of circuit breakers
- 1 isolating switch
- 1 switch disconnector
- 1 x 4-pole busbar system
- 1 contactor
- 1 changeover contactor
- 1 thermal-magnetic circuit breaker
- 1 TeSys U motor starter with Modbus port
- 1 Twido PLC with Modbus port
- 1 power meter with 3 CTs
- 2 control boxes with buttons and indicators
- 1 terminal block for connecting the boxes and limit switches
- 5 limit switches

Benefits

- Specially-designed panel for intermediate level certification
- Choice between wired version and non-wired version
- Can be mounted in the containment cabinet (see page 108)

To order

MD1AAPCBPNC	Non-wired panel (separate kit components)
MD1AAPCBP	Wired panel

1 digital axis training bench
Digital axis

Learning objectives

- To learn about the different position control principles
- To understand the mechanical and dynamic phenomena associated with position control (acceleration, moving mass, accuracy, etc.)
- To set up a drive card

Main industries

- Electrotechnical engineering
- Automation engineering

Characteristics

Power supply	230 V/360 VA
Dimensions (H x W x D)	**Operative part**
	400 x 920 x 430 mm
Weight	40 kg
	Control part
	600 x 560 x 310 mm
	30 kg

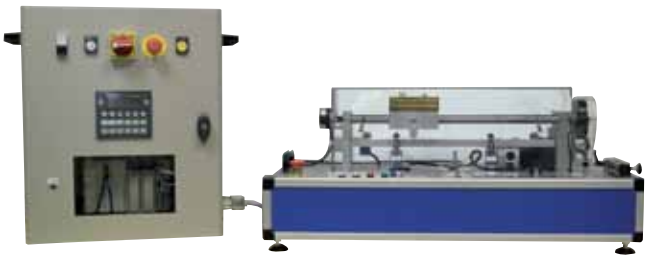
Presentation

This bench is used to study position and velocity servo control of a moving part. It is controlled by a Premium PLC with a drive card. This controls a servo-motor with brake and a tachogenerator. An encoder at the end of the shaft gives the position to the drive card.
The carriage in the operative part can hold 3 different loads, and also 3 loads at the end of the shaft.
The operative part can be positioned vertically.

Description

Operative part
- 1 variable-inertia axis with 600 mm stroke
- 1 variable-inertia moving part, driven by a ball screw
- 1 DC motor 200 W 300 rpm
- 1 drive card
- 1 x 400 pt/rev incremental encoder
- 1 mimic diagram with measuring points

Control cabinet
- 1 TSX57 Premium PLC with 8 inputs/16 outputs (discrete)
- 1 TSXCAY21 axis control module
- 1 Magelis XBT HMI terminal
- Protection and power supply circuits
- Removable connectors for connecting the operative part



Control part + operative part

Benefits

- Use of a drive card
- Control in open loop or closed loop mode
- Operative part can be used in horizontal or vertical position

To order

MD1AE793	Digital axis - control part
MD1AE794	Digital axis - operative part

Level control training bench
NIVOREG

Learning objectives

- To study the behaviour of a system
- process control with or without pure delay time
- To understand the parameters accuracy
- and stabilization of a process
- To study simple, cascaded or feedforward loops:
  - P, PI, PD, PID with digital output
  - two states ON/OFF with discrete output
  - three states ON/OFF with outputs
  - hot/cold with digital outputs
  - split-range with digital outputs
  - IMC (model-based controller) with digital output
  - feedforward (predictive control) with digital output

Main industries

- Electrotechnical engineering
- Automation engineering
- Electrical engineering
- Engineering

Characteristics

Power supply	230 V/270 VA
Dimensions (H x W x D)	700 x 780 x 450 mm
Weight	46 kg

Presentation

The NIVOREG bench is used to study a process control system such as those found in continuous industrial processes.
The aim is to control water level and water flow in different system conditions/disturbances.
The bench consists of 2 water columns: one for the tank, the other for displaying the level control.
3 pumps are installed in the base to perform the filling, emptying and system disturbance functions.
A tap at the top of the tank means the system can operate in a stable or unstable state.

Description

This process control bench consists of a monobloc structure comprising:
- 1 operative part made up of 2 water columns
- 3 filling, emptying and disturbance pumps
- 1 control part with an M340 PLC
- 1 Magelis XBTGT terminal for controlling, configuring and displaying the curves
- 1 set of sensors for pressure, flow rate and level

Benefits

- Compact system
- Configuration of the various process control loops
- Operation on a touchscreen with graph plotter

To order

MD1AE885	NIVOREG process control bench

1 brushless axis training bench
XYLOPHONIS

Learning objectives

- To learn about the special features and capacities of brushless motors
- To use the different operating modes: position control, velocity or current
- To study the kinematic problems of positioning a moving part on a real-life system
- To calculate the kinematics and sizing of the assembly: drive, motor, gearbox, braking resistor
- To set up a Lexium servo drive
- To study the principles of servo control
- To control and configure:
  - in disconnected mode on the drive or using the PowerSuite software
  - remotely via the CANopen bus

Main industries

- Electrotechnical engineering
- Electrical engineering
- Engineering science

Characteristics

Power supply	230 V/200 VA
Dimensions (H x W x D)	680 x 780 x 460 mm
Weight	50 kg

Presentation

The XYLOPHONIS bench replicates a Z axis in an industrial application which requires large dynamic displacement.
It consists of a moving electromagnet with a variable load and a hammer to play the 14 xylophone keys.
To avoid acoustic discomfort the hammer is on a ratchet mechanism.
The motor-drive unit consists of a BSH brushless motor and a Lexium drive. The control system consists of a M340 PLC with CANopen bus to control the drive.

Description

Operative part
- 1 xylophone with fourteen notes
- 1 carriage guided on the vertical axis by two ball bushings, driven by a notched belt, stroke 330 mm
- 3 masses from 1 to 3 kg
- 1 x 1.4 Nm servo motor with encoder, 8:1 planetary gearbox, and holding brake
- 2 mechanical limit switches
- 1 detector for homing
- 1 safety limit switch on the access door

Control part
- 1 Twido or M340 PLC with 14 inputs/10 outputs (discrete) and a CANopen communication module
- 1 Lexium servo drive with CANopen bus
- 1 HMI terminal with prerecorded melody and 3 different tempos

Benefits

- Study of a position and velocity servo control system

To order

MD1AE965TW	XYLOPHONIS (Twido version)
MD1AE965MR	XYLOPHONIS (M340 version)

Pneumatic joystick with rotary actuator
Pneumatic arm

Learning objectives

- To study and set up a pneumatic unit
- To program and run an automated system
- To make adjustments and maintain the pneumatic components

Main industries

- Electrical engineering
- Industrial maintenance
- Electrotechnical engineering
- Industrial maintenance
- Industrial maintenance

Characteristics

Power supply	230 V/100 VA
Compressed air	5 bar
Dimensions (H x W x D)	**Operative part**
Weight	400 x 467 x 400 mm
	14 kg
	Control part
	160 x 290 x 240 mm
	4.3 kg

Presentation

The pneumatic arm is used to move a mechanical part with 5 degrees of freedom (2 rotations, 3 translational moves). Setup consists of running the wiring between the arms, the control desk and a PLC panel (not provided) using the set of cables.
The movement cycle should be programmed in Ladder (LD) or Structured Text (ST).
The equipment is made by FBO and marketed by Schneider Electric.

Description

Operative part
- 1 air conditioning unit with manual valve and pressure gauge
- 1 soft starting unit with solenoid valve
- 5 bistable 5/2 directional control valves, 24 VDC electrical control
- 5 pneumatic actuators: rotating body, up/down, forward-back, rotation of grip, opening/closing of grip
- Inputs and outputs on safety sockets and Sub-D connector

Control part
- 1 control desk:
  - box with a connection diagram and safety sockets
  - operating and signalling controls for wiring the safety circuit and managing the run modes (automatic, manual and fault signalling)
- 1 set of safety leads

Option:
To create the automation sequence, we suggest using our panel-mounted TSX37, TSX57, M340 PLCs with a minimum of 16 I/O (see page 143).

Control desk

Benefits

- Option of connecting a PLC on sockets or with Sub-D connectors
- Optimized GRAFCET program
- Use of different programming languages (LD and ST)

To order

MD1AE973	Control desk
MD1AE974	Pneumatic joystick operative part

5-movement joystick

Learning objectives

- To analyze the various components and their effects (functional analysis)
- To take the wiring diagram into account
- To take the different run modes into account (GEMMA)
- To study and debug parts of the programs (from the simplest to the most sophisticated)
- To make adjustments and perform mechanical debugging
- To work on the electrical and mechanical parts

Main industries

- Industrial maintenance
- Industrial maintenance
- Industrial maintenance

Characteristics

Power supply	230 V/130 VA
Compressed air	6 bar
Dimensions (H x W x D) **Weight**	**Operative part** 580 x 820 x 520 mm 32 kg
	TSX37 Micro control part 220 x 380 x 350 mm 4 kg
	M340 control part 220 x 380 x 350 mm 4 kg

Presentation

This equipment represents an industrial automatic assembly station. A cylindrical part is taken by the arm's gripper, laid on the punching station, and then removed. The system has 5 degrees of freedom for the arm and various sensors and actuators.

Description

Operative part
- Structure typically with secure access
- 1 product supply station
- 1 x 5-movement pneumatic joystick
  - double-acting cylinders
  - 3/2, 4/2 directional control valve
  - track grip system
- 1 punching station
- 1 station for removing parts
- 1 batch of parts
- 1 control desk

Control part
- 1 panel-mounted TSX37 Micro or M340 with 32 inputs/24 outputs (discrete)
- 1 set of rolled ribbon cables

Benefits

- Working on WORDS and BITS
- Time delay and counter programming
- Use of different languages (SFC, ST, FBD)

To order

MD1AE914	5-movement joystick operative part
MD1AE913	TSX Micro control part
MD1AE916MR	M340 control part

Automatic part sorting subsystem
FORMATRIS

Learning objectives
- To analyze the system
- To analyze the identification technologies
- To study run and stop modes (GEMMA)
- To study GRAFCET
- To program in SFC
- To program in Structured Text
- To study linear measurement systems
- To study the load cell
- To program a 0-10 V 4-20 mA signal

Main industries
- Industrial maintenance
- Industrial maintenance
- Industrial maintenance

Characteristics

Power supply	230 V/200 VA
Dimensions (H x W x D)	450 x 860 x 720 mm
Weight	51 kg
Compressed air	6 bar

Presentation
This equipment simulates an industrial automatic part sorting system according to a number of criteria: type of material, weight, dimensions.
The application provided sets up the entire system and offers three run modes: automatic, jog and manual.
The HMI terminal is used to view the result of measurements and to calibrate the analog measurement device.
Programming software (not supplied) can be used to customize operation, display the GRAFCET cycle and data tables in real time.

Description
Operative part
- 1 belt conveyor fitted with a geared motor
- 4 double-acting pneumatic cylinders
- 1 photoelectric cell
- 1 inductive sensor
- 2 capacitive sensors
- 1 x 0-10 V analog limit switch
- 1 4-20 mA analog load cell
- 12 parts to be sorted according to the following criteria:
  - type of material (plastic or metal)
  - weight of the part
  - dimensions and shape (presence of hole and/or groove)

Control part
- 1 TSX Micro or M340 PLC
- 1 programmable LCD HMI terminal
- Bistable 4/2 electro-pneumatic interfaces
- Control relays

Benefits
- Study of both discrete and analog sensors
- Compact equipment
- Programming in different languages

To order

MD1AE955MI	FORMATRIS with TSX Micro PLC
MD1AE955MR	FORMATRIS with M340 PLC

Automated drilling system
PERCETRIS

Learning objectives

- To study and justify the various sensor technologies (photoelectric, inductive, capacitive, fibre optic, analog)
- To select and size electrical and pneumatic actuators
- To analyze and justify a pneumatic supply structure (isolator, blocker, directional control valve)
- To justify the choice of electrical protection components
- To configure drive operation
- To measure current and voltage at the motor terminals
- To program all or part of the production cycle (OR or AND cycle, hierarchical Grafcet, work on words, Ladder language, counter, time delay, etc.)
- To set up GEMMA loops
- To set up analog I/O cards

Main industries

- Industrial maintenance
- Automation engineering
- Industrial maintenance

Characteristics

Power supply	230 V/3 kVA
Dimensions (H x W x D)	1820 x 1450 x 600 mm
Weight	175 kg
Compressed air	6 bar

Presentation

This industrial equipment can be used to create an automated manufacturing cycle for drilling a pulley wheel. The cycle is as follows: arrival of parts on the station, positioning, checking of the type of material, weight, size, drilling operation, sorting and removal on the basis of characteristics decided by the operator (parts OK/NOK).

Description

- 1 monobloc frame
- 1 parts transfer belt
- 1 waiting area
- 1 part inspection station
- 1 drilling unit
- 1 sorting and removal station
- 1 control cabinet incorporating the control systems
- Sensors: inductive, capacitive, photoelectric, linear, analog, magnetic with pressure drop
- Pneumatic control systems: cylinders and directional control valves
- 1 Magelis HMI terminal: selection guide, messages, parameter setting
- 1 M340 PLC
- 1 x 0.18 kW Altivar drive
- Safety limit switches with Preventa module
- 1 batch of parts for the process in various materials

Benefits

- Wide choice of practical exercises for several training levels
- Drilling can be simulated to avoid using up parts
- Multi-technology system

To order

MD1AE825LMR	PERCETRIS system with M340 PLC

Parcel sorting system
TAPIRIS

Learning objectives

- To set up automated management of a sorting system:
  - parcel identification and sorting
  - control system components, sensors, cylinders, variable speed drive
- To study and set up an ASi or CANopen bus
- To study communication on ASi, CANopen and Ethernet
- To communicate between PLC and PC (database)
- For electronic engineering: to study exchanges of data between the PLC and PC

Main industries

- Electronic engineering
- Electronic engineering
- Electrical engineering

Characteristics

Power supply	230 V/150 VA
Compressed air	6 bar
Dimensions (H x W x D)	**Operative part**
Weight	750 x 1730 x 540 mm
	32 kg
	Control part
	500 x 500 x 160 mm
	7 kg

Presentation

TAPIRIS simulates an automated parcel sorting station. The parcels are represented by cubes with a label containing a barcode and geometric shapes. They should be removed to one of the three containers. Sorting generates a database which can be used in a number of ways:
- The embedded web server in the PLC Ethernet module
- The Web Designer software to create customized HTML pages in the web server
- The OPC/OFS data server software with Excel, Visual Basic

The belt and PLC panel communicate via ASi or CANopen bus.

Description

Operative part
- 1 automatic parcel loading station
- 1 conveyor belt, 1.4 m long
- 1 x 180 W geared motor
- 1 Altivar drive cabinet
- 3 photoelectric cells to detect the passage of parcels
- 1 barcode scanner to identify the parcels
- 2 cylinder removal stations
- 1 set of parcels with identification labels

Control part
- 1 TSX37 Micro/TSX57 Premium/M340 PLC
- 1 ASi or CANopen module
- 1 Ethernet module
- 1 control station
- 1 XBT terminal

Premium panel

CANopen Tapiris operative part

Benefits

- Use of an ASi or CANopen bus
- Data used with an OPC server
- Use of PLC web server

To order

MD1AE854T	TAPIRIS OP (ASi version)
MD1AE854TC	TAPIRIS OP (CANopen version)
MD1AE858	TAPIRIS CP (TSX Micro version)
MD1AE858P	TAPIRIS CP (Premium version)
MD1AE858MR	TAPIRIS CP (M340 CANopen version)
MD1AE858MRA	TAPIRIS CP (M340 ASi version)

Stage lighting gantry

Learning objectives

- To prepare a site
- To make the area safe
- To set up and dismantle an installation
- To perform commissioning and maintenance
- To conduct a mechanical and kinematic study of a hoist
- To configure and adjust a variable speed drive

Main industries

- Industrial maintenance
- Industrial maintenance

Characteristics

Power supply	400 V
Dimensions (H x W x D)	**Gantry** 2500 x 2500 x 2500 mm
Weight	**Cage** 300 x 1710 x 1710 mm
	Control desk 1150 x 800 x 505 mm

Presentation

This equipment is typical of that used by professionals in the industrial or entertainment worlds. It is designed for studying setup and maintenance of a collapsible stage lighting gantry consisting of a fixed part and a moving cage.
A graphic display terminal is used to control the motors and adjust the cage position.
Two programs to handle the cage and a program to control spotlights are installed in the PLC.
The equipment is made by ELECTRONA and marketed by Schneider Electric.

Description

Standard version

- 1 collapsible gantry made of triangular aluminium beams
- 1 moving cage whose position and velocity are servo controlled by 4 motors with encoders
- 4 x 125 daN chain hoists, 1 of which has a rope drive, slings and fixing clamps
- 1 x chain hoist for assembly/dismantling operations
- 1 base-mounted control desk with Twido PLC, with braked castors
- Altivar drives on CANopen bus and graphic display terminal
- 1 set of connecting cables with connectors
- 2 storage trolleys mounted on braked castors:
  - for the gantry and the cage
  - for the 5 hoists and set of cables
- Accessories:
  - 1 x 150 daN weight indicator
  - 1 strain gauge, 0-10 V analog output

Available as an option

- 1 set of 4 colour LED spotlights
- 1 pre-wired electrical cabinet, for simulating repair of a hoist

Benefits

- Equipment assembly/dismantling operations
- Assembly designed for frequent operations
- Drives controlled for the cage position

To order

MD1AA770	Stage lighting gantry
UEHGJSL	Set of LED spotlights
UEHGCOFINT	Practice cabinet

Industrial packaging machine
Shrink wrapper

Nouvelle version

Learning objectives

- To commission an installation safely
- To communicate on Ethernet, CANopen and Modbus networks
- To change production
- To perform maintenance:
  - configure the temperature controller
  - troubleshoot problems with the bar cycle
  - repair a silicon-coated counterbar
- To study energy efficiency:
  - measure energy consumption
  - temperature control of the travelling sealing bar
  - temperature control of the tunnel
  - variable speed control

Main industries

- Electrotechnical engineering
- Maintenance
- Production

Characteristics

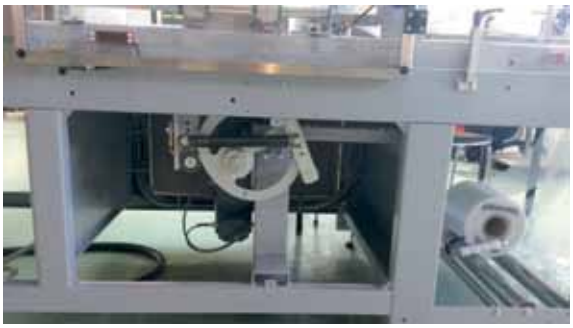
Power supply	400 V/40 kW
Dimensions (H x W x D)	2070 x 5500 x 1450 mm
Weight	1000 kg

Presentation

This industrial packaging machine is a manually-loaded shrink wrapper for agri-foodstuffs.

Description

Industrial shrink wrapper comprising the following equipment:
- Motorized upper film flow controller
- Travelling sealing bar
- Shrink tunnel
- Cooler
- Encasing
- Conveyor with square bars
- Centralized lubrication
- Multi-step detection
- Making the sealing bar safe
- Specific equipment:
  - 30 kW twin-turbine tunnel
  - roller outfeed
- Control system:
  - SoMachine or Pack Drive
  - supervision interface



Mechanical cam for moving the sealing bar

Benefits

- Mechanical cam for moving the sealing bar
- Energy efficiency study with high power
- Consumables provided

To order

MD1FARD	Industrial shrink wrapper

Integrated production system
PRODUCTIS

Learning objectives

- To use an integrated system for packaging tablets
- To set up multi-product production management with a combination of manual and automatic stations
- To study how a workshop is organized (time management, production changeovers, quality monitoring)
- To carry out maintenance operations:
  - dismantling/reassembly of stations (4-station version)
  - replacing sensors
  - sensor cylinder adjustments
  - troubleshooting

Main industries

- Automation engineering
- Automation engineering
- Mechanical engineering
- Engineering

Characteristics

Power supply	400 V/2.6 kVA
Dimensions (H x W x D)	1850 x 1150 x 2150 mm
Weight	340 kg
Compressed air	6 bar

Presentation

PRODUCTIS replicates a pharmaceutical packaging line. Beads representing tablets are distributed into bottles. The system consists of 2 filling stations and 2 capping stations. A wire mesh conveyor transfers pallets holding the bottles from station to station. With 2 bead colours and 2 bottle heights, numerous different types of production are possible.
In its standard 4-station version, 2 stations (capping and filling) can be dismantled for maintenance to be performed mechanically away from the machine (mechanical stands provided).
In the 2-station version, the stations are fixed and adjustments are made on the machine.
The capping and filling stations with their stands are also sold separately as subsystems for practising maintenance operations. If mounted on PRODUCTIS they will be recognized by the control system.

Description

Standard 4-station version
- Mechanically-welded frame with wire mesh conveyor
- 90 W asynchronous motor
- 2 removable transparent protective casings with safety switches
- 2 fixed stations: bottle filling and capping-inspection
- 2 equivalent stations (subsystems) which can be dismantled
- 2 stands for reassembling and adjusting subsystems
- 1 M340 PLC
- Ethernet communication architecture
- 1 HMI terminal for controlling and monitoring production
- RFID pallet detection
- 1 set of accessories (pallets, white beads, green beads, large bottles, small bottles, caps)

2-station version
Same composition with just 1 filling station and 1 capping station

Subsystem
Subsystems are supplied with a stand for assembly and cables with flying leads.

Benefits

- PRODUCTIS runs with reusable bottles and beads: no consumables
- Compact equipment
- System with realistic industrial proportions

To order

MD1AE905MR	PRODUCTIS M340 with 4 stations
MD1AE905MR2P	PRODUCTIS M340 with 2 stations
MD1AE903	Bottle filling station
MD1AE904	Bottle capping-inspection station

Flexible dosing line

Nouveau

Learning objectives

- To learn about a flexible dosing line in the pharmaceutical field
- To run, manage, adjust and control an industrial flexible line
- To carry out maintenance operations
- To manage production flows and the manufacturing range
- To study control systems and communication networks

Main industries

- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	400 V/12 kVA
Dimensions (H x W x D)	1850 x 3650 x 1350 mm

Presentation

The flexible dosing line is a combination of 3 complementary devices:
- PRODUCTIS (see page 173)
- the Pick and Place joystick (BEMA)
- the logistics storage system (BEMA)

Performs the following operations:
- automatic feeding of bottles and caps
- distributing tablets into the bottles
- capping the bottles and discarding any products declared NOK
- packing capped bottles in a box
- automatically removing the box
- storage in defined areas, counters

The tablets, bottles, caps and boxes can be reused.
Equipment developed jointly with BEMA.

Description

- The joystick is responsible for:
  - supply
  - unloading
  - putting bottles from the PRODUCTIS unit into boxes

It has 6 storage magazines (bottles, caps and box) and can manage 2 box fill operations simultaneously. Once a box is full, it is automatically removed to the storage area.
- The purpose of the logistics storage system is to dispatch the boxes into 5 different storage areas according to storage commands that are either programmed or come from upstream production zones.

For a detailed configuration, please contact us.

Benefits

- Compact industrial line
- 6 workstations
- Numerous manufacturing combinations

To order

MD1AE905MR	PRODUCTIS M340 with 4 stations
UEHGLFDOS	Joystick + storage system
UEHGLFDOSIMP	Labelling machine + barcode printing software

Packaging line
Sleeving

Nouveau

Learning objectives

- To perform commissioning
- To make mechanical and pneumatic adjustments
- To control a line
- To change production
- To perform diagnostics
- To automate the line
- To study diagrams
- To produce a mechanical design
- To study different wave technologies

Main industries

- Maintenance
- Production
- Electrotechnical engineering
- Engineering

Characteristics

Power supply	400 V/10 kW
Dimensions (H x W x D)	2000 x 3000 x 1000 mm
Compressed air	6 bar

Presentation

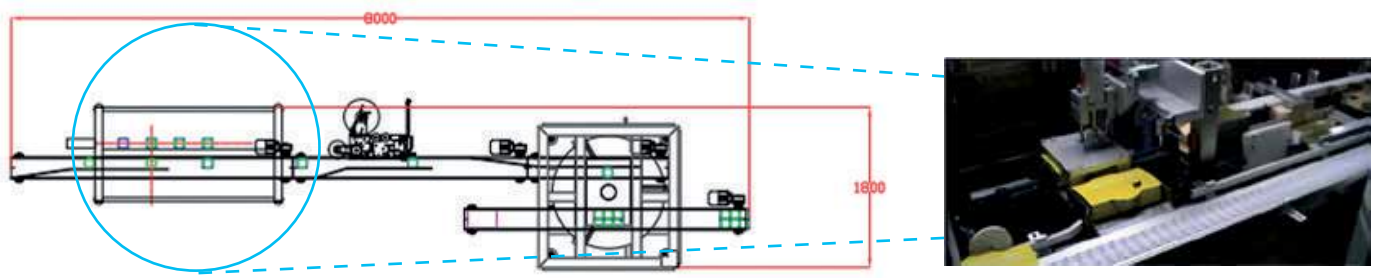
With this industrial packaging line, the products are overwrapped in sleeves, labelled, then placed in trays.
The line performs the following functions:

- Selecting a product to overwrap
- Unstacking the sleeve on the filling station
- Checking that products and sleeves are present on the various stations
- Transferring products, sleeves
- Unloading the sleeve
- Option of dummy run operation (without sleeving)

The consumables - products, sleeves and master trays - can be reused.

Description

- Synchronous motor
- Asynchronous motor
- Variable speed drive
- Linear cylinder
- Sercos axis controller
- Safety module on Sercos
- Touchscreen HMI
- Ethernet network, Sercos III bus



Benefits

- Multi-technology industrial machine
- Multi-discipline teaching equipment
- Can be operated using an iPad

To order

UEHG FOURREAU	Sleeving packaging line

Packaging line
Tray packing

Nouveau

Learning objectives

- To perform commissioning
- To make mechanical and pneumatic adjustments
- To control a line
- To change production
- To perform diagnostics
- To automate the line
- To study diagrams
- To produce a mechanical design
- To study different technologies

Main industries

- Maintenance
- Production
- Electrotechnical engineering
- Engineering

Characteristics

Power supply	400 V/10 kW
Dimensions (H x W x D)	2000 x 3500 x 1500 mm
Compressed air	6 bar

Presentation

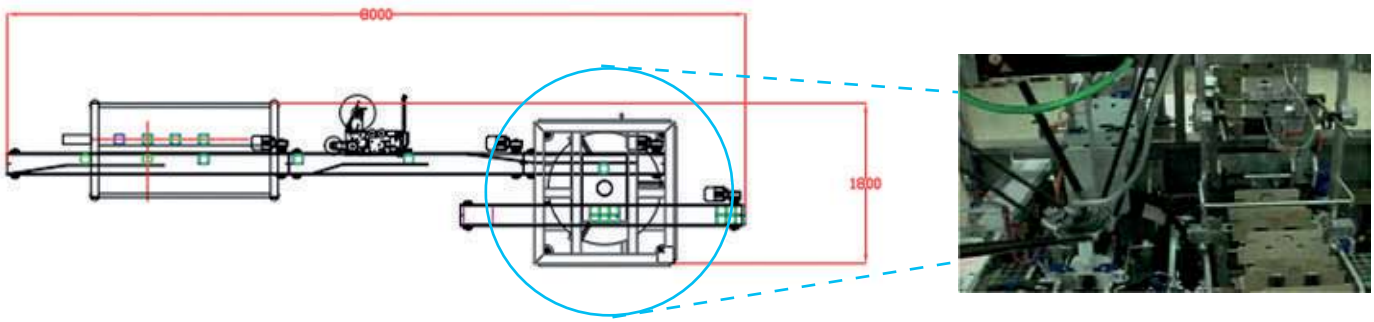
With this industrial packaging line, the products are overwrapped in sleeves, labelled, then placed in trays.
The line performs the following functions:

- Checking that trays and sleeves are present on the various stations
- Transferring sleeves to the tray packing station
- Picking up the sleeve with a vacuum gripper
- Aligning the sleeve correctly
- Inserting sleeves to create 2 rows of 3 products in 2 layers
- Removing the full tray

The consumables - products, sleeves and master trays - can be reused.

Description

- 3-axis robot
- Synchronous motor
- Asynchronous motor
- Variable speed drive
- Linear cylinder
- Sercos axis controller
- Safety module on Sercos
- Touchscreen HMI
- Ethernet network, Sercos III bus



Benefits

- Multi-technology industrial machine
- 3-axis robot
- Can be operated using an iPad

To order

UEHG BARQUETTE	Tray packing line

Assembly line
Linking assembly stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, detection, electrotechnical
- To perform a functional and structural analysis
- To study the wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust, change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D)	Transfer line only
Weight	1040 x 4250 x 700 mm
	200 kg

Presentation

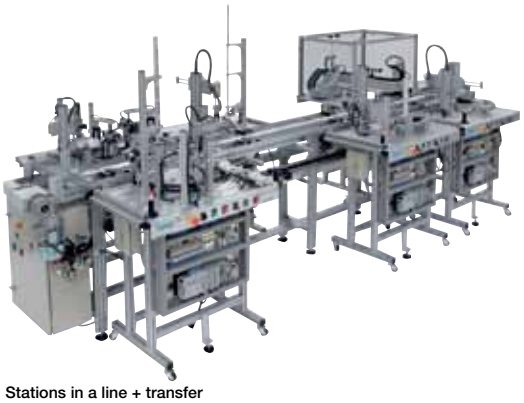
The transfer line described in this offer can be used to create a linear assembly line by linking the stations described in pages 178 to 183 (references containing ...AES...) around a central transfer system, with a maximum of 8 stations.
The parts (base, bearing, shaft, screws, cover) are assembled in stages via a pallet which travels from station to station until it reaches the inspection station.
This equipment is made by SMC and marketed by Schneider Electric.

Alternative
To create a modular assembly line, we suggest a version in which each station has its own mini-transfer system (references containing ...AESM..., pages 172 to 182).

Description

- Control and monitoring cabinet with variable speed drive, M340 PLC, Ethernet and fieldbus
- End stops, elevators and rotary pallet systems
- Transport pallet with binary identification system

Available as an option
RFID pallet identification system



Stations in a line + transfer

Modular stations

Benefits

- Numerous manufacturing options
- Line can be added to over time
- Fault creation device

To order

MD1AESC	Transfer line
MD1AESCRF	RFID option for transfer line

Assembly line (continued)
Base supply and bearing insertion stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, detection, electrotechnical
- To perform a functional and structural analysis
- To study wiring diagrams
- To perform electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D) Weight	**Base supply station** 1480 x 900 x 580 mm 120 kg
	Bearing insertion station 1430 x 900 x 580 mm 120 kg

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies.
They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.
The first station in this offer supplies the bases, the second station fits the bearings on the bases (see details below).
For a wider range of options, bearings can be fitted of different heights.
The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

Base supply station
Performs the following operations:
- Supplying bases
- Checking the base position
- Transporting the base
- Discarding incorrect bases
- Insertion in the pallet indentation

Bearing insertion station
Performs the following operations:
- Supplying bearings
- Transfer to the measuring station
- Measuring the bearing height
- Inserting the bearing

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Base station

Bearing insertion station

Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

MD1AES1	Base supply station
MD1AESM1	Base supply station with integrated transfer system
MD1AES2	Bearing insertion station
MD1AESM2	Bearing insertion station with integrated transfer system

Assembly line
Hydraulic press and shaft fitting stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use pneumatic technology
- To perform a functional and structural analysis
- To study temperature regulation
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D)	**Press station**
	1400 x 900 x 580 mm
Weight	120 kg
	Shaft station
	1800 x 900 x 580 mm
	120 kg

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies.
They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.
The first station in this offer applies hydraulic pressure to a bearing. The second station is used to supply and insert a shaft in the bearing (see details below).
For a wider range of options, there are 2 types of shaft.
The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

Hydraulic press station
Performs the following operations:
- Inserting the base + bearing assembly
- Supplying the press
- Pressing the bearing
- Taking out the assembly

Shaft fitting station
Performs the following operations:
- Supplying shafts to a rotary table
- Measuring the shaft height
- Detecting the shaft material
- Ejecting non-conforming shafts
- Inserting the shaft in the bearing

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Hydraulic press station

Shaft fitting station

Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

MD1AES3	Hydraulic press station
MD1AESM3	Hydraulic press station with integrated transfer system
MD1AES4	Shaft fitting station
MD1AESM4	Shaft fitting station with integrated transfer system

Assembly line (continued)
Cover fitting and screw fitting stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D)	**Cover station**
	1400 x 900 x 580 mm
Weight	120 kg
	Screw station
	1930 x 900 x 580 mm
	120 kg

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies.
They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.
The first station in this offer fits a cover on an assembly.
The second station is used to supply and insert screws in the base (see details below).
For a wider range of options, there are 6 different types of cover.
The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

Cover fitting station
Performs the following operations:
- Supplying covers to a rotary table
- Loading a cover
- Detecting the material
- Measuring the cover
- Ejection of non-conforming covers
- Inserting the cover

Screw fitting station
Performs the following operations:
- Supplying screws
- Transferring pallets
- Manipulating screw insertion

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Cover fitting station

Screw fitting station

Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

MD1AES5	Cover insertion station
MD1AESM5	Cover insertion station with integrated transfer system
MD1AES6	Screw insertion station
MD1AESM6	Screw insertion station with integrated transfer system

Assembly line
Robot and warehousing stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical, robotics
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D) Weight	**Robot station** 1500 x 900 x 580 mm 120 kg
	Storage station 1500 x 900 x 580 mm 135 kg

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.
The first station in this offer is a robot that performs screwing, assembly and disassembly operations.
The second station takes finished products on the main conveyor pallet, and stores them in a warehouse according to the instructions from the supervision system or from a local HMI (see details below).
The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

5-axis robot station protected by a cover
Performs the following operations:
- Screwing in 4 screws
- Assembly and disassembly of elements stored in 2 zones

Finished product storage station
Performs the following operations:
- Storage by 2-axis electrical gantry robot
- Arranging items by position

Available as an option
Touchscreen HMI

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Robot station

Storage station

Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

MD1AES7	5-axis robot station
MD1AESM7	5-axis robot station with integrated transfer system
MD1AES8	Automatic warehousing station
MD1AESM8	Automatic warehousing station with integrated transfer system
MD1AEIHM8	Optional HMI touch screen

Assembly line (continued)
Paint and quality control stations

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: electrical shaft
- To understand industrial communication (CANopen, Ethernet)
- To study the vision sensor
- To study the brushless motor
- To analyze temperature regulation
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Power supply	230 V
Compressed air	6 bar
Dimensions (H x W x D)	**Paint station** 1500 x 900 x 580 mm
Weight	120 kg
	Control station 1500 x 900 x 580 mm
	120 kg

Presentation

Automated assembly stations (pages 177 to 183) can be used to study automation functions and component technologies. They can be integrated around a pallet transfer system (maximum of 8 stations, see page 177). They are also available in a version with an integrated transfer system.
The first station in this offer represents a paint drying station. The second station checks the conformity of items manufactured by the various preceding stations (size and colour).
The equipment is made by SMC and marketed by Schneider Electric.

Description

Elements common to all stations:
- 1 electrical mounting plate (550 x 400 mm)
- 1 M340 Ethernet PLC

Paint station
Performs the following operations:
- Inserting the assembly in the oven (simulated)
- Drying operation with regulation
- Taking out the assembly

Artificial vision quality control station
Performs the following operations:
- Inserting/taking out the assembly
- Laying down on rotary table
- Inspection by artificial vision system
- Removal of defective products

Version with integrated transfer system
- 1 conveyor belt integrated in the station, equipped with a pallet indexer (remote I/O on Ethernet)

Paint station

Quality control station

Benefits

- Numerous manufacturing options
- Operation as standalone stations or in a line
- Fault creation device

To order

MD1AES9	Paint station
MD1AESM9	Paint station with integrated transfer system
MD1AES10	Quality control station
MD1AESM10	Quality control station with integrated transfer system

Assembly line (end)
Supervision and simulation

Nouveau

Learning objectives

- To learn about and gain expertise in industrial control systems
- To study components that use different technologies: pneumatic, electrotechnical, detection, variable speed control, communication
- To perform a functional and structural analysis
- To study wiring diagrams
- To analyze components and electrical wiring
- To perform commissioning
- To run and control a line
- To program, modify a program
- To adjust or change a production range
- To carry out repairs

Main industries

- Automation engineering
- Industrial maintenance
- Industrial maintenance
- Mechanical engineering
- Engineering

Characteristics

Recommended configuration	Windows XP, Vista, Windows 7

Presentation

The supervision system is used to represent the configuration of an industrial assembly line (pages 177 to 182) and to control the whole system and manage production. It records events and alarms and generates logs. It has a similar graphic interface to the real-life system, with animations.
The simulation system replicates the manufacturing stages on the various mounting stations. It can be used to practise control and programming without risking damage to the real-life system.
The equipment is made by SMC and marketed by Schneider Electric.

Description

- Supervision
  - application on a PC
  - 1 production monitoring view
  - 1 view per station
  - 1-station license
- Simulation
  - application on a PC
  - 3D views per station
  - 1-station license

Supervision

Simulation

Benefits

- Control of a production line
- Independent simulation of the line

To order

MD1AESSUP	Supervision system
MD1AESIM	Simulation of assembly stations

VIRTUAL UNIVERSE PRO 3D simulator

Nouveau

Learning objectives

- To create 3D models or complementary parts from an object library
- To test control systems, electrical and pneumatic diagrams in tandem with supply systems
- To validate PLC programs
- To simulate behaviour
- To check anticipated performance
- To work on tasks: preparing the system recipe with the customer
- To create interactive presentations
- To train operators

Main industry

- Automation engineering

Characteristics

Recommended configuration	Software bundle in the form of a software key. Windows XP, Vista, Windows 7 and 8 (32 and 64-bit)

Presentation

VIRTUAL UNIVERSE PRO is 3D software that can be used to create or import machine operative parts in order to test a functional assembly. Models can be created from an object library, or imported from CAD files. The operative parts can be simulated in real time, controlled by an M340 or M238 PLC, by an integrated virtual controller, or by computer programs with a simple IP connection.
The software is developed by IRAI and marketed by Schneider Electric.

Description

- NVIDIA PhysX 3D motor using Newton's method
- Automatic import of digital models from SOLIDWORKS, INVENTOR, CATIA
- Automatic import of 3D file formats: 3DXML, 3DS, OBJ, etc.
- Electrical, pneumatic, hydraulic diagram editor
- HMI editor for creating a control desk
- Integrated controller (Grafcet, Ladder, etc.) for:
  - completing the PLC part
  - configuring customized behaviour
- Discrete and analog control
- Simultaneous connection and viewing the status of the UNITY or SOMACHINE program
- Integration of several cameras and configuration of the décor
- Collision management

To order: xyz
x: number of VUP licenses (1 = 1 station, 2 = 10 stations, 3 = academic site)
y: number of PLCs (1 = 1 PLC/2 = 5 PLCs/3 = 10 PLCs)
z: type of PLC (1 = M238, 2 = M340 Modbus, 3 = M340 Ethernet)

Benefits

- Intuitive and user-friendly configuration
- 3D models can be optimized for greater fluidity
- Programming task freed up from the need for an operative part

To order

MDSIMUIRAxyz	VUP license with or without PLC (xyz: see above)
MDSIMUIRA100	1 station without PLC
MDSIMUIRA200	10 stations without PLC
MDSIMUIRA300	Academic site license, without PLC

Please contact us for other references

Notes

BipBop offer

Contents

Chapter 5
BipBop offer

BipBop Programme

Schneider Electric is implementing a sustainable development programme designed to provide a reliable, affordable and clean electricity supply to those who need it most worldwide.

This strategy - known as BipBop (Business, Innovation and People at the Base Of the Pyramid*) - is one of the company's Corporate Social Responsibility initiatives.

The BipBop programme involves local communities and stakeholders in each country working together to tackle three major obstacles to providing sustainable access to electricity, namely:
- lack of financial resources
- lack of equipment for accessing energy
- lack of skills and expertise

B Business

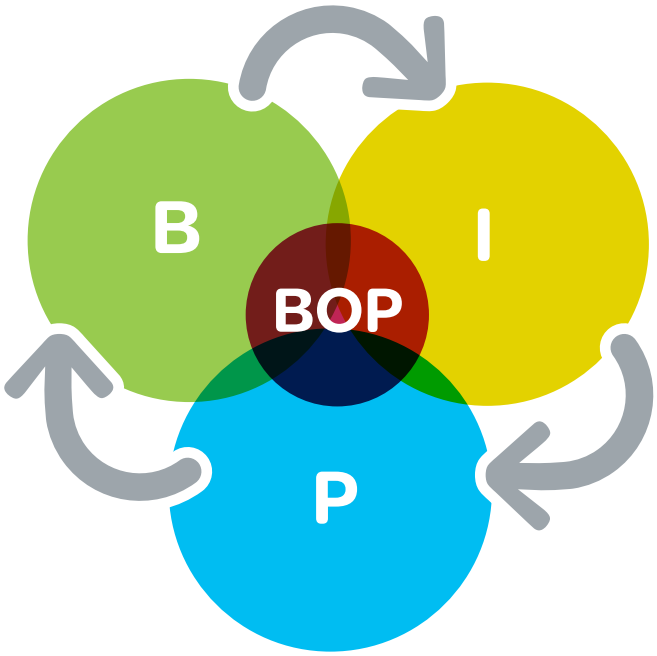
- Investing and supporting the development of businesses working in the electrical industry

I Innovation

- Designing appropriate solutions to become an electrical distribution champion and help people at the bottom of the pyramid

P People

- Educating and supporting disadvantaged people at the bottom of the pyramid by developing their energy management skills through training



** BOP = Base Of the Pyramid, an expression used to refer to the world's poorest people in a given country.*

Motor starter cabinet

Nouveau

Learning objectives

- To learn about motor starter wiring diagrams: star-delta and reversing
- To set up an asynchronous machine
- To study contactors and motor protection devices
- To select the type of motor starter according to different criteria

Main industries

- Electrotechnical engineering
- Industrial maintenance

Characteristics

Power supply	400 V/250 VA
Dimensions (H x W x D)	240 x 720 x 600 mm
Weight	20 kg

Presentation

This cabinet is designed for wiring different types of motor starter.
The transparent cover allows students to see the components.
The components are wired using safety leads.

Description

The cabinet includes the following equipment:
- 1 fused (off-load) isolator
- 1 magnetic circuit breaker
- 1 thermal-magnetic circuit breaker
- 3 contactors including 1 with auxiliary contact block
- 1 reversing contactor
- 1 thermal overload relay
- 1 x 24 VAC power supply
- 3 pushbuttons
- 1 master switch

Accessories provided
- 1 power lead
- 1 set of 4 mm safety leads
- 1 set of 2 mm safety leads

400/690 V, 180 W motor adapted for training purposes
- 1300 rpm asynchronous motor with inertia wheel, mounted on plinth
- Safety sockets for motor winding and earth connections

Benefits

- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order

MD3BPDM	BipBop motor starter cabinet
MD1AMP013	400/690 V, 180 W motor adapted for training purposes

Domestic cabinet

Nouveau

Learning objectives

- To install components: one-way and two-way switches, sockets, etc.
- To study the function of each component
- To set a programmable timer switch
- To study the impulse relay function

Main industry

- Electrician in the building sector

Characteristics

Power supply	230 V/10 A
Dimensions (H x W x D)	240 x 720 x 600 mm
Weight	16 kg

Presentation

This cabinet is designed for learning how to wire the basic functions required in a domestic or small business installation, including impulse relays, timers, timer switches and light-sensitive switches.
The transparent cover allows students to see the components.
The components are wired using safety leads.

Description

The cabinet includes the following components:
- 3 domestic sockets
- 2 two-way switches
- 3 pushbutton switches
- 1 pushbutton switch with pilot light
- 3 pilot lights
- 1 general-purpose RCBO
- 2 x 10 A and 16 A circuit breakers
- 1 timer
- 1 timer with switch-off warning
- 1 impulse relay
- 1 impulse relay with illuminated pushbutton control
- 1 programmable timer switch
- 1 light-sensitive switch

Accessories provided
- 1 power lead
- 1 set of 4 mm safety leads

Benefits

- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order

MD3BPDOM	BipBop domestic cabinet

Electrical hazards awareness cabinet

Nouveau

Learning objectives

- To make non-electricians aware of electrical hazards
- To use PPE and CPE
- To carry out basic operations on LV equipment in safe conditions
- To identify and lock out electrical circuits before working on them
- To measure an installation

Main industries

- Electrotechnical engineering
- Energy engineering
- Industrial maintenance
- Electrical engineering

Characteristics

Power supply	400 V/250 VA
Dimensions (H x W x D)	610 x 690 x 360 mm
Weight	27 kg

Presentation

This cabinet is used to make students aware of the electrical hazards present in a domestic or industrial environment.
Students equipped with their PPE will make the installation safe before working on the equipment.

Description

The domestic distribution part on the front panel of the cabinet comprises 3 circuits protected by circuit breakers:
- 1 domestic socket and 1 cable gland plate
- 1 domestic socket
- 1 switch and a light

The industrial part inside the cabinet comprises:
- 1 padlockable switch disconnector
- 1 splitter box with removable protection
- 1 thermal-magnetic circuit breaker
- 1 contactor with auxiliary contact block
- 1 motor connection to double-recess sockets
- 1 mushroom head emergency stop button
- 2 indicators and 1 start button

Accessories provided
- 1 power lead
- 1 set of 4 mm safety leads
- Fuses, socket outlets, protective covers, locking device, etc.

230/400 V, 180 W motor adapted for training purposes
- 1300 rpm asynchronous motor with inertia wheel, mounted on plinth
- Safety sockets for the earth and motor winding connections

Voltage tester and PPE kit
See page 8 (Chapter 1)

Benefits

- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order

MD3BPSRE	BipBop electrical hazards awareness cabinet
MD1AMP001	230/400 V, 180 W motor adapted for training purposes
MD1AA639	Voltage tester and PPE kit

Reactive power factor correction cabinet

Nouveau

Learning objectives

- To measure electrical values and phase shift
- To analyze reactive power consumption
- To study reactive power factor correction
- To install power factor correction capacitors
- To study overcorrection

Main industry

- Electrotechnical engineering

Characteristics

Power supply	230 V/1.3 kVA
Dimensions (H x W x D)	610 x 700 x 350 mm
Weight	40 kg

Presentation

This reactive power factor correction cabinet is equipped with 3 lights (linear loads) and 1 induction coil (non-linear load) to generate a phase shift. Correction is performed using a set of 8 capacitors. Each element is controlled separately. Current and voltage measuring points are on the side of the cabinet.

Description

The reactive power factor correction cabinet includes the following components:

- 3 halogen lights with dimmer control
- 1 phase shift inductor
- 8 capacitors
- 13 wired selector switches for creating different types of circuit:
  - 8 for the capacitors
  - 3 for the lights
  - 1 for the phase shift inductor
  - 1 for the dimmer bypass
- 1 dimmer switch
- 1 measuring point for current drawn
- 1 measuring point for the AC supply voltage
- 1 power lead

Benefits

- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order

MD3BPCER	BipBop reactive power factor correction cabinet

Earthing systems and discrimination cabinet

Nouveau

Learning objectives

- To study the different earthing systems
- To study what protection devices are used for and how they work
- To select the most suitable means of protection for an installation
- To determine the fault currents
- To study current and time discrimination

Main industry

- Electrotechnical engineering

Characteristics

Power supply	400 V/250 VA
Dimensions (H x W x D)	240 x 720 x 600 mm
Weight	20 kg

Presentation

This earthing systems cabinet is designed for studying how to protect people and equipment in a TT system installation.
The equipment comprises different electrical protection devices and resistors for simulating a person or various devices connected to the grid.

Description

The earthing systems cabinet includes the following components:
- 1 isolation transformer
- 1 set of resistors
- 1 Vigirex residual current relay
- 1 circuit breaker with shunt trip
- 1 x 300 mA RCBO
- 1 x 30 mA RCBO

Accessories provided
- 1 pushbutton to create the fault
- 1 general-purpose circuit breaker
- 1 power cable
- 1 set of 4 mm safety leads

Benefits

- Compact equipment
- Low-cost solution
- Rugged wiring on safety sockets

To order

MD3BPSLT	BipBop earthing systems cabinet

Solar-powered water extraction
SOLAR WATER

Nouveau

Learning objectives

- To learn about and set up the water extraction bench
- To study how to operate, configure and maintain ATV 312 Solar drives
- To size the photovoltaic panels needed for the bench to work

Main industry

- Electrotechnical engineering

Characteristics

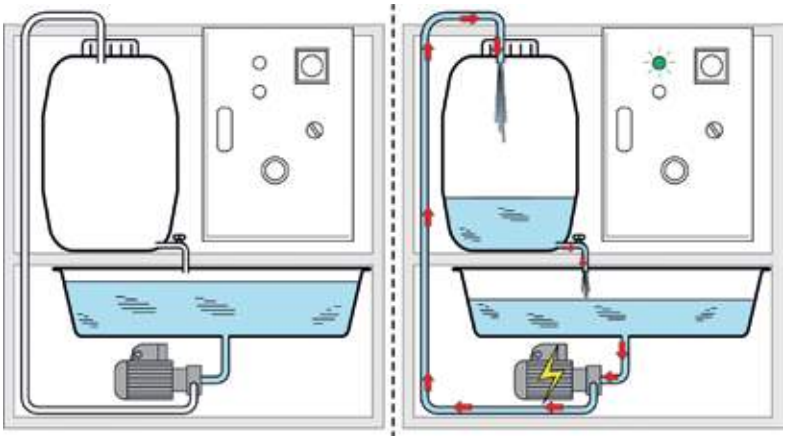
Power supply	230 V/180 W
Dimensions (H x W x D)	730 x 700 x 390 mm
Weight	40 kg empty/55 kg full

Presentation

The SOLAR WATER bench replicates a Schneider Electric stand-alone solar-powered water pumping solution for areas where it is not possible to connect to the electricity supply. Electricity is generated using photovoltaic panels to power a dedicated drive directly.
The system operates without batteries, the purpose being to provide a continuous supply of water by ensuring the tank is sized correctly according to requirements and the daily amounts of sunlight.
To facilitate use for teaching purposes, this model can be powered by a PV array with 300 VDC output, by a 24 VDC laboratory power supply, or via the AC main power supply.

Description

- 1 x 180 W Altivar 312 Solar variable speed drive
- 1 centrifugal pump
- 1 upper tank with level sensor
- 1 lower tank to simulate the water table
- 1 pump ON/OFF switch
- 1 rotary dial to vary the voltage
- 1 pump running indicator
- 1 pump fault indicator
- ! mushroom head emergency stop button
- 1 power lead
- Circuit breakers



Benefits

- Compact equipment
- Challenges of water extraction illustrated by real-life cases
- Stand-alone operation possible

To order

MD3BPODS	SOLAR WATER extraction bench

Traffic lights and lift

Nouveau

Learning objectives

- To analyze a timing diagram and transpose it into a Ladder diagram
- To translate a Ladder and FBD diagram
- To analyze a timing diagram and transpose it into a GRAFCET diagram
- To study the following control system functions:
  - time delay
  - counting
  - memory
  - conditional actions

Main industries

- Electrotechnical engineering
- Industrial maintenance

Characteristics

Power supply	230 V/10 VA
Dimensions (H x W x D)	290 x 340 x 140 mm
Weight	3 kg

Presentation

This offer comprises two separate cabinets.
The traffic light cabinet is used to study the control system for a set of traffic lights at a crossroads with a pedestrian crossing.
There are two operating modes: a 3-colour traffic signal and a flashing signal.
The lift cabinet is used to study the control system for a 4-level lift. The lift car position is displayed by red indicators and door opening/closing is indicated by LEDs. Call buttons at each landing level and in the lift car are used to call the lift to go up or down.

Description

The traffic light cabinet includes:
- 1 x 24 VDC supply
- 1 Zelio PLC
- 1 pedestrian crossing call button

The lift cabinet includes:
- 1 x 24 VDC supply
- 1 M221 PLC
- 1 mimic panel with LEDs and indicators
- Control buttons

Benefits

- Compact equipment
- Low-cost solution

To order

MD3BPXROAD	BipBop traffic light cabinet
MD3BPLIFT	BipBop lift cabinet

Services

Contents

Chapter 6
Services

E-learning
E-Learning

Nouveau

Training @

Learning objectives

- To develop a learning path for the student
- To integrate the necessary resources for completing practical exercises
- To set up one-to-one sessions to discuss results
- To assess progress by means of a mark (overall or interim percentage)
- To allow completion of work outside of school hours

Main industries

- All disciplines

Presentation

The E-learning offer provides the option to complete practical exercises in a digital format rather than on paper, as well as to follow a programme of topic-based training sessions linked up to the teaching equipment. The E-learning programme offers a more personalized approach to learning by making resources available for use by students. The main advantages of this approach are that it avoids delays in practical exercises and periods of inactivity when teachers are involved with other groups. Teachers also have greater availability in terms of monitoring student progress.

Description

- Integration of practical exercises on digital media
- Integration of topic-based training modules
- Modules (practical exercises and training sessions) distributed via an LMS platform

Benefits

- Individual programme for completing practical exercises
- Optimum conditions for students to succeed
- Learning evaluation questionnaire

To order

Training @ | Offer integrated in all our models

System modernization offer

Nouveau

Learning objectives

- To coordinate teachers for work to be carried out over a number of years depending on the complexity of the machine and/or the installed base to be retrofitted
- To manage a schedule
- To manage orders for equipment
- To program PLCs, display units, drives, etc.
- To carry out project monitoring in a real-life situation
- To commission the equipment
- To carry out wiring tasks with students
- To perform tasks led by students

Main industries

- Maintenance
- Electrotechnical

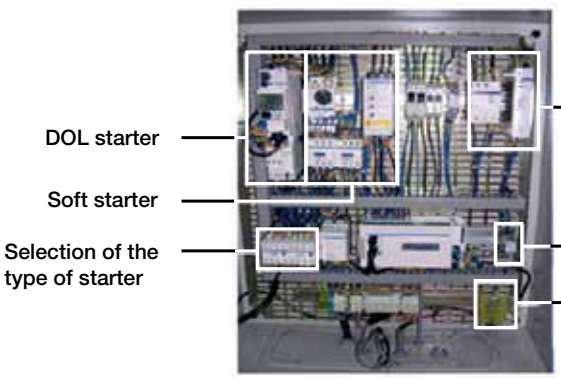
Presentation

We have a sizable installed base of training equipment in schools and colleges, much of which is outdated. We are now offering a modernization service which is designed to:

- Offer a low-cost means of retrofitting machines
- Integrate the latest technical developments
- Harmonize equipment for students in different disciplines (maintenance and electrotechnical engineering) with different qualification levels

Description

- Equipment provided at reduced cost
- Advice and expertise from Schneider Electric at the pre-project stage
- Schneider Electric support throughout the project
- Training on software and equipment for the teachers at the schools/colleges participating in the project



Retrofit plate for teaching system equipment

Benefits

- Low-cost means of retrofitting the installed base
- Harmonized equipment for different disciplines
- Suitable topic for electrotechnical engineering projects

To order

UEHGMODMAC	Machine modernization

Please contact us to define the offer

On-site commissioning

Presentation

We offer an on-site commissioning service to help you get your new Schneider Electric teaching equipment up and running as quickly and smoothly as possible.
This offer includes a half-day group training session by one of or our specialists or partners.

Conformity check
In addition to the manufacturer's certificate supplied with our equipment, we offer an on-site machine conformity check at your premises.

Communication between LV switchboard and equipment
We offer the following services to help you set up your training equipment to communicate with the Schneider Electric teaching LV switchboard:
- Integration of requirements into existing systems
- Development and modification of PLC programs and display units
- On-site program installation, installation testing and commissioning

Your Schneider Electric Education contact will help you define a specification tailored to your needs.

Note
- Installation of the necessary plumbing and electrical connections must be organized by the school/college prior to commissioning.
- The service offer references below are only available in mainland France.

Benefits

- Involvement from the manufacturer
- Customized support
- Get to grips with your new equipment more quickly

To order

MD1SMIF	Commissioning + group training
MD1SCTL	On-site conformity check

To set up communication between LV switchboard and teaching equipment: please contact us

Electric vehicle charging station

Nouveau

Presentation

This EV charging station consists of a photovoltaic shelter providing parking for 2 cars with an EV charging station equipped with 2 T3 connectors:
- The electricity generated by the PV panels is distributed to the nearest building.
- The charging station is powered via the AC power supply.

The charging station is is part of a campaign to encourage electric mobility and sustainable development: it allows both staff and visitors to charge their electric or hybrid vehicles at the school/college using “green” electricity. The aim is to balance annual PV electricity generation and EV consumption.
The station is assembled and connected to the AC power supply by Schneider Electric. A preliminary site visit is necessary to assess the site configuration and connection distances.
It is also possible to have PV electricity generation and EV charging data sent to a supervisory program or a web page (available as an option).

Description

- 1 x 25 m² shelter
- 1 x 3 kVA single-phase protection cabinet with Schneider Electric CONEXT inverter
- 1 Schneider Electric EVlink charging station with 2 T3 3kW or 7kW single-phase connectors (T2 connector option also)

Available as an option
- Supervision of PV generation and EV charging on PC
- Customized web pages
- Outdoor 46” display screen under the shelter
- Real-time display of solar power generated
- Wi-Fi hotspot on the charging station

Benefits

- Turnkey installation, showcase for the school/college
- Equipment can be dismantled and does not require planning permission
- No need for EDF subscription

To order

UEHGSTPVBC2P	EV charging station with 2 parking spaces + PV shelter

For options and different station variants: please contact us

Top-up courses

Schneider Electric runs training courses and technical days for trainers in connection with academic training programmes.

For teachers in the public sector, registration is via the CERPEP website:
➜ https://eduscol.education.fr/pid31532/stages-cerpep-de-formation-en-milieu-professionnel.html

For teachers in the private sector, registration details can be found on the CTPN website:
➜ http://www.ctpn.asso.fr/stages.php3/

Examples of SERPEP courses available

- **UNITY** Getting started and programming in UNITY: 4 days
- **SysML** modelling and programming in UNITY: 4 days
- **RT2012** Energy efficiency and PV technology: 5 days
- **SoMachine** programming in SoMachine: 4 days
- **Industrial LANs** Ethernet, Modbus, CANopen: 4 days
- **KNX certification** KNX programming with ETS5: 5 days
- **Advanced KNX application**: 3 days
- **Energy and sustainable development challenges**: 1 day
- **PSR and H&S** psycho-social risks and health and safety in the workplace: 1 day

- **Fibre optics** (by region): 1 day

Technical Days: contact your Schneider Electric Education representative to arrange

- **JTECO** energy efficiency in electrical installations
- **JTBECO** energy efficiency in buildings
- **JTDET** industrial detection
- **JTDM** motor starters
- **JTVV** variable speed control
- **JTRT2012** applying the requirements of the RT2012 energy efficiency standard
- **JTCER** reactive power factor correction
- **JTFDR** lightning protection
- **JTBTCOM** communicating switchboards
- **JTFO** fibre optics

Learning space on the website

The Schneider Electric website contains all you need to know about our education offer:

https://www.schneider-electric.fr/sites/France/fr/produits-services/enseignement/offre-pedagogique.page

From this page you can access:

- the education programme offer including details of the equipment
- the different catalogues for the education offer
- up-to-date news about Schneider Electric's educational initiatives
- Energy City, a tool to help explain various professions in the electricity sector
- a link to the Schneider Electric careers page

Energy University

https://www2.schneider-electric..com/sites/corporate/en/products-services/training/energy-university/energy-university.page

Supplement your learning with some 180 free training modules available in English to help you improve your knowledge of Data Centres and energy efficiency. You can also select modules in French on energy efficiency, smart grids, energy audits, HVAC, lighting, etc.

Your Schneider Electric Education contacts

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Product index

Product index (continued)

Reference index

Reference index (continued)

> Contact us!

Schneider Electric at your service!

Call this number to speak to a member of our dedicated sales team. Lines are open 8 am to 6 pm, Monday to Friday, all year round.

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