

Educational Solutions

Catalog 2022

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Life Is On Schneider Electric



Electrification and digitization

The fight against climate change and the revival of activity, particularly industrial activity, are two pillars defined by the state to build the France of tomorrow.

The electrification of our energy uses promotes their decarbonization, and the digital transition at work today is the foundation of energy efficiency.

These profound changes in our country, while beneficial, will require new and additional skills.

Preparing tomorrow's global players for these vital changes is our collective responsibility.

Electrification

x 2
global energy capacity by 2040

+ 80 %
new capacity in renewable energy by 2040

2016
Global investment in electricity surpasses oil and gas for the first time in 2016

30 %
fleet will be powered by electricity by 2040

Digitalization

x 10
Ten times more new devices connected than people by 2022

+ 25 %
combined annual growth rates of IP traffic from year to year

+ 40 %
productivity by 2035 through new automation techniques

And because we at Schneider Electric design, produce and implement innovative solutions for safe, efficient, reliable and clean energy, we have designed educational solutions for you to help you impart this knowledge.

Schneider Electric, a major French industrial actor and strongly implanted in the hexagon

- 30 manufacturing plants,
- more than 16 400 employees, 1 000 alternates and 700 annual trainees,
- 3 logistics centers,
- 4 research and development sites with 2500 engineers and technicians,
- 28 trade agencies.

Residential
Individual or collective

Buildings
offices, health, shops, hotels

Industry
food, metals, water, machinery

Data Center
server rooms

Energy
production, distribution, distribution, securing of the electro-sensitive industry

First user of our solutions on our industrial and tertiary sites, we can share our experience with you the new skills needs expected by the labor market on the electrical and automation trades.

Intencity, Schneider Electric's new building is the

demonstrator of its know-how

It is a cluster of technologies and common sense, based on three pillars:
Human, digital and sustainable development.

Guided tour, the way to go!



Schneider Electric Transforms its Vaudreuil site in

display case of the industry of the future

It is the demonstration of a successful digital transformation of an industrial site. Its clients can visit the site for a better understanding of the impact of the Industry of the Future

Presentation



Educational Solutions



Industrial production

Selection aid B2
Compact production lines B6
IOT Supervision B10
Augmented reality B14
Communication B15
Automation B18
Human / machine interface B28
Machine detection and security B29
Motor start B33
Variable speed and axle control B37

Smart building and smart grid

Selection aid C2
SmartGrid C4
Energy efficiency C5
Domestic C9
Electric vehicle C17
Electrical installation C19

Electrical distribution and energy

Selection aid D2
Electrical safety D6
Installation wiring D11
Protection of property and persons D16
Energy quality D19
Energy production D22

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Industrial production

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Selection aid
Industrial production

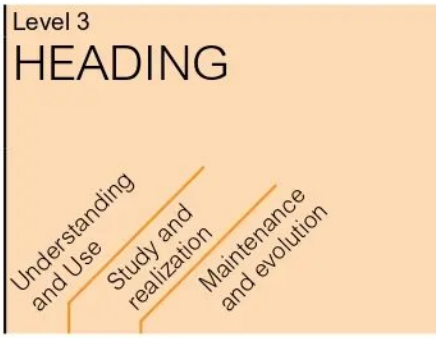
Different types of educational solutions

Pack
Business skills training through student projects.

Modular bench
Learning concepts and knowledge.

Model
Implementation of advanced technologies.

System
Complete understanding of a business environment.



Compact production lines

Smart Productis				
Smart Assemblis				

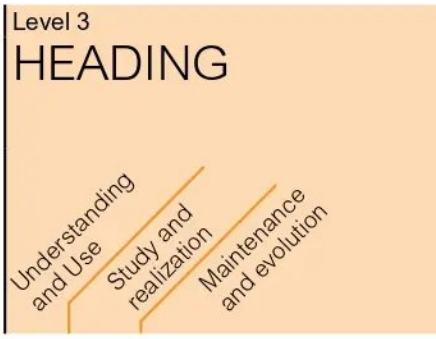
IOT Supervision

Models	IOT supervision development			
	Study of industrial supervision			
	Augmented Reality Development			
Packs	Communication add-ins			
Modular bench	Industrial communication			
Model	Industrial communication			

Automation

Packs	Automation Software			
	Initiation machines			
	Machine automation (architecture)			
	Industrial automation			
	Industrial automation (architecture)			
Modular bench	Automation			
Systems	Automatic parts sorting			
Benches	Level control study			
	Package sorting			
Pack	Congestion project WorldSkills			

	Level 4 Bac pro			Level 5 BTS			Level 6+ Bachelor, Licence Pro, Master, Engineer			Page
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Human / machine dialog

Packs	Human-machine dialog displays			
	RFID Add-in			
Modular benches	RFID deck			
	Safety of machinery			
	Machine security non-material barrier			
Pack	Motor Start			
Modular bench	Motor Start			
Bench	Motor Start			
Packs	Electronic starters			

Variable speed and axle control

Packs	Speed switches			
	Servo motors			
	Linear axes			
Model	Training controllers			
Benches	Speed change with motor			
	Charging bench for training controller			
Modular bench	Controller Discovery Altivar 320			
Pack	Automatic machines (advanced architectures)			

	Level 4 Bac pro			Level 5 BTS			Level 6+ Bachelor, Licence Pro, Master, Engineer			Page
	Understanding and Use	Study and realization	Maintenance and evolution	Understanding and Use	Study and realization	Maintenance and evolution	Understanding and Use	Study and realization	Maintenance and evolution	
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Smart Productis



References

Bottles filling station for Productis	**MD1AE903**
Bottles capping station for Productis	**MD1AE904**
Cyber Smart Productis	**MD1AE905CYB**
IoT Productis Box	**MD1AE905IOTB**
Productis Sensor Batch	**MD1AE905IOTC**
Smart Productis 2 x M580	**MD1AE905M5802P**
Increased Reality Productis	**MD1AE905RA**
AR Smart Productis without tablet	**MD1AE905RAST**
CAMM Productis	**MD1AE905SUPG**
Renovation Productis to Smart	**MD1AER905**
Rental Productis 1 month	**MD1AL905**
Productis Digital Twins	**MDSIMAE9**

Do you have any questions about this offer?

Our team can help you.
Scan or click on the QR code:

Presentation

Smart Productis is a packaging line for the pharmaceutical or agri-food industry designed specifically for the apprenticeship of trades related to industrial processes.

The system may consist of:
- 2 filling stations,
- 2 stoppers for managing multi-batch productions.

This educational equipment offers a modular and scalable solution designed for training in industry 4.0 trades.

Benefits

Smart Productis provides access to industry 4.0 intelligence through 5 options to build a customized educational solution:
- Augmented reality
- Virtual reality
- Cybersecurity
- Performance monitoring (IIoT)
- CAMM.
- Autonomous TOR Transmitter (Xiot)
- 4G remote maintenance



Composition of your solution

Augmented reality

Augmented Reality applications developed on Schneider Electric's teaching equipment allow the performers to perform their tasks more securely and efficiently thanks to the immediate visualization of the machine's states and guided procedures.

Features:

- Performing maintenance, adjustment and logging procedures in a guided manner,
- Real-time visualization of machine states: operation, efficiency, production,
- Visualization of machine components and virtual security zones
- Access to documentation,
- Follow-up of the operations carried out and sharing between the various stakeholders.

Virtual Reality

Virtual reality enables users of Schneider Electric's educational facilities to get trained safely thanks to its immersive environment that reproduces reality. The machine's digital twin makes it possible to test out changes to the program on a computer before they are implemented on the machine.

Features:

- Guided or autonomous learning of operating procedures (modes of operation),
- Control or visualization of machine states through the link between the Twin and the Machine,
- Testing the changes to the program and the machine settings with the help of the digital twin.

Cybersecurity

Cybersecurity is an essential component of industry 4.0, which intricately connects all equipment to internal and external networks. Schneider Electric's teaching equipment makes it possible to study various protection devices (hardware and software) in the context of industrial production.

Features:

- Simulation of cyber-threats with prefabricated scripts
- Visualizing the effects of attacks on the HMI,
- Analyzing the communication frameworks or threads with WireShark software
- Programming the protection features of the Modicon M580 and the StormShield SNi40 firewall,
- Wiring of the internal and external network connections.

Performance Tracking (IIoT)

Thanks to the Connected Objects (IIoT) technology, advanced control of industrial processes is possible. Distributed as closely as possible to the strategic points of the installation, these communication sensors continuously collect the functional parameters and other data that are essential for the control and maintenance of the teaching equipment of Schneider Electric.

Features:

- Monitoring the status of and measurements of all connected sensors,
- Creating indicators from individual data and monitoring dashboards,
- Alarm configuration based on the sensor statuses and smartphone notifications
- Access to conditional maintenance by configuring thresholds on sensor data,
- Possibility of registering the sensors on the Schneider Electric server (Telemecanique Cloud Infrastructure) to configure alarms.

CAMM

The Computer-Aided Maintenance Management (CAMM) option provides an easy-to-use and efficient tool for optimizing preventive and curative maintenance operations of industrial processes.

Features:

The Lina Maintenance software allows you to discover all the functionalities of a CAMM system:

- Dashboard editing
- Equipment tracking,
- Organization of work,
- Inventory and procurement management,
- Archiving of documents and procedures.



Compact Smart Productis production line



▶ Download complete interactive documentation of Smart Products.

▶ View Smart Productis video

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **Pro PLP Level** (Production Line Driver)

Recommended training

For updating your knowledge

GREENBLT

Lean Green belt: Diagnose performance and extending the production flows

Scan or click on the QR code

Compact production lines
Smart Assemblis



Do you have any questions about this offer?

Our team can help you.
Scan or click on the QR code:

Presentation

Smart Assemblis is a modular automated assembly line of mechanical components designed to discover and understand the benefits of industry 4.0.

Its flexibility allows you to tailor solutions to your needs and respond to them.

The 11 suggested items make it possible to put together a complete automated line consisting of 3 to 10 items, while offering the possibility of independent use.

Benefits

Smart Productis provides access to industry intelligence 4.0 through five options that help in structuring a customized educational solution:
- Augmented reality (AR),
- Virtual reality (VR),
- Cybersecurity,
- Supervision,
- CAMM,
- Performance monitoring (Ilot),
- Smart Store (Ipicking),
- Change of ranges,
- Autonomous TOR transmitter (Xiot),
- 4G remote maintenance.



Composition of your solution

Augmented reality

Augmented Reality applications developed on Schneider Electric's teaching equipment allow the performers to perform their tasks more securely and efficiently thanks to the immediate visualization of the machine's states and guided procedures.

Features:
- Carrying out maintenance, adjustment and commissioning procedures in a guided manner,
- Real-time visualization of machine states: operation, efficiency, production,
- Visualization of machine components and virtual security zones
- Access to documentation,
- Follow-up of the operations carried out and sharing between the various stakeholders.

Virtual Reality

Virtual reality allows users of Schneider Electric's educational facilities to train safely thanks to its immersive environment that reproduces reality perfectly. The machine's digital twin makes it possible to test out changes to the program on a computer before they are implemented on the machine.

Features:
- Guided or autonomous learning of operating procedures (modes of operation),
- Control or visualization of machine states through the link between the Twin and the Machine,
- Testing the changes to the program and the machine settings with the help of the digital twin.

Cybersecurity

Cybersecurity is an essential component of industry 4.0, which intricately connects all equipment to internal and external networks. Schneider Electric's teaching equipment makes it possible to study various protection devices (hardware and software) in the context of industrial production.

Features:

- Simulation of cyber-threats with prefabricated scripts
- Visualizing the effects of attacks on the HMI,
- Analyzing the communication frameworks or threads with WireShark software
- Programming the protection features of the Modicon M580 and the StormShield SNi40 firewall,
- Wiring of the internal and external network connections.

Supervision

The Supervision option allows you to get familiarized with digital tools for monitoring, in real time, the operating and production parameters of industrial processes in order to significantly improve operational productivity.

Features:

- Execution of production orders,
- Monitoring of machine states and modes of operation,
- Monitoring the actuator and sensor states of all stations in the line,
- Production performance visualization
- Diagnostics in case of failure,
- Communication network administration.

CAMM

The Computer-Aided Maintenance Management (CAMM) option provides an easy-to-use and efficient tool for optimizing preventive and curative maintenance operations of industrial processes.

Features:

The Lina Maintenance software allows you to discover all the functionalities of a CAMM system:

- Dashboard editing
- Equipment tracking,
- Organization of work,
- Inventory and procurement management,
- Archiving of documents and procedures,
- Visualization of energy consumption.

▶ **Download complete interactive documentation of Smart Assemblis.**



Compact production line Smart Assemblis



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **Pro PLP Level** (Production Line Driver)

Recommended training

For updating your knowledge

GREENBLT

Lean Green belt: Diagnose performance and extending the production flows

Scan or click on the QR code

IOT Supervision

The industry of the future: Schneider Electric's vision



The concept

• Everyone is talking about it without ever fully understanding what is at stake.or even imagining the consequences it could have for the way companies function. In any case, the factories of the future will have to meet new challenges in terms of competitiveness, performance and respect for the environment.

• To do this, they have new means which are as much levers of competitiveness (technologies, methods, work organization patterns, etc.) as they open up incredible prospects.

Factory of the Future, Industry 4.0, Connected Industry

• Factory of the Future is a response to several simultaneous transitions: in terms of energy, ecological, digital, organizational and societal. Each of these transitions uses many new technologies or modes of organization that are coming of age, are in the process of development or design.

• The aim is to continue modernizing the production tool and to support companies in transforming their business models, their organizations, their design and marketing methods, in a world where digital tools are blurring the lines between industry and services.

In concrete terms, what does this factory of the future look like?

• It is built on the foundations of the present-day factory:
• the investments already committed will not be called into question,
• the focus is on the new levers of competitiveness that represent the 5 keys of the smart factory.

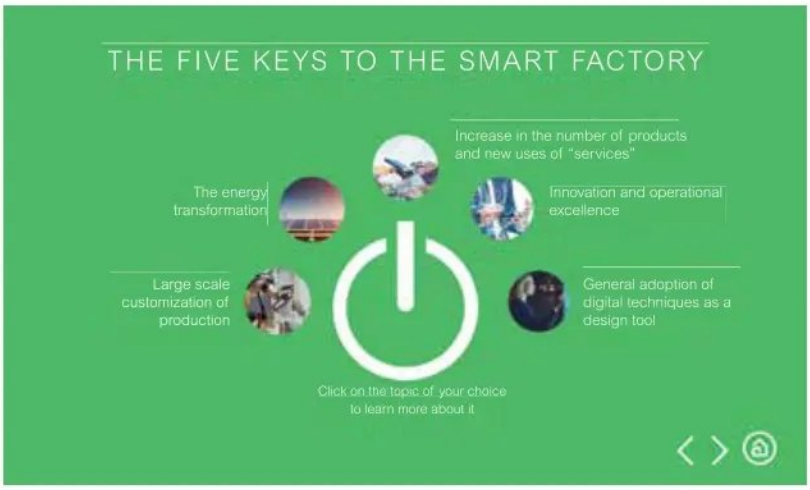
Mass production customization

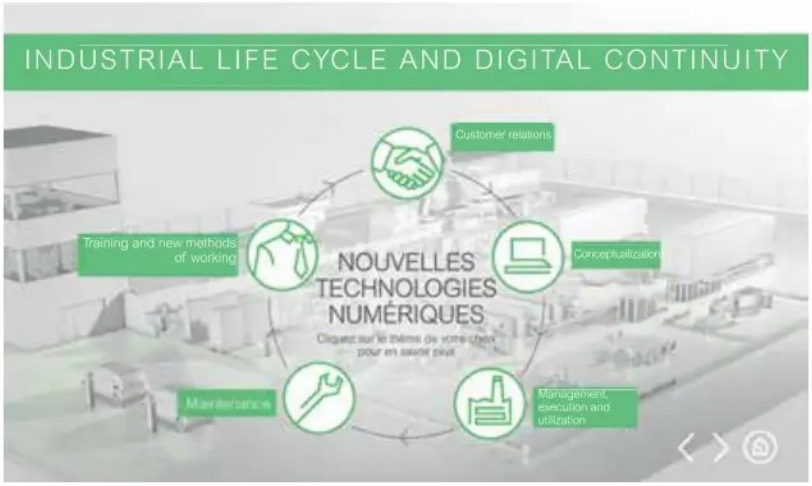
Today, the industrial sector must be able to respond to the acceleration and personalization of consumer expectations:
• on the one hand, it must deal with variable market conditions, in particular as regards the availability of resources,
• on the other hand, at the other end of the chain, the consumer now has access to an unlimited offer, everywhere and in real time.

Where products were once standardized, we must now be able to meet specific and precise needs.

The energy transition

The energy transition is now an essential component of industrial performance. The cost of energy has a strong impact on the cost of products. Added to this is the tension over access to energy resources and the environmental factor, with the need to reduce the carbon footprint.





Upgrading of products and new uses "services"

Innovation and new technological capabilities represent an opportunity to regain color in the markets and to set oneself apart with more innovative, higher-end products. It is also an opportunity for transforming customs and sometimes even for creating new business models.
The rise in the range of new products is a good way to rebuild your image in a changing world.

Innovation and operational excellence:

One of the challenges for the industry of tomorrow is to shorten the cycle from product design to market roll-out with an impeccable level of quality.

For industrial managements, this means:
- Strengthening R&D investments,
- Improving the flexibility of manufacturing tools,
- Training teams in new production methods.

In summary: gaining in intelligence and agility.

Widespread adoption of digitalization as a structuring tool:

New technologies offer opportunities for reinventing the plant and paving the way for a new industry based on:
- the digital revolution: embedded sensors, connected machines and products, Internet of things, virtualization,
- new materials: composites, nanomaterials, etc.,
- new production techniques: additive manufacturing, cobotics, augmented reality, etc.

Industrial life cycle and digital continuity

Our proposals:

1. Customer Relationship

- A generalization of the personalized offer that requires rethinking the organization of production.
- A customer at the heart of the value chain, throughout the entire industrial life cycle.
- A substitution of product marketing by usage marketing with widespread use of virtual experience before the actual market roll-out.

2. Design

- 3D modeling.
- Digital simulation.
- Process Life Management (PLM).
- Virtual reality.

3. Execution and Operations

- Process automation.
- Speed change.
- Start and Stop system.
- Robotics.
- Human Machine Dialog.
- Web Client Monitoring.
- Automated machines.

4. Maintenance

- Conditional maintenance.
- Augmented reality.
- Collaborative maintenance.

5. Training and new working methods

- Immersive virtual simulation.
- Energy management.

New digital technologies for the industry of the future:
- Cloud,
- Big Data
- Cybersecurity,
- Micro data center
- Internet of things.

IOT Supervision

Model | IOT supervision development [new]

Learning goals

- Transform industrial equipment by integrating connected objects.
- Develop or modify a product and process monitoring application using the measured data.
- Build control maps and analyze the data.

Presentation

- The Industrial Internet of Things (IIOT) is at the heart of modern industry. Measuring and analyzing product and process characteristics makes it possible to take quick and sound decisions and to anticipate and predict failures.
- IOT enables production and maintenance technicians to make safe and environmentally responsible decisions.
- This equipment enables the design and implementation of all IIOT applications:
  - Installation and connection of measurement sensors,
  - Real-time visualization of machine and process states
  - Development and presentation of statistical analysis control maps.

Description

- The IIOT development kit includes the following:
  - One WiFi server PC (screen and keyboard not included),
  - Ecostruxure Machine SCADA Expert development software (training not included: see suggestion at the bottom of the page),
  - One Ecostruxure Machine Scada Expert Builder license. (the cloud or local license must be renewed annually: click here),
  - Open source software Node-RED,
  - a Zigbee receiver for coupling wireless measurement sensors.
- The sensor pack is to be ordered separately. It includes:
  - Control devices,
  - All-or-nothing receivers,
  - Sensors for measuring temperature and electrical quantities.
- An Android or iOS tablet for operation can be provided as an option.

References

IIOT development kit		**MD4STPKDEVIOT**
Sensor Pack for IIOT Development		**MD4STPKDEVIOTCAPT**
Tablets for operation	Android	**MD1ACTABA**
	iOS	**MD1ACTABI**

The +

- Scalable industrial solution that can be adapted to suit all your systems.
- Use in development and operations.



IIOT development kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CIRA** (automatic regulation of industrial controls)
- **BTS CRSA** (design and realization of automatic systems)

Recommended training

For updating your knowledge

PRGSCA

Programming with EcoStruxure Machine Scada Expert or BLUE Open Studio

Scan or click on the QR code

IOT Supervision

Model | Study of industrial supervision IOT & AR [new]

Learning goals

- To understand the benefits of connected industrial systems for production and maintenance.
- Perform functional product & process analysis of a continuous furnace.
- Connect wireless measurement sensors.
- Understand the principle of statistical control maps.
- Operate a connected through oven and visualize drifts.
- Find the optimum (environmentally responsible) operating point of the equipment.

Presentation

- The supervision of the production and operating states of industrial equipment associated with AR (augmented reality) constitutes the foundation of modern industry. These techniques enable more production of better quality and at lower cost while optimizing the amounts of energy used.
- The purpose of this model is to sensitize to and raise awareness among future maintenance technicians and production process pilots of these new technologies.

Description

- The IIOT and AR operating kit includes:
  - a WIFI server PC (screen and keyboard not included),
  - pre-developed supervision applications and augmented reality applications,
  - a Zigbee receiver for coupling wireless measurement sensors.
- The operational part simulating an automated continuous furnace is sold separately. It includes:
  - Control devices,
  - All-or-nothing receivers,
  - Sensors for measuring temperature and electrical quantities.
- An Android or iOS tablet for operation can be provided as an option.

References

Industrial Internet of Things (IIOT) and AR (augmented reality) operating kit		**MD4STPKDID**
Automated passage (through) furnace		**MD4STPKDIDPOP**
Tablets for operation	Android	**MD1ACTABA**
	iOS	**MD1ACTABI**

The +

- Pre-developed IIOT (Industrial Internet Of Things) and AR (augmented reality) applications.
- Possibility of integrating IOT and AR development.
- Transportable secure model.



Industrial Internet of Things (IIOT) and AR (augmented reality) operating kit



Automated continuous furnace (front)



Automated continuous furnace (interior)

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **BTS CIRA** (automatic regulation of industrial controls)

Recommended training

For updating your knowledge

TPM

Total Productive Maintenance
Ensure equipment availability
Scan or click on the QR code

Model | Augmented Reality Development [new]

Learning goals

- Transform teaching equipment by integrating the possibilities of augmented reality.
- Developing or modifying an augmented reality application.

Presentation

- Reality is at the heart of the industry of the future. It allows maintenance and operations technicians to work more efficiently on their tasks and to intervene under conditions of optimum safety.
- This equipment makes it possible to design and implement all the accessible applications, thanks to augmented reality:
- Rendering useful documentation accessible from dynamic links and QR codes,
- Alerting to hazards through image recognition and measurement feedback,
- Real-time access to the operational and monitoring data of the equipment,
- Guiding stakeholders in maintenance and operations.

Description

- The augmented reality application development kit includes:
- One WiFi server PC (screen and keyboard not included),
- Ecostruxure Augmented Operator Advisor development software (training not included: see suggestion at the bottom of the page),
- an Ecostruxure Augmented Operator Advisor Builder license (the cloud or local license must be renewed annually: click here),
- Ecostruxure Operator Terminal Expert runtime software (used for its drivers),
- One Ecostructure Operator Terminal Expert Runtime license,
- One Zigbee receiver for coupling wireless measurement sensors.
- An Android or iOS tablet for operation can be provided as an option.

References

Augmented reality application development kit		**MD4STPKDEVRA**
Tablets for operation	Android	**MD1ACTABA**
	iOS	**MD1ACTABI**

The +

- Industrial and scalable solution that can be adapted to suit all your systems.
- Can be used in development and operations.



Augmented reality application development kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CIRA** (automatic regulation of industrial controls)
- **BTS CRSA** (design and realization of automatic systems)

Recommended training

For updating your knowledge

AOADEV

Programming with EcoStruxure Augmented Operator Advisor

Scan or click on the QR code

Packs | Communication Add-ins

Learning goals

- Programming industrial communication.
- Study and implement a distributed input/output system.

Presentation

These packs make it possible to complete an automatic pack and to discover the use of distributed input/output devices of the Advantys type and their different modes of communication on bus and network.

Description

Modbus connector

- 1 16E / 16S module installed on Modbus.
- 1 8-way Modbus distribution frame.
- 4 Modbus cords of 1 m.
- 1 TeSys U motor start on Modbus.
- 1 24 VDC 1.2 A power supply.
- 1 energy meter on Modbus.

CANopen Connectivity

- 1 8 I/O module installed on CANopen.
- 1 CANopen 4-way splitter.
- 5 1 m CANopen cords.
- 1 CANopen Sub-D/RJ45 cord.
- 1 24 VDC 1.2 A power supply.
- 1 0.18 kW 230 V controller.
- 1 programming cable.

Ethernet connector

- 1 16E / 16S module on Ethernet.
- 1 5-port switch.
- 4 RJ45/RJ45 cords.
- 1 24 VDC 1.2 A power supply.
- 1 0.18 kW controller with Ethernet card.
- 1 programming cable.
- 1 Modbus/Ethernet gateway.

References

I/O Packs	on the Modbus bus	**MD1APCM**
	on the CANopen bus	**MD1APCC**
	on the Ethernet network	**MD1APCE**

The +

- Predefined package.
- Cost effective.



I/O pack on Modbus

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CIRA** (automatic regulation of industrial controls)
- **BTS CRSA** (design and realization of automatic systems)

Recommended training

For updating your knowledge

APETH

Ethernet

General knowledge and programming

Scan or click on the QR code

Communication

Modular bench | Industrial communication

Learning goals

- Configuring an industrial field network.
- Diagnosing a communication error.
- Scheduling.
- Defining a communication architecture.
- Choosing a communication medium.

The +

- Fast and secure implementation.
- Robust wiring on safety sockets.
- Scalable solution.



Presentation

Industrial automation solutions are relying increasingly on communication networks and field buses.

This modular offer allows you to quickly realize a communication configuration with the most commonly used protocols: Ethernet TCP/IP, CANopen, serial Modbus...

Description

This bench consists of the modules below. You can also purchase each module separately (à la carte offer).

Designation	Quantity	References
Support structure	1	MD1AM000
3.5" touch display module	1	MD1AM0019
RFID sensor module	1	MD1AM0021
Ethernet Gateway module	1	MD1AM0054
Remote I/O module on Ethernet	1	MD1AM0020
M340 self-contained module	1	MD1AM0024
Ethernet switch module	1	MD1AM0025
RS232 Frame viewing module	1	MD1AM0027
Remote I/O module on CANopen	1	MD1AM0053
CANopen junction box module	1	MD1AM0036
Magnetic protection module	1	MD1AM1004
Central measurement module	1	MD1AM2003
3 I.T module	1	MD1AM2004
WiFi router module	1	MD1AM2010
24 VDC power supply module	1	MD1AM4001
Altivar 0.18 kW 230V CANopen controller module	1	MD1AM5001

References

Industrial communication modular bench	**MD1AMLCOM**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **RISC + SSHT Pro SN** (digital systems)

Level

Recommended training

For updating your knowledge

APETH

Ethernet

General knowledge and programming

Scan or click on the QR code

Communication

Model | Industrial communication [new]

Learning goals

- Connecting a bus or network.
- Configuring an industrial field network.
- Diagnosing a communication error.
- Programming an exchange using Unity Pro software.
- Defining a communication architecture.
- Choosing a communication medium.

The +

- Ready to use solution.
- Scalable solution.



Presentation

Automation solutions are relying increasingly on communication networks and field buses. These configurations allow you to work with the most common protocols: Ethernet, CANopen, Modbus...
The pre-wired on-grid solution makes it possible to reproduce an industrial automation installation with the different communications between sensors, controllers and actuators.

Description

Different versions of pre-wired grids are offered:
Ethernet Version

- 1 Modicon M580 Ethernet controller.
- 1 UA OPC Ethernet communication module
- 2 I/O simulators.
- 1 Modicon M221 controller.
- 1 switch.
- 1 color touch display.
- 1 Ethernet remote I/O module.
- 1 controller for Ethernet communications.
- 1 0.37 kW brushless motor
- 1 Ethernet RFID sensor.
- 1 Zigbee hub.
- 1 power supply and protection box.

Modbus + CANopen + Ethernet version

- 1 Ethernet communication module.
- 1 Modicon M340 CANopen Ethernet controller.
- 2 I/O simulators.
- 1 switch.
- 1 color touch display.
- 1 Ethernet remote I/O module.
- 1 CANopen remote I/O module.
- 1 controller for Ethernet communications.

1 0.37 kW brushless motor.

- 1 Modbus RFID sensor.
- 1 communicating measuring station.
- 1 Modbus RS485/TCPIP gateway.
- 1 power supply and protection box.

References

Communication plates	Ethernet	**MD1AE58E**
	CANopen Ethernet Modbus	**MD1AE34MEC**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **BTS SN** (digital systems)

Recommended training

For updating your knowledge
APETH
Ethernet
General knowledge and programming
Scan or click on the QR code

Pack | Software Automation & HMI dedicated teaching [new]

Learning goals

• Programming and operating industrial control and display devices such as controllers and HMIs.

The +

• Permanent Establishment Licenses.
• 1 year updates included.
• Access to online XLS resources.



Presentation

• Schneider Electric enables training institutions to acquire industrial software at preferential prices
• Schneider Electric's offer consists of 2 packs containing all automation software for one and all HMI software for the other
• The 2 packages include a subscription to the online services offered by Schneider Electric: https://xsl.se.com/public/

Descriptive

Automation software packs

• If you have had a subscription contract to PL7, Unity or EcoStruxure Control Expert, you will need the update pack
• If you have never had a Schneider Electric automation software contract, then you will need the basic package
• The 2 packages contain the following software:
- Ecostruxure Control Expert (ex Unity),
- PL7 PRO + Advantys STB,
- Ecostruxure Machine Expert (ex SoMachine),
- Ecostruxure Machine Expert Basic (ex SoMachine Basic),
- Unity Diff, Twido suite, Zelio soft and Zelio com.
• Updates do not require an earlier version on your workstation.
• If in doubt, consult your local support.

HMI software packages

• If you have a subscription contract for Vijeo Designer, you will need the update pack.
• If you have never had a Schneider Electric HMI software contract, you will need the basic package.
• The 2 packages contain the following software:
- Ecostruxure Termina Expert,
- Vijéo Designer Classic and Lite.
• Updates do not require an earlier version on your workstation.
• If in doubt, consult your local support.

References

Automation Pack	Update	**FSACSFRCDEAPIXL**
	Basic	**FSACSFCDEAPIXL**
HMI packages	Update	**FSACSFRCDEHMI**
	Basic	**FSACSFCDEHMI**

Competencies covered

• Understanding and Use
• Study and realization
• Maintenance and Evolution (scaling)

Target degrees

• **Level Pro MSPC** (maintenance of connected production systems)
• **RISC + SSHT Pro SN** (digital systems) **Level**

Recommended training

For updating your knowledge
PRODECENCY
Programming with EcoStruxure Control Expert
Scan or click on the QR code

Packs | Initiation Machines

Learning goals

- Study and implement different types of machines (controllers).
- Programming a robot with SoMachine Basic and SoMachine.

Presentation

This offer introduces you to the programming of the Modicon M221 and M241 programmable controllers as well as to the industrial communication buses and networks of Modbus, CANopen and Ethernet.
Depending on the version chosen, the user will be able to discover the different types of programming and the different communication functions.

Description

Modicon M221 Pack
- 1 Modicon M221 24E/16S TOR controller, 2E analog and Ethernet port.
- 1 Ethernet cable.
- 1 PC/API USB cable.
- 1 simulation terminal block.
- 1 SoMachine Basic software + tutorial on USB key.

Modicon M241 controller pack with analog I/O
- 1 Modicon M241 with 14E/10S TOR, Ethernet and CANopen ports.
- 1 analog 4E/2S module.
- 1 programming cable.
- 1 Ethernet cable.

Modicon M241 Ethernet Controller Pack
- 1 Modicon M241 with 24E/12S TOR, Ethernet port
- 1 switch.
- 1 programming cable.
- 1 Ethernet cable.

References

Modicon M221 Pack	**MD1AP21**
Modicon M241 Analog Pack	**MD1AP41A**
Modicon M241 Ethernet Pack	**MD1AP41E**

The +

- Cost effective.
- Predefined package.
- Initiation support.



Modicon M221 Pack



Modicon M241 Analog Pack

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **BTS CRSA** (design and realization of automatic systems)
- **RISC + SSHT Pro SN** (digital systems)

Level

Recommended training

For updating your knowledge

SOMA1

Development with EcoStruxure Machine Expert (basic)

Scan or click on the QR code

Packs | Automatic machines (architecture)

Learning goals

- Study and implement different types of machines (controllers).
- Programming a robot with SoMachine basic and SoMachine.
- Implementing an automation architecture.

The +

- Solutions adopted by machine manufacturers.
- One connection point and one single application.
- Solutions Tested - Validated - Documented.

Presentation

This offer makes it possible to realize an automation architecture for an industrial machine with programmable logic controllers Modicon M221, M241 and M258 as well as for the implementation of industrial communication buses and networks Modbus, CANopen and Ethernet. Depending on the versions, the user will be able to discover the different types of programming, different communication functions.



Add-in Pack



Display, safety and motor start package

Description

Modicon M221 with display, machine safety and motor start

- 1 Modicon M221 24 E/16 S TOR with Ethernet port.
- 1 analog 4E/2S module.
- 1 Ethernet cable.
- 1 motor start module + 9 A contactor and motor circuit breaker.
- 1 safety module + one emergency shutdown LP.
- 1 3.5" Ethernet color touch display.
- 1 24 VDC / 3 A power supply.
- 1 input simulation terminal block.

Modicon M241 controller pack with display and controller

- 1 Modicon M241 with 14E/10S TOR, Ethernet port and CANopen.
- 1 5.7" color touch terminal.
- 1 24 VDC 3 A power supply.
- 1 0.18 kW 230 V controller.
- 1 CANopen junction box + CANopen cable.
- 1 programming cable.
- 1 display/control cable.
- 1 controller/control cable.

Add-ins for Modicon M221 and M241

- 1 analog 4E/2S module.
- 1 motor-start module, 9 A contactor and motor-circuit breaker.
- 1 machine safety module with emergency stop LP.
- 1 3.5" Ethernet color touch display.
- 1 WiFi terminal.

Modicon M258 performance controller pack with display and controller

- 1 Modicon M258 with 26E/16S, CANopen master port and Ethernet port.
- 1 5.7" color touch terminal.
- 1 24 VDC 3 A power supply.
- 1 0.18 kW 230 V controller.
- 1 CANopen junction box + CANopen cable.
- 1 programming cable.
- 1 display/control cable.
- 1 controller/control cable.

References

Modicon Packs	M221 complete with HMISTU, safe, TeSys U	**MD1AP21C**
	M241 with HMISTU display and Altivar 320 controller	**MD1AP241STU**
	M258 with HMISTU display and Altivar 320 controller	**MD1AP258STU**
Add-ins for Modicon M221 or M241 Packs		**MD1AP21P**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **BTS CRSA** (design and realization of automatic systems)
- **RISC + SSHT Pro SN** (digital systems)

Level

Recommended training

For updating your knowledge

LEX32

Motion control and linear axes - Lexium 32

Scan or click on the QR code

Packs | Industrial Automation

Learning goals

- Study and implement different types of machines (controllers).
- Programming a robot with Unity Pro.
- Implement industrial communication.

Presentation

This offer provides training in the programming of the Modicon M340 programmable logic controller as well as in the implementation of the Modbus, Ethernet and CANopen industrial communication networks and buses.
Depending on the versions, the user will be able to discover the different types of programming, and different communication and regulation functions.

Description

Modicon M340 Modbus mini pack
- 1 Modicon M340 Modbus + USB processor.
- 1 230 V power supply.
- 1 16E module with screw terminal.
- 1 16S relay module with screw terminal.
- 1 rack 4 expandable slots.
- 1 USB/PC to PLC cable.

Modicon M340 Modbus Pack
- 1 Modicon M340 Modbus + USB processor.
- 1 230 V power supply.
- 2 16E modules with screw terminal block.
- 1 16S relay module with screw terminal.
- 1 rack 8 expandable slots.
- 1 USB/PC to PLC cable.

Modicon M340 Modbus + Ethernet Pack
- 1 Modicon M340 Modbus + USB + Ethernet + one 8 MB memory card.
- 1 230 V power supply.
- 1 16E module with screw terminal.
- 1 16S relay module with screw terminal.
- 1 rack 8 expandable slots.
- 1 USB/PC to PLC cable.

Modicon M340 Modbus + Ethernet + CANopen Pack
- 1 Modicon M340 Modbus processor + CANopen + USB + one 8 MB memory card.
- 1 Ethernet module
- 1 230 V power supply.
- 1 16E module with screw terminal.
- 1 16S relay module with screw terminal.
- 1 rack 8 expandable slots.
- 1 USB/PC to PLC cable.

Control add-on
- 1 4E analog insulated module + terminal block.
- 1 isolated 2S module + terminal block.

References

Modicon M340 Packs	Modbus mini	**MD1AP34MN**
	Modbus	**MD1AP34M**
	Ethernet Modbus	**MD1AP34ME**
	CANopen Ethernet Modbus	**MD1AP34MEC**
Control add-on		**MD1AP34R**

The +

- Predefined package.
- Cost effective.



Modbus Single Pack

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BP SN** (Digital Systems) **RISC + SIT**
- **BTS CRSA** (design and realization of automatic systems)
- **BTS CIRA** (automatic regulation of industrial controls)

Recommended training

For updating your knowledge
UP340B
Programming - Modicon M340 (EcoStruxure Control Expert, basic)
Scan or click on the QR code

Packs | Industrial Automation (Architecture)

Learning goals

- Programming a robot with Unity Pro.
- Implement a communicating automation architecture.

Presentation

These packs enable the realization of complete architectures of high performance automation as used in industrial processes.

Description

Modicon M340 x 5 and HMI x 5 Pack

- 2 controllers with Ethernet and CANopen ports.
- 3 controllers with Ethernet and Modbus ports.
- 3 Ethernet modules.
- 5 x 16 E modules.
- 5 x 16 S modules .
- 5 x 24V DC power supplies.
- 5 x 5.7" Magelis color touch displays with Ethernet and Modbus ports.
- 1 Altivar controller 0.75 kW mono + 1 x 750 W brushless motor.
- 1x 9 A Lexium servo-controller + 1x 0.9 Nm 3000 rpm closed loop brushless motor.
- 1 Modbus energy meter.

Modicon M580 Pack

- 1 M580 processor with 3 Ethernet ports of which 2 are real-time.
- 1 230 V power supply.
- 1 16E module + screw terminal block.
- 1 16S relay module + screw terminal.
- 1 rack with 8 expandable slots, X bus and Ethernet bus.

Modicon M580 Ethernet Architecture Pack

- 1 Modicon M580 processor, 3 Ethernet ports of which 2 are real-time.
- 2x 230 V power supplies .
- 2x 16E modules + screw terminals.
- 2X 16S relay modules + screw terminals.
- 1 real-time Ethernet offset module.
- 1 rack with 8 expandable slots, X-bus, Ethernet bus.
- 1 rack with 4 expandable slots, X-bus, Ethernet bus.

References

Pack of 5 Modicon M340 and HMI	**MD1APPFM34**
Modicon M580 Pack	**MD1AP58EE**
Modicon M580 Ethernet Architecture Pack	**MD1AP58EA**

The +

- End-user solution in the agri-food, energy and fluid management sectors.
- PL7 import compatibility.
- Advanced Ethernet services.
- Energy measurement.



Modicon Pack

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **BTS CIRA** (automatic regulation of industrial controls)

Recommended training

For updating your knowledge

UP340B

Programming - Modicon M340 (EcoStruxure Control Expert, basic)

Scan or click on the QR code

Modular benches | Automation

Learning goals

- Study and implement an automation architecture:
  - programming,
  - communication with controllers, communicating motor starters...
  - control functions.
- Discover industrial communication networks and buses (Modbus, CANopen, Ethernet).
- Study human/machine dialog terminals.

The +

- Fast and secure implementation.
- Robust wiring on safety sockets.



Presentation

This offer possible to build automation architectures very quickly by connecting the various modules using secure cords.
It makes it possible to discover programmable controllers, and enables communication between controllers and displays.
Each box or module corresponds to one component or one automation function. You can also purchase each module separately as well as modular operating components.

Description

Each box or module corresponds to one component or one automation function. You can also purchase each module separately, as well as modular operating parts.

Composition

Modicon M221 Modular Bench	1	**MD1AML221**
Support structure	1	MD1AM000
Module 16 TOR inputs with flat cables	1	MD1AM0005
16 output TOR module with flat cables	1	MD1AM0006
Display module	1	MD1AM0019
M221 Module	1	MD1AM0032
24 VDC power supply module	1	MD1AM4001
Machine control module	1	MD1AM7002
Modicon M340 Modular Bench	1	**MD1AMLMR**
Support structure	1	MD1AM000
M340 module with 1 card 16 inputs, 16 outputs	1	MD1AM0003
Module 16 TOR inputs with flat cables	1	MD1AM0005
16 output TOR module with flat cables	1	MD1AM0006
Display module	1	MD1AM0016
Ethernet switch module	1	MD1AM0025
24 VDC power supply module	1	MD1AM4001
Machine control module	1	MD1AM7002

References

Modular benches	Modicon M221	**MD1AML221**
	Modicon M340	**MD1AMLMR**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **RISC + SSHT Pro SN** (digital systems) **Level**
- **BTS CRSA** (design and realization of automatic systems)

Recommended training

For updating your knowledge
IFAI
Components of an automated system
Scan or click on the QR code

System | Automatic parts sorting

Learning goals

- Scan the system.
- Analyze the identification technologies.
- Study the start and stop modes (GEMMA).
- Study linear measurement systems.
- Study the weighing sensor.
- Program a 0-10 V and 4-20 mA signal.
- Configure the system.

The +

- Study of TOR and analog sensors.
- Compact equipment.



Presentation

This equipment simulates an industrial system of automatic sorting of parts according to several criteria: material type, weight, dimensions. The system offers three modes of operation: automatic, step by step and manual. The dialog terminal enables the visualization of the measurement results and the calibration of the analog measuring device. Programming software (not provided) allows you to customize the operation, and to view the Grafcet cycle and the data tables dynamically.

Description

Operating part

- 1 belt conveyor equipped with a geared motor.
- Double action pneumatic cylinders.
- 1 photocell.
- 1 inductive sensor.
- 2 capacitive sensors.
- 1 analog 0-10 V stroke sensor.
- 1 analog weighing sensor 4-20 mA.
- 12 pieces to sort according to the criteria:

- type of material (plastic or metal),
- part weight,
- dimensions and shape (presence of hole and/or groove).

Control Part

- 1 Modicon M340 programmable logic controller.
- 1 dialog terminal.
- 4/2 bistable electropneumatic interfaces.
- Control relay.

References

Automatic coin sorting system	**MD1AE955MR**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **Level Pro MSPC** (maintenance of connected production systems)

Recommended training

For updating your knowledge

IFAI

Components of an automated system

Scan or click on the QR code

Bench | Study of the regulation of levels

Learning goals

- Study the behavior of a regulation system with or without pure delay.
- Understand the precision and stabilization parameters of a process.
- Study simple, cascading or feed forward loops:
  - P, PI, PD, PID with digital output
  - ON/OFF two TOR output states,
  - ON/OFF three output states
  - hot/cold with digital outputs,
  - split-range with digital outputs,
  - IMC (model regulator) with digital output,
  - digital feed-forward (predictive controls).

The +

- Compact system.
- Setting up the different control loops.
- Touch screen operation with curve plotter.





Presentation

This bench makes it possible to study a control system like those encountered in continuous industrial processes. The objective is to regulate a water level and a water flow under different conditions/system disturbances. The bench consists of 2 columns of water:

- one for the tank,
- the other for visualizing the controls.

Three pumps are installed in the base to ensure the functions of filling, emptying, and perturbation of the system. A valve at the top of the reservoir makes it possible to operate in a stable or non-integrating system.

Description

Composition

- 1 operating part consisting of 2 columns of water.
- 3 filling, draining and perturbation pumps.
- 1 control part with M340 controller.
- 1 Magelis terminal for the control, parameterization and visualization of curves.
- 1 set of pressure sensors, flow sensors and level sensors.
- 1 set of measuring points or controls for 3 pumps.

Characteristics

- Monolithic structure
- Power supply: 230 V / 270 VA
- Dimensions (H x L x P): 700 x 780 x 450 mm
- Weight: 46 kg

References

Level control study bench	**MD1AE885**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CIRA** (automatic regulation of industrial controls)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge

UP340B

Programming - Modicon M340 (EcoStruxure Control Expert, basic)

Scan or click on the QR code

Bench | Package sorting

Learning goals

- Implementing the automated management and control of a sorting system.
- Study and implement a CANopen bus.
- Study Ethernet network communication.
- Implement a database.
- Study the exchange of information between API and PC.

Presentation

The TAPIRIS bench simulates an automated parcel sorting station. Packages are represented by cubes with a label containing a bar code and geometric shapes. After passing under an optical reader, they are removed onto one of the three trays.
Sorting generates a database that can be used in several ways:
- the Web server embedded in the Ethernet coupler of the controller,
- the Web Designer software to create custom html pages in the web server,
- OPC/OFS data server software with Excel and Visual Basic.

Communication between the mat and the automatic plate is ensured through a CANopen bus.

Description

Operating part

- 1 automatic parcel loading station.
- 1 conveyor belt of length 1.4 m.
- 1 180 W geared motor.
- 1 Altivar control set (controller?).
- 4 photo-electric cells for detecting the passage of packages.
- 1 bar code detector for package identification.
- 2 jack evacuation stations.
- 1 set of packages with identification tags.

Control Part

- 1 Modicon M340 Modbus controller, CANopen.
- 1 Ethernet coupler.
- 1 dialog-operator terminal.

References

Package sorting system	Operations part	**MD1AE854TC**
	Control part	**MD1AE858MR**

The +

- Data usage with the OPC server.
- Implementation of a Web site.



TAPIRIS operating part



TAPIRIS Command Part

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **BTS SN** (digital systems)

Recommended training

For updating your knowledge

APETH

Ethernet

General knowledge and programming

Scan or click on the QR code

Packs | WorldSkills bottling project [new]

Learning goals

- Installation and connection.
- Commissioning.

The +

- Low cost: machine symbolized on transfer.
- Wide field of study.

Presentation

- The bottling project packs bring together different Schneider-Electric components that are commonly used in machines and industrial environments. It makes it possible to study the protection and starting of the motors, the detectors and the system of buttons (keys). It is monitored through a color touch display and incorporates an Ethernet communication interface.

This teaching equipment makes it possible to evaluate each candidate based on the WorldSkills France 2015, section "industrial control":

- installation and wiring element of power and control circuits,
- testing and commissioning of relay wiring and logic,
- API installation and I/O wiring,
- pre-commissioning testing,
- program testing and commissioning,
- Modicon M340 controller and HMI configuration,
- Changes to the electrical diagram.

- The bottling line pack is accompanied by a choice of 6 complementary building site packs that facilitate an understanding of connected technologies:

1. Wiring and control of a 24 V AC motor using a 1-way electronic starter.
2. Wiring and control of a 24 V ac motor using a 2-way electronic starter.
3. Wiring and control of a 24 V DC motor using a variable speed drive, control by potentiometer 1 direction of rotation.
4. Wiring and control of a 24 V DC motor using a variable speed drive with M221 controller.
5. Wiring of an additional machine safety device with 24 V DC control.
6. Zigbee radio control and consumption measurement (metering).



Compacting pack









Description

Composition

- Installation and connections with electrical box, buttons, motor start, safeguards, API and HMI.
- Sensors and actuators.
- Biometric sensor and Ethernet I/O remote module for fiber optics (only with the bottling project).
- Pathways.
- Screen printing representing the installation.
- Candidate file.

References

Material and business record industrial control for bottling		**MD1APPWS6**
24 V AC motor control pack	1 direction of rotation	**MD1APPWSC1**
	2 directions of rotation	**MD1APPWSC2**
24 V DC motor control pack	Variable speed	**MD1APPWSC3**
	variable speed and controller	**MD1APPWSC4**
	and machine security	**MD1APPWSC5**
	Zigbee radio control	**MD1APPWSC6**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Level Pro MSPC** (maintenance of connected production systems)

Packs | Man-machine dialog displays

Learning goals

- Study and implement different types of touch terminals.
- Discover the Vijeo Designer software.
- Initiation into supervisory functions.

Presentation

This offer presents the different types of touch screen graphics terminals of the Magelis HMISTU and XBTGTO range as well as the programming software Vijeo Designer.

Description

Magelis HMISTU Compact Display Pack

- 1 touch terminal, 5.7" display, 32MB memory, 1 com RS232/485 port,1 Ethernet port, 2 USB ports, 22mm hole mounting.
- 1X 1.8m HMI/PC programming cord.
- 1 Modicon M340 HMI/API cord.
- 1 HMI/TSX API cord.
- 1 x 24 V DC, 1.2 A power supply.
- 1 Vijeo Designer software for HMI display.

Magelis HMIGTO Advanced panel optimum display pack

- 1 touch terminal, 10.4" display, 96MB memory, 1 com RS232 port,1 com RS485, 2 USB and 1 Ethernet port.
- 1 x 24 V DC, 3A power supply.
- 1 Modicon M340 HMI/API cord.
- 1 HMI/TSX API cord.
- 1 light column on USB.
- 1 4GB memory card.
- 1x 1.8m HMI/PC programming cord

References

5.7" HMI Display Pack	**MD1APHMI855**
10.4" HMI Display Pack	**MD1APHMI10V2**

The +

- Cost effective.
- Predefined package.







HMI Controller Pack



HMI GTO

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **Level Pro MSPC** (maintenance of connected production systems)

Recommended training

For updating your knowledge

VIJDS

HMI - Magelis and Vijeo Designer

Scan or click on the QR code

Machine detection and security
Pack | **RFID Add-in**

Learning goals
- Understand RFID data transmission technology.
- Implement Modbus/TCP communication between stations and an automation architecture.

Presentation
RFID packs allow you to study and implement an application for access control, identification and traceability.
Each station has a network address with read/write access. Addressing is carried out very easily using a badge that is supplied with the pack. The data is stored in the badge or in the label presented.

Description
Modbus RFID Pack
- 2 Modbus RTU stations 40x40 mm.
- 1 Modbus/Ethernet gateway.
- 1 switch 5 Ethernet ports.
- 10 EEPROM badges.
- 2 station configuration badges.
- 1 set of cables.

References

Modbus RFID Pack	**MD1APPFRFID**

The +
- Cost effective.
- Predefined package.



Modbus RFID Pack

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **RISC + SSHT Pro SN** (digital systems) Level
- **BTS CRSA** (design and realization of automatic systems)

Modular bench | RFID Card Set

Learning goals

- Understand RFID data transmission technology.
- Know the communication mechanisms between Modbus/TCP and IT equipment:
  - Addressing a read/write station,
  - Data calculation, 16-bit encoding,
  - Writing encoded data into a badge,
  - Reading a coded badge,
  - Parsing a 16-bit response.
- Visualization of the Modbus lines or threads.
- Interactive card games.
- Programming on Windows and JavaScript on Magelis.

The +

- Application for reading threads on tablet.
- Fast and secure implementation.
- Fun aspect of the equipment.



Presentation

This offer allows you to discover RFID transmission technology based on an interactive card game. It also enables you to learn about the communication between the IT equipment using Modbus/TCP. The computer connection can be wired or wireless for viewing the threads and the data transmitted on the bus.

Description

The basic offer includes the following elements. The games and learning applications are provided on CD, along with an Android app for tablet. You can also purchase each module separately (à la carte offer).

Modules

Designation	References
Support structure	MD1AM000
WiFi router module	MD1AM2010
24 V power module	MD1AM4001
RFID module with display	MD1AMP016

References

RFID Modular Bench	**MD1AMLRFID**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **RISC + SSHT Pro SN** (digital systems) Level
- **Level Pro MSPC** (maintenance of connected production systems)

Modular benches | Safety of machinery

Learning goals

- Study machine safety categories and determine risk levels.
- Implement the appropriate security arrangements in accordance with current standards.
- Learn about scalable security features:
  - Emergency stop surveillance,
  - Monitoring of safety switches,
  - Monitoring of coded magnetic switches,
  - zero speed control by association with a key safety switch.

The +

- Fast and secure implementation.
- Robust wiring on safety sockets.



Security operating part



Modular safety bench

Presentation

The modular machine safety offer comprises two parts: a control part in the form of a modular structure and an operating part on a panel.
The aim is to reproduce the safety chain by wiring safety switches, Preventa modules and line contactors. All of this makes it possible to study safety categories 3 and 4.
The operating part comprises two rotating parts protected by removable grilles and safety end-of-travel.

Description

Designation	Quantity	Ref.
Support structure	1	MD1AM000
Emergency Shutdown Surveillance Security Module	1	MD1AM9001
Safety module for monitoring emergency stop and position switch	1	MD1AM9002
Universal security module	1	MD1AM9025
Timing monitoring module	1	MD1AM9004
Zero speed monitoring module	1	MD1AM9005
Timing monitoring module	1	MD1AM9006
24V DC / 2.5A power module	1	MD1AM4001
Magneto-thermal circuit breaker module	1	MD1AM1015
Contactor module	3	MD1AM1008

References

Modular machine safety bench	**MD1AMLSECU**
Machine safety operating part	**MD1AMP011**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **Level Pro MSPC** (maintenance of connected production systems)

Modular bench | Security machine immaterial barrier [new]

Learning goals

- Study and implement a machine security architecture based on non-hardware barrier sensors.
- Discovering and wiring PREVENTA security modules.
- Studying and wiring photoelectric light barriers.
- Configure using SoSafe software .

Presentation

- The offer of modular non-material machine security barriers consists of a control part in modular form and a security module with non-material barriers.
- The safety module for non-material barriers can be mounted on the 2 meter conveyor ref. MD1AMP024 (optional) to automatically move objects in front of gates.

Description

Designation	Quantity	Ref.
Support structure	1	MD1AM000
24 VDC power supply module	1	MD1AM4001
Emergency stop fist safety module	1	MD1AM9015
Safety module safety switch	2	MD1AM9017
Safety module push button reset	1	MD1AM9018
Light beacon safety module	1	MD1AM9019
Coded magnetic switch safety module	1	MD1AM9020
Preventa 8 input 2 output controller security module	1	MD1AM9021
Preventa 8 input 2 output security plug-in	1	MD1AM9022
IP Ethernet diagnostic interface security module	1	MD1AM9023
Security module non-material barriers	1	MD1AMP036
TI24 connector cords for bus connection	3	A9XCAH06
1.8m USB PC connector cable	1	BMXXCAUSBH018
CD-ROM - Sensors XUSL Safety Light Curtains	1	

References

Batch of machine safety modules - non-material barrier	**MD1AMLSECUMA**
Motorized conveyor - 2 meters	**MD1AMP024**

The +

- Simple and robust implementation.
- Secure wiring.



Modular batch and operating part of an non-material barrier



Motorized conveyor 2 m



Non-material barrier installed on the conveyor

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **Level Pro MSPC** (maintenance of connected production systems)

Packs | Motor Start

Learning goals

- Study and implement the various motor start-up schemas:
  - Separation or sectioning,
  - Control or switching,
  - Short circuit protection,
  - Overload protection.
- Know the equipment and implementation differences.
- Make power control equipment.

Presentation

This assembly allows electromechanics to design, assemble, wire and troubleshoot power control equipment.

Description

Base pack

- 1 platinum kit with wiring accessories.
- 1 24 V DC power supply kit.
- 1 set of protections and contactors for realizing:
  - 1 x 1.5 kW direct starter,
  - 1 x 1.5 kW direct starter-inverter,
  - 1 1.5 kW starter star-triangle with 1 or 2 directions of operation

TeSys U Add-on

- 1 kit for making a 1.5 kW direct starter.
- 1 integrated, modular direct starter-inverter with low implementation.

Variable speed (controller) add-on

- 1 Altivar 1.5 kW speed controller.
- 1 progressive starter.
- SoMove software.

References

Basic motor starter hardware package	**MD1AA740**
TeSys U add-on hardware pack	**MD1AA740T**
Motor starter hardware VV add-on kit	**MD1AA740V**

The +

- Complete set predefined for all motor starter types.
- Cost effective.



Ref. Pack MD1AA740



Ref. Pack MD1AA740T



Ref. Pack MD1AA740V

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- Electrotechnical BTS
- BTS MS (systems maintenance)

Recommended training

For updating your knowledge

VVI

Speed switches: Basic knowledge

Scan or click on the QR code

Modular benches | Motor Start

Learning goals

- Study and implement the various motor start-up schemes.
- Know the appliances and their different implementations.

Presentation

Modular motor-start benches allow quick implementation of the components of a power control equipment and the electromechanical control of motor-starter units that are to be studied. These components are mounted on housings and connected to double-well plugs.

Description

Composition

400 V 0.18 kW modular motor-start bench - ref. MD1AMLDM		
Support structure	3	MD1AM000
TeSys U Starter Module	1	MD1AM1001
Magnetic circuit breaker module	1	MD1AM1002
Magneto-thermal circuit breaker module	1	MD1AM1003
Switch-disconnector module	1	MD1AM1005
Fuse disconnector module	1	MD1AM1006
Thermal relay module	1	MD1AM1007
Contactor module	3	MD1AM1008
Switch-inverter module	1	MD1AM1009
Progressive starter module	1	MD1AM1018
Timed Auxiliary Module	1	MD1AM1012
Machine control module	1	MD1AM7004
24V DC 2.5A power module	1	MD1AM4001
400 V 0.75 kW modular motor-start bench - ref. MD1AMLDM3		
Support structure	1	MD1AM000
TeSys U Starter Module	1	MD1AM1001
Magnetic circuit breaker module	1	MD1AM1002
Magneto-thermal circuit breaker module	1	MD1AM1020
Switch-disconnector module	1	MD1AM1005
Fuse port disconnector module	1	MD1AM1006
Thermal relay module	1	MD1AM1021
Contactor module	3	MD1AM1008
Switch-inverter module	1	MD1AM1009
Progressive starter module	1	MD1AM1018
Timed Auxiliary Module	1	MD1AM1012
Machine control module	1	MD1AM7004
24V DC Power Module	1	MD1AM4001

Optional learning motors:

- 230/400 V or 400/690 V motor, see page F5

References

400 V modular motor-start benches	0.18 kW	**MD1AMLDM**
	0.75 kW	**MD1AMLDM3**

The +

- Fast and secure implementation.
- No risk of deterioration of the components.



Ref. Bench MD1AMLD

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge

VVI

Speed switches: Basic knowledge

Scan or click on the QR code

Motor start

Bench | Motor Start

Learning goals

- Implement commonly used schemas:
  - direct start,
  - startup star-triangle,
  - two-way start,
  - Start with electronic starter.
- Combine power control components:
  - switch,
  - disconnector,
  - contactor,
  - thermal relay,
  - TeSys U controller
- Measure voltages and currents in the circuit.
- Calculate torques, forces and energies.
- Learn about safety and protection.

Presentation

The motor start bench allows you to study the different electromechanical and electronic motor start schemes.
These could comprise the following:
- Basic components: Vario switches, LS1D disconnectors, LC1/LC2 contactors, Class 10 LRD thermal relays,
- Hardware that offers specific features: GV2 motor-circuit breakers, Integral 18 starters, TeSys U integrated motor-starters, Altistart ATS01 progressive starter-retarders.

Description

The bench is mounted on a chassis with blocking wheels and has 2 autonomous and independent working faces with industrial components connected to safety sockets:
- 1 automatic side for power circuit analysis and connection,
- 1 manual side for analysis and connection of power and control circuits.

The lower part contains:
- 2 groups (230 V AC 185 W motor and 190 V DC 280 W generator),
- 2 adjustable load rheostats,
- 1 voltmeter,
- several ammeters on each motor phase and load,
- 1 set of secure cords.

References

Motor start-up bench	**MD1AA540**

The +

- Mobile equipment.
- Two faces can be used simultaneously.
- Secure and robust wiring.



Manual side



Automatic side

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge
VVI
Speed switches: Basic knowledge
Scan or click on the QR code

Packs | Electronic starters

Learning goals

- Study and implement electronic motor starts.
- Set up (parameterize) an electronic starter.
- Implement industrial Modbus or Ethernet communication.

Presentation

These three packs make it possible to understand different types of electronic starter-retarders: Altistart 01, Altistart 22 and Altistart 48.
The Altistart ATS01 starter is designed for simple applications such as conveyors. It runs the motor in 2 phases.
The Altistart ATS22 starter is designed for pumping, ventilation and compression applications. It runs the motor in 3 phases. It incorporates the bypass command sequence and motor protection.
It communicates in Modbus.
The Altistart ATS48 is designed for pumping, ventilation, compression and high torque applications. It runs the motor in 3 phases. It integrates many advanced functions like on-the-fly recovery, smoke removal, automatic restart etc.
It communicates in Modbus.

Description

The packs consist of the following:

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

Altistart 22
- 1 15 A / 230-400 V starter.
- 1 TeSys GV3L magnetic circuit breaker.
- 1 line switch.
- 1 SoMove software.
- 1 PC link cord.

Altistart 48
- 1 17 A / 230-400 V starter.
- 1 TeSys GV3L magnetic circuit breaker.
- 1 line switch.
- 1 Ethernet gateway.
- 1 Modbus network branch cable.
- 1 SoMove software.

References

Electronic starter packs	ATS01 with TeSys U	**MD1APATS01**
	ATS22	**MD1APATS22**
	ATS48	**MD1APATS48**

The +

- Cost effective.
- Predefined full set.





Altistart Pack 01



Altistart 22

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge
VVI
Speed switches: Basic knowledge
Scan or click on the QR code

Variable speed and axle control
Packs | Speed switches

Learning goals
- Study and implement electronic motor starts.
- Set up (parameterize) an electronic controller.
- Use SoMove software.
- Implement industrial Modbus or Ethernet communication.

Presentation
The compact Altivar ATV320 is a controller designed for machine applications with many business functions (auto-tuning, machine safety). It is powered by 230 V single-phase or 400 V three-phase. It communicates in Modbus and CANopen.
The Altivar ATV930 is a high-end controller that integrates a web server. It accepts all types of motors. It is powered by 230 V single-phase or 400 V three-phase and has communication ports in Modbus, CANopen and Ethernet.
The Altivar ATV320 book is a vertical format controller that saves space in electrical cabinets. It is powered by single-phase 230 V or three-phase 400 V. It communicates in Modbus and CANopen.

Description
The packs consist of the following:
Altivar 320 Compact
- 1 1.5 kW single-phase or three-phase controller.
- 1 USB stick with technical documents and SoMove software.
- 1 PC link cord.

Altivar 930
- 1 1.5 kW single-phase or three-phase controller.
- 1 USB stick with technical documents and SoMove software.
- 1 PC link cord.

Altivar 320 book
- 1 1.5 kW single-phase or three-phase controller.
- 1 USB stick with technical documents and SoMove software.
- 1 PC link cord.

References

Altivar 320 controller pack	230 V - single phase - 1.5 kW	compact format	**MD1APATV320CM**
		Book format	**MD1APATV320BM**
	400 V - three-phase - 1.5 kW	compact format	**MD1APATV320CT**
		Book format	**MD1APATV320BT**
Altivar 930 controller pack	230 V - single phase - 1.5 kW		**MD1APATV930M**
	400 V - three-phase - 1.5 kW		**MD1APATV930T**

The +
- Cost effective.
- Predefined full set.



Altivar 320 Pack



Altivar 930

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Level Pro MSPC** (maintenance of connected production systems)
- **Electrotechnical BTS**

Recommended training
For updating your knowledge
VVI
Speed switches: Basic knowledge
Scan or click on the QR code

Packs | Servo-motor

Learning goals

- Make the technical choices concerning speed / positioning / size.
- Study the mechanical calculation of an axis.
- Implement products.
- Set (parameterize) the axis with SoMove software.
- Implement CANopen bus.

The +

- Cost effective solutions
- Predefined sets.



Lexium 32 servo-controller pack

Presentation

These packs allow you to execute a project on an axis control application. The Lexium 32 single-phase and three-phase servo-controllers are to be associated with a brushless motor of the BMH or BSH type.

Description

Lexium 32 servo-controller pack

- 1 Lexium 32 3 A single-phase or 1.5 A three-phase servo-controller.
- 1 CANopen communication card.
- 1 set of power cables and control cables.
- 1 PC/ATV32 programming cord.

Lexium Pack 32 with motor

- 1 single-phase 9 A Lexium 32 servo-controller.
- 1 CANopen communication card.
- 1 brushless BSH 0.8 N.m 250 W, 3000 rpm motor.
- 1 set of cables.

Motor integrated Lexium 32i package

- 1 brushless BMI 2.2 N.m 700 W 3200 rpm motor with Lexium 32i.
- 1 CANopen communication card.
- 1 set of cables and accessories.

References

Servo-controller packs	Lexium 32	single-phase	**MD1APLX32M**
		three-phase	**MD1APLX32T**
	Lexium 32i and BSH servo-motor		**MD1APMTLX32**
Servo-motor pack	Lexium 32i integrated with the motor		**MD1APMTLXI**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge

LEX32

Motion control and linear axes - Lexium 32

Scan or click on the QR code

Packs | Linear axes

Learning goals

- Make the technical choices concerning speed / positioning / size.
- Study the mechanical calculation of an axis.
- Implement products.
- Set up axes with SoMove software.
- Implement CANopen bus.
- Manage end-of-line security.
- Perform an original take and a manual control of type JOG.
- Discover automated motion control, synchronize axes.

The +

- Predefined sets.
- Pre-assembled solutions.
- Free SoMove software.



Linear Axis and Motor Pack



2-axis Cartesian robot with motors

Presentation

The one axis or two axis packs make it possible to produce a machine with robotic movements. They are composed of one or more axes with linear displacement, with toothed belt drive and roller guides.
The packs are delivered with mounted brushless motors.

Description

Linear Axis Pack with Motor

- 40 x 40 mm profile.
- 1000 mm stroke, 2 end of line sensors PNP.
- Payload 4 kg, speed 2 m/s, acc. 15 m/s2.
- 0.4 kW, 6000 rpm, DC 0.8 N.m. BSH-05 brushless motor,
- Planetary reducer 1:3.
- Motor mounted on the right, reversible on the left.

Linear axle pack with motor and controller

Idem Linear Axle Pack above with the following in addition:

- Lexium 32M Servo-controller
- CANopen communication 0.35-0.4 kW 1.8-1.5 A.

2-axis XY robot with motors

- 40 x 40 mm profile.
- Stroke 350 x 350 mm (adaptable to demand).
- 4 end of travel sensors PNP.
- Payload 5 kg, speed 2 m/s, acc. 15 m/s2.
- BSH brushless motors mounted on the right.

2-axis XY robot with motors and controllers

- 1.5A / 230V mono
- Lexium Motion Controllers.

References

Linear Axis Packs	with motor	**MD1APMTPAS**
	with motor and controller	**MD1APMT32PAS**
2 axis robots	with motors	**MD1APMTMAX2**
	with motors and controllers	**MD1APMT32MAX2**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge
LEX32
Motion control and linear axes - Lexium 32
Scan or click on the QR code

Variable speed and axle control
Model | training controllers

Learning goals
- Discover the basic principles of a variable speed drive (controller).
- Study and implement a controller.
- Operate terminal and controller functions:
  - visualization,
  - adjustment,
  - configuration...

Presentation
Speed controllers are supplied in a kit to power three-phase learning motors or the charging bench for learning controllers. They are to be connected to the network by secure cords.

Description
Altivar 320 pack
- A single-phase or three-phase 0.18 or 0.75 or 1.5 kW / 230 V controller.
- A set of safety cords.
- SoMove parameterization software,
- Power from 0.55 to 4 kW and voltage 400 V on demand.

Altivar 930 box
- A 0.75 to 4 kW / 230 V single phase variable speed drive or controller or 0.75 to 5.5 kW 400 V three phase controller.
- A set of safety cords.
- SoMove parameterization software,
- Other powers on request.

Charging bench for training controller
- see page B42

Optional learning motors:
- 230/400 V or 400/690 V motor, see page F5

The +
- Ready-to-use controller.
- Secure and robust wiring.





References

Learning controller boxes Altivar 320	230 V single phase	0.18 kW	**MD1AA320W02M2**
		0.37 kW	**MD1AA320W04M2**
		0.55 kW	**MD1AA320W06M2**
		0.75 kW	**MD1AA320W07M2**
	230 V three-phase	0.18 kW	**MD1AA320W02M3**
		0.37 kW	**MD1AA320W04M3**
		0.55 kW	**MD1AA320W06M3**
		0.75 kW	**MD1AA320W07M3**
Altivar 930 training controller set	230 V three-phase	0.75 kW	**MD1AA930W07M3**
		1.5 kW	**MD1AA930W15M3**
		2.2 kW	**MD1AA930W22M3**
		3 kW	**MD1AA930W30M3**
		4 kW	**MD1AA930W40M3**
	400 V three-phase	0.75 kW	**MD1AA930W07N4**
		1.5 kW	**MD1AA930W15N4**
		2.2 kW	**MD1AA930W22N4**
		3 kW	**MD1AA930W30N4**
		4 kW	**MD1AA930W40N4**
		5.5 kW	**MD1AA930W55N4**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrotechnical BTS**
- **BTS CIRA** (automatic regulation of industrial controls)
- **BTS CRSA** (design and realization of automatic systems)

Recommended training
For updating your knowledge
VVI
Speed switches: Basic knowledge
Scan or click on the QR code

Variable speed and axis control
Bench | Speed change with motor

Learning goals
- Control an asynchronous motor.
- Learn how a controller works.
- Implement an electronic controller:
  - motor wiring,
  - control wiring,
  - standard settings.

Presentation
This bench makes it possible to study and implement the control of an asynchronous motor with brake.
The synoptic includes measurement points upstream and downstream of the controller, as well as internal points on the DC bus.
The power and control sequence is pre-wired on double-well bushings.
Secure cords are provided with the bench.

Description
- 1x 0.37 kW 230 V Altivar controller.
- 1 0.37 kW asynchronous motor.
- 1 powder brake coupler.
- Pre-wired general protection and control sequences.
- 1 synoptic with measuring points.
- 1 set of secure cords.

References

ATV speed change bench with powder brake	**MD1AA580FP**

The +
- Access to the internal measuring points of the controller.
- Robust wiring on safety sockets.
- Adjustable brake for resistance torque.





Powder brake view

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrotechnical BTS**
- **BTS CRSA** (design and realization of automatic systems)

Recommended training
For updating your knowledge
VVI
Speed switches: Basic knowledge
Scan or click on the QR code

Variable speed and axle control

Bench | Training controller charging bench

Learning goals

- Discover the different types of mechanical loads: pump, fan, lift, conveyor...
- Work on different types of torque: constant, linear, quadratic, hyperbolic, manual.

Presentation

With the charging bench, it is possible to study the different types of torques encountered in industrial applications or buildings, in particular constant, linear, quadratic and hyperbolic torques. It enables manual control of a resistant torque.
To do this, the bench incorporates two motors coupled face to face.
One is driven by the internal speed controller, the other by a controller external to the bench.
The Altivar 320 control module makes it possible to operate only in open loop mode, while the Altivar control module 930 also has servo-control functions.

The bench is control by means of the controller boxes
(2 references to choose).

Description

Charging bench for training controller

- 1x 370 W motor with encoder, driven by Altivar internal controller.
- 1x 180 W / 230-400 V motor with encoder, driven by an external controller or a box controller.
- 1 brake resistance.
- 1 mechanical brake.
- 1 synoptic with:

- measurement points,
- 6 fault switches,
- command inputs,
- rotary knobs and potentiometers.

References

Charging bench for training controller		**MD1AA595**
Training controller boxes	ATV320 0.37 kW 230 V mono	**MD1AA320W04M2**
	ATV930 0.7 kW 230 V mono	**MD1AA930W07M3**

The +

- Study of all types of drive pairs.
- Compatible with all types of controllers.





Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **BTS CRSA** (design and realization of automatic systems)

Recommended training

For updating your knowledge
VMEX
Speed switches

Basic knowledge
Scan or click on the QR code

Variable speed and axle control

Modular bench | Learn about Altivar 320 controller

Learning goals

- Wire and implement a speed controller.
- Set up a speed controller.
- Wire and implement a three-phase motor.

Presentation

- The modular offer allows you to understand the principles and to implement them in an educational and secure way
- The Altivar 320 speed controller package makes it possible to understand the advantages of variable speed for driving industrial motors, and to implement the ATV320 speed controller safely.

Optional learning motors:
- 230/400 V or 400/690 V motor, see page F5

Description

Designation	Quantity	Ref.
Support structure	1	MD1AM000
ATV320 module - 0.18 kW - 230 V	1	MD1AM5001
ATV Control Module	1	MD1AM7001
Three-phase 4 A magnetic protection module	1	MD1AM1004

References

Modular bench Altivar 320	**MD1AMLATV320**

The +

- Scalable modular solution.
- Secure solution.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Level Pro MSPC** (maintenance of connected production systems)
- **RISC + SSHT Pro SN** (digital systems)

Level

Recommended training

For updating your knowledge

VMEX

Speed switches

Basic knowledge

Scan or click on the QR code

Variable speed and axle control

Packs | Automatic machines (advanced architectures)

Learning goals

- Study and program an axis control.
- Programming and using a controller with integrated man-machine interface.

The +

- Solutions adopted by machine manufacturers.
- One connection point and one single application.
- Solutions Tested - Validated.

Presentation

These packs enable training in the programming and use of functions encountered in industrial machines: Motion control with Modicon LMC, simple machine control with Magelis controller display.
The user will discuss the various basic functions, programming, communication and regulation functions.



Motion controller pack

Description

Modicon LMC058 Motion Controller Pack and Lexium 32 Servo Drive

- 1 Modicon LMC058 motion controller with 26E/16S TOR, Ethernet port and 2 CANopen ports.
- 1x 7.5" color graphics terminal.
- 1 24 VDC 3 A power supply.
- 1 Lexium 32 servo controller (500 W - 3 A).
- 1 programming cable.
- 1 CANopen cable.
- 1 controller cable.

References

LMC058 + LXM32 Motion Controller Pack	**MD1AP058LX**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS CRSA** (design and realization of automatic systems)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge

SOMA1

Development with EcoStruxure Machine Expert (basic)

Scan or click on the QR code


TURPE_5
Conso
Ecart
Marges
Sans Prod
15.35 MW
111.2 MW
SOMMES_MW_GEG
G1 Pa+Co(121MW)
Charge_Transfos
Répartition Gre
Pertes_90kV+Transfos

Smart building and smart grid

Selection aid C2

SmartGrid C4

Energy efficiency C5

Domestic C9

Electric vehicle C17

Electrical installation C19

Selection aid
Smart building and smartgrid

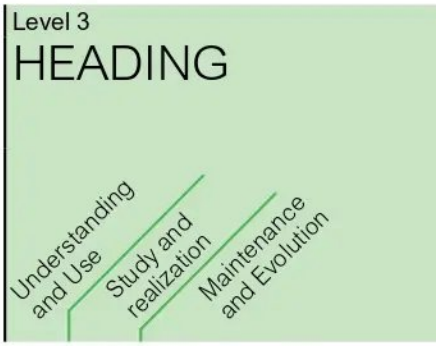
Different types of educational solutions

Pack
Business skills training through student projects.

Modular bench
Learning concepts and knowledge.

Model
Implementation of advanced technologies.

System
Complete understanding of a business environment.



Energy efficiency

System	CityGrid			
Modular bench	Energy efficiency of ventilation	■		
Models	Energy efficiency of ventilation			
	Ventilation with speed controls			
	Energy efficiency	■		

Domestic

Model	KNX	■		
	KNX Mini Building			
Modular benches	KNX discovery			
	KNX Pro			
	KNX energy efficiency			
Packs	KNX	■	■	
	VDI 19"	■	■	
Modular bench	Measurement of building energies	■	■	

Electric vehicle

System	Charging terminal for electric vehicle			

Facilities and networks

Packs	3D Mini Cell Box	■	■	
	Appliances	■	■	■
	Control by pilot wire	■	■	
Modular benches	Residential	■	■	
	Residential and small tertiary			
Packs	Connected Habitat	■	■	■
	GTL complete RT2012	■	■	
	Measurement in the habitat RT2012			
	Wireless home renovation			
	Energy efficiency controls			
Campus Electrician [new]				

	Level 4 Bac pro			Level 5 BTS			Level 6 Bachelor, Licence Pro, Master, Engineer			Page
	Understanding and Use	Study and realization	Maintenance and Evolution	Understanding and Use	Study and realization	Maintenance and Evolution	Understanding and Use	Study and realization	Maintenance and Evolution	
				■			■			C4
	■			■			■			C5
	■			■			■			C6
				■			■			C7
	■									C8
	■									C9
				■			■			C10
	■	■		■	■					C11
	■	■		■	■					C12
	■	■		■	■					C13
	■	■		■	■					C14
	■	■		■	■					C15
	■	■		■	■					C16
	■	■		■	■		■	■		C17
	■	■								C18
	■	■	■							C19
	■	■								C20
	■	■								C21
	■	■		■	■					C22
										C23
	■	■	■	■	■	■				C24
	■	■	■	■	■	■				C25
	■	■	■	■	■	■				C26
	■	■	■	■	■	■				C27
	■	■	■	■	■	■				C28

SmartGrid
System | CityGrid

Learning goals
- Study and understand an intelligent SMART GRID network.
- Implement city-wide energy management.
- Analyze the factors that influence energy consumption and production: time of day, weather conditions, renewable energy...
- Manage the balance between consumption and production to avoid "blackout".
- Analyze and understand the architecture of the components that enable the management of a SMART GRID.
- Master communication between the various players in the simulation game to achieve the objectives.

Presentation
- The CityGrid system consists of 6 desks.
- Five of them model the functioning of a city composed of different areas that represent typical patterns of consumption or production:
- residential area: consumption of 50 houses with electric heating, self-production EnR and EV charging terminal,
- tertiary area: office building consumption with thermal storage and self-production EnR,
- industrial area: consumption of a plant with 2 production lines in operation and a generator,
- infrastructure area: street consumption of a neighborhood with public lighting and EV charging stations,
- renewable energy production area: production by photovoltaic EnR and wind turbines plus grid.
- The final workbench is the operator responsible for managing the needs and resources required for overall operation:
- it constantly visualizes the consumption/production balance of all the zones, sends storage or load shedding requests DR. (requests/answers), imposes weather conditions, time, language (French, English).
- it can also choose the mode of operation (automatic, manual, connected) and implement scenarios.
- The automatic mode offers 3 scenarios taking place in winter, lasting one day during the week, the 24-hour cycle is reduced to 30 minutes: without DR, DR without EnR or DR with EnR.
- The manual mode provides 1 scenario and 1 hour during which each zone captures its consumption or production values. The operator recognizes the imbalance and asks each zone to consume more (storage) or consume less (restitution, load shedding, erasure) in order to restore balance. If the balance is not achieved, the results will be a 'blackout'.
- The equipment mode works like the manual mode but with the CityGrid connected to existing teaching equipment through GRIDBOX boxes, or simulation cases (one per area).

References

CityGrid mounted in 6 mobile desks		**MDGCGCITY**
CityGrid Kit		**MDGCGCITYKIT**
Kit for interfacing with real teaching equipment		**MDGCGGRIDBOX**
Simulation boxes	tertiary zone	**MDGCGSIMUBUILD**
	energy area	**MDGCGSIMUENR**
	industrial area	**MDGCGSIMUIND**
	infrastructure area	**MDGCGSIMUINFRA**
	residential area	**MDGCGSIMURESI**

The +
- Available as a console version or as a kit to be mounted (preloaded components).
- Group work with 6 small groups.
- Can be interfaced with existing educational facilities.







Competencies covered
- **Understanding and Use**
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS FED** (home energy fluids) option C - HBD (home automation and interconnected buildings)

Energy efficiency

Modular bench for energy efficiency in ventilation

Learning goals

- Demonstrate an energy efficiency solution.
- Measure U/I network and motor according to the energy chain.
- Use a measuring center:
  - energy measurements,
  - comparison of consumption.
- Set the variable drive to suit the energy saving law.

The +

- Low noise ventilation equipment.
- Recovery of operating data on PC.



Presentation

This modular bench makes it possible to demonstrate the energy savings that can be achieved in a ventilation installation.
The comparison is made between an electromechanical control by contactor and an electronic control with a controller.
The ventilation rate is adjusted by means of a diaphragm or by variable speed (controller).

Description

Composition

- 1 support structure ref. MD1AM000.
- 1 magnetic protection module ref. MD1AM1004
- 1 thermal relay module ref. MD1AM1007
- 1 switch module ref. MD1AM1008
- 1 central measuring module PM ref. MD1AM2003
- 1 module 3 TI 50 / 5 A ref. MD1AM2004
- 1 Ethernet gateway module with web server ref. MD1AM2029
- 1 Altivar module ref. MD1AM5001
- 1 controller module controller ref. MD1AM7001
- 1 motor starter control module ref. MD1AM7004
- 1 24 VDC power module ref. MD1AM4001
- 1 motorized fan with column and bale ref. MD1AMP014
- 1 USB/RJ45 cable for connection to the controller.
- 1 RJ45/RJ45 cable for connection to the gateway.
- SoMove parameterization software.

Characteristics

- Power supply: 230 V / 0.18 kW
- Support structure:
  - dimensions (H x L x P): 910 x 1030 x 400 mm
  - Weight: 6.5 kg
- Modules:
  - dimensions (H x L x P): 245 x 150 x 70 mm
  - Weight: 0.7 kg

References

Modular bench ventilation energy efficiency	**MD1AMLATVEE**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS FED** (home energy fluids) option C - HBD (home automation and interconnected buildings)
- **RISC + SSHT Pro SN** (digital systems) **Level**

Recommended training

For updating your knowledge

VVI

Speed switches: Basic knowledge

Scan or click on the QR code

Energy efficiency
Ventilation energy efficiency case

Learning goals
- Demonstrate an energy efficiency solution.
- Measure U/I network and motor according to the energy chain.
- Use a measuring center:
- energy measurements,
- comparison of consumption.
- Set the variable drive to suit the energy saving law.

Presentation
This suitcase makes it possible to demonstrate the energy savings that can be achieved in a ventilation or pumping installation.
The comparison is made between an electromechanical control by contactor and an electronic control with a controller.
The ventilation rate is controlled by a diaphragm or speed controller.

Description
Composition
- 1 measuring station,
- 1 direct departure circuit breaker / contactor,
- 1 departure via Altivar 0.18 kW,
- 1 direct switch/controller,
- 1x 0.18 kW fan,
- safety socket measurement points,
- 1 Ethernet gateway with web server,
- 1 USB/RJ45 cable for connection to the controller,
- 1 RJ45/RJ45 cable for connection to the gateway,
- SoMove parameterization software.

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

References
Ventilation energy efficiency case	**MD1ATVEE**

The +
- Low noise ventilation equipment.
- Understanding the benefits of speed control.
- Recovery of operating data on PC.



Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS FED** (home energy fluids) option C - HBD (home automation and interconnected buildings)
- **MEEC Pro Level** (Electrical and Connected Environments)

Recommended training
For updating your knowledge
VVI
Speed switches
Basic knowledge
Scan or click on the QR code

Energy efficiency

Ventilation with variable speed control case

Learning goals

- Study the characteristics of a centrifugal fan.
- Perform flow measurements and power consumption measurements.
- Show the contributions of variable speed to energy savings.
- Study ATC with energy recovery.
- Calculate head losses.
- Check facility EMC levels.
- Use ECO2 software to calculate economic data.

Presentation

This bench makes it possible to study the ventilation installation of a tertiary building, and to calculate the return on investment of a controller using the software ECO8.
The fan is driven by an electromechanical sequence or by a pump/ ventilation specific controller. The flow rate is regulated mechanically by means of a valve. An air flow sensor at the top of the chimney allows you to compare the different settings.

Description

- Bench mounted on chassis with locking wheels.
- 1x 0.75 kW motorized fan,
- 1 electrical box with protections and controls.
- 1 Altivar controller with remote viewing.
- 1 measuring station with current transformers.
- 1 pressure controller with its diaphragm probes.
- SoMove software for parameterizing the controller.
- ECO2 software for calculating the depreciation.

Characteristics

- Power supply: 400 V AC / 0.75 kVA
- Dimensions (H x L x P): 2500 (1850 chimney row) x 1200 x 850 mm
- Weight: 133 kg

References

Ventilation bench with variable speed Altivar 630	**MD1AA750A63**

The +

- Mobile equipment.
- Sound trap to reduce noise.
- Demountable chimney for handling.



Bench with Altivar 630

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS FED** (home energy fluids) option C - HBD (home automation and interconnected buildings)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge

VMEX

Controllers
Diagnostics and Maintenance
Scan or click on the QR code

Model | Energy efficiency

Learning goals

- Implement energy monitoring of equipment.
- Use and set up a central measurement unit:
- draw up a consumption balance,
- implementing optimization solutions,
- monitoring the results of energy saving actions over time,
- know the state of its installation.

Presentation

This electrical box is used to measure, record and track power consumption to determine the energy efficiency of equipment. It is placed between the single or three-phase network and the equipment to be measured which may be real or educational. A switch allows you to choose between three modes of use:

- on a single-phase 16 A industrial plug,
- on a three-phase 16 A industrial plug,
- in external measurement mode, by connection with cords and clamps for busbars.

The consumption data is accessible on the power server via an RJ45 socket located in front of the cabinet.

Description

Composition

- 1 Universal Panel Server.
- 1 Modbus three-phase measuring station.
- 1 Modbus single-phase energy meter.
- 1 single-phase RF sensor for iC60.
- 1 three-phase RF sensor for iC60.
- 1 four-phase RF sensor for iC60.
- 3 amperimetric clamps 250/5 A.
- 1 set of cords with crocodile clips.
- 1 cable equipped with a 2P+T 16 A plug.
- 1 cable equipped with a 3P+T 16 A plug.
- 1 socket socket 2P+T 16 A.
- 1 socket socket 3P+T 16 A.
- 1 adapter industrial plug 16 A /domestic 16 A.
- Circuit breaker protection.

Characteristics

- Power supply: 230 or 400 V AC / 16 A max
- Dimensions (H x L x P): 720 x 570 x 400 mm
- Weight: 17 kg

References

Energy Efficiency Box	**MDG99140**

The +

- Robust mobile equipment.
- Easy implementation between the sector and the equipment to be measured.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)

Recommended training

For updating your knowledge

MEEB

Control the energy efficiency of the building

Scan or click on the QR code

Domestic
Model | KNX

Learning goals
• Understand and master the management of lighting and roller shutters with the KNX bus:
- lighting function in TOR,
- variable lighting control,
- centralization of control,
- electric roller shutter control,
• Discover the ETS software tool for the design and commissioning of a KNX project.

Presentation
The KNX case allows you to set up the basic functions of a KNX installation. The synoptic of the suitcase depicts an apartment with two lighting zones, and a rolling shutter simulated by LEDs.

Description
Composition
• 1 lighting actuator module TOR.
• 1 lighting variation module.
• 1 module for roller shutter.
• 1 USB/PC interface module.
• 1 TCP IP interface module.
• 1 ETS software license.

Characteristics
• Power supply: 230 V single phase / 15 VA
• Dimensions (H x L x P): 150 x 460 x 340 mm
• Weight: 5 kg

References
KNX case	**MD1AVKNX**

The +
• Initiation to KNX.
• Fast implementation without wiring.
• KNX application preloaded.



Competencies covered
• Understanding and Use
• Study and realization
• Maintenance and Evolution (scaling)

Target degrees
• **Pro MEEC Level** (Electrical Connected Environments)

Recommended training
For updating your knowledge
KNXC
KNX System
KNX Certification
Scan or click on the QR code

Domestic
Model | KNX Mini Building

Learning goals
- Discover KNX communication (address, frame, function group).
- Implement temperature and brightness control.
- Discover SysML analysis of a system.
- Demonstrate the improvement of the KNX network on lighting and heating.
- Evaluate the power and power consumed in different scenarios.

Presentation
The KNX mini-building model is designed to implement lighting and heating control functions in a tertiary building and therefore to enable energy management. The equipment comprises 3 zones:
- the meeting room: thermal control with a radiator, a regulating module with temperature sensor, a fan, a halogen spot,
- the lounge: light regulation with a dimmable halogen spot, a roller shutter, a presence sensor,
- outside: exterior of the building with an exterior lighting block.

A touch screen allows you to work on different operating scenarios and to measure the energy consumed. The KNX modules of the modular offer can be connected to this model to extend the functionality.

Description
Lounge area
- 1x 12V halogen spot with dimming.
- 1 presence and brightness detector.
- 1 double key push button.
- 1 concealed roller shutter.

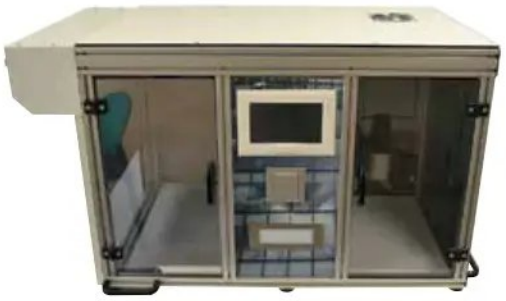
Outside area
- 1 single push button.
- 1 LED light slab.
- 1 touch screen.

Meeting room area
- 1x 12V halogen spot.
- 1 fan.
- 1 single push button.
- 1 thermostat with remote temperature sensor.
- 1 electric heating of 100W.
- 1 switchboard.
- 1 WiFi router.
- 1 ETS software license.

Characteristics
- Power supply: 230 V / 1.75 kVA
- Dimensions (H x L x P): 580 x 1010 x 570 mm
- Weight: 47 kg

References
Mini-building model KNX MINIBAT	**MDG993EBMB**

The +
- A single system for studying simple functions and KNX regulation.
- Remote tablet control.
- Possible extension of the KNX bus.



Front



Back

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training
For updating your knowledge
KNXC
KNX System
KNX Certification
Scan or click on the QR code

Domestic
Modular bench | KNX discovered

Learning goals
- Analyze the functionality and principle of a home automation installation on a KNX bus.
- Install and connect components.
- Perform system setup according to different scenarios.
- Understand the concepts of energy efficiency.

The +
- Use of digital tools to control a home automation application.
- Fast and secure implementation.
- Robust wiring on safety sockets.



Presentation
This modular bench is intended for the parameterization of the most common KNX functions such as on-off switching for lighting, heating, controlled outlets, lighting variation, roller shutter control.
The bench can be controlled remotely by smartphone, thanks to the IP module and wireless router.
It can be supplemented by real operational parts such as the optional roller shutter.

Description
Composition
- 1 support structure ref. MD1AM000.
- 1 single reference protection module MD1AM2001.
- 1 bus power module ref. MD1AM3001.
- 1 module with 4 outputs TOR ref. MD1AM3003.
- 1 light controller module ref. MD1AM3005.
- 1 USB interface module ref. MD1AM3007.
- 1 IP controller module ref. MD1AM3049.
- 1 actuator module roller shutters ref. MD1AM3008.
- 1 module double push Artec ref. MD1AM3009.
- 1 pusher module 4 thermostat M-Plan ref. MD1AM3017.
- 1x 24 V power module ref. MD1AM3032.
- 2x 15 W lamp modules ref. MD1AMP004.
- 1 module electric shutter ref. MD1AMP007.
- 1 wireless router module ref. MD1AM2010.
- ETS software.
- USB cable for programming.

The modular bench can be augmented with:
- other modules,
- learning roller shutter ref. MD1AAVOLETR see Page F7.

Characteristics
- Power supply: 230 V AC / 10 A
- Support structure:
- dimensions (H x L x P): 910 x 1030 x 400 mm
- Weight: 6.5 kg
- Modules:
- dimensions (H x L x P): 245 x 150 x 70 mm
- Weight: 0.7 kg

References
KNX Modular Bench Discovery	**MD1AMLKNXCI**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)

Recommended training
For updating your knowledge
KNXC
KNX System
KNX Certification
Scan or click on the QR code

Domestic
Modular bench | KNX Pro

Learning goals
- Analyze the functionality and principle of a home automation installation on a KNX bus.
- Install and connect components.
- Perform system setup according to different scenarios.
- Understand the concepts of energy efficiency.

The +
- Use of digital tools to control a home automation application.
- Fast and secure implementation.
- Robust wiring on safety sockets.



Presentation
This modular bench makes it possible to implement typical functions of a tertiary building or a hotel, such as lighting variation, infrared remote control, thermostat, card reader, roller shutter.
The homeLYink function allows you to monitor the entire installation.
It can be supplemented by real operational parts such as the optional roller shutter.

Description
Composition
- 1 support structure ref. MD1AM000.
- 1 Wiser for KNX IP controller module ref. MD1AM3049.
- 1 single reference protection module MD1AM2001.
- 1 bus power module ref. MD1AM3028.
- 1 module with 4 outputs TOR ref. MD1AM3003.
- 1 module 4 inputs 230 V ref. MD1AM3004.
- 1 light controller module ref. MD1AM3005.
- 1 light controller module 1-10V ref. MD1AM3042.
- 1 USB interface module ref. MD1AM3061.
- 1 actuator module roller shutters ref. MD1AM3008.
- 1 motion detection module Argus ref. MD1AM3013.
- 1x 24 V power module ref. MD1AM3032.
- 1 card reader module hotel ref. MD1AM6031.
- 1 KNX 3-way energy measuring module ref. MD1AM3048.
- 1 double push button module ref. MD1AM6017.
- 2x 15 W lamp modules ref. MD1AMP004.
- 1 module electric shutter ref. MD1AMP007.
- 1x 42 W halogen or LED lamp module ref. MD1AMP009.
- 1X 20 W lamp module + balast 1-10 V ref. MD1AMP022.
- 1x IR remote control.
- 2x ETS software license.
- 1 USB cable for programming.

The modular bench can be augmented with:
- other modules,
- learning roller shutter ref. MD1AAVOLETR see Page F7.

Characteristics
- Power supply: 230 V AC / 10 A
- Support structure: 910 x 1030 x 400 mm - 6.5 kg
- Modules: 245 x 150 x 70 mm - 0.7 kg

References
KNX Pro Modular Bench	**MD1AMLKNXPRO**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS FED** (home energy fluids) option C
HBD (home automation and interconnected buildings)

Recommended training
For updating your knowledge
KNXADV
KNX System
Advanced KNX Certification
Scan or click on the QR code

Modular bench | KNX energy efficiency

Learning goals

- Analyze the functionality and principle of a home automation installation on a KNX bus.
- Install and connect components.
- Perform system setup according to different scenarios.
- Understand the concepts of energy efficiency.

The +

- Use of digital tools to control a tertiary application.
- Multifunction: piloting, programming, telemetry.
- Multiprotocol: KNX, Modbus, DALI.



Presentation

This bench enables the implementation of KNX solutions meeting the requirements of RT2012, i.e. ensuring active energy efficiency and comfort.
It consists of the functions for lighting regulation, heating regulation, consumption measurement, weather station, which will generate energy savings thanks to an optimization of the settings.
This set can be supplemented by real operational parts such as the optional roller shutter.

Description

Composition

- 1 support structure ref. MD1AM000.
- 1 single reference protection module MD1AM2001.
- 1 bus power module ref. MD1AM3028.
- 1 module with 4 outputs TOR ref. MD1AM3003.
- 1 module with 2 outputs ref. MD1AM3045.
- 1 light controller module 2 channels ref. MD1AM3053.
- 1 USB interface module ref. MD1AM3061.
- 1 actuator module roller shutters ref. MD1AM3008.
- 2x 4 multifunction modules M-Plan push buttons ref. MD1AM3019.
- 1 presence and brightness detector module IR ref. MD1AM3014.
- 1 multifunction display module ref. MD1AM3056.
- 1 DALI gateway module ref. MD1AM3020.
- 1x 24 V power module ref. MD1AM3032.
- 1 homeLYnk IP controller module ref. MD1AM3049.
- 1 WiFi module ref. MD1AM2010
- 1 weather station module ref. MD1AM3057.
- 1 servomotor module for valve ref. MD1AM3034.
- 1x IR remote control.
- 2x 15 W lamp modules ref. MD1AMP004.
- 2x 50 W lamp module ref. MD1AMP009.
- 1 module electric shutter ref. MD1AMP007.
- 1 multi-address DALI lighting module ref. MD1AMP025.
- 1 central measuring module PM ref. MD1AM2003.
- 1 KNX 3-way energy measuring module ref. MD1AM3048.
- 1x 3 TI module 50 / 5 A ref. MD1AM2004.
- 1 USB cable for programming.
- 2x ETS software licenses

The modular bench can be completed with other modules.

Characteristics

- Power supply: 230 V AC / 10 A
- Support structure: 910 x 1030 x 400 mm - 6.5 kg
- Modules: 245 x 150 x 70 mm - 0.7 kg

References

KNX Energy Efficiency Modular Bench	**MD1AMLKNXEE**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge
KNXADV
KNX System
Advanced KNX Certification
Scan or click on the QR code

Domestic
Packs | KNX

Learning goals
- Analyze the functionality and principle of a home automation installation on a KNX bus.
- Install and connect components.
- Perform system setup according to different scenarios.
- Understand the concepts of energy efficiency.

Presentation
The packages in this offer allow you to create KNX educational facilities within your premises, and to implemented them in your 3D teaching cells. These can be complemented with functions such as weather sensor, clock, CO2 sensor, energy meter, Modbus gateway, web coupler or smartphone access.

Description
2 main packs and 1 add-on are available:

Primary Packs	Pack discovery	Pack roller shutter and 7 inch screen	Add-on remote supervision
3-row Resi9 box	1	1	-
10 A 30 mA Differential circuit breaker	1	1	-
KNX Bus Power	1	1	-
USB-KNX Interface	1	1	-
Multifunction push button 2 keys	1	1	-
Room thermostat	1	-	-
MD1AAKNXVR 4-Key Multifunction Push Button	1	-	-
MD1AAKNXVR 8-Key Multifunction Push Button	1	-	-
Presence detector with infrared receiver	1	1	-
Mixed actuator 8 outputs	1	1	-
2-output variation actuator	1	1	-
ETS Software License	1	1	-
USB programming cable	1	1	-
PIC cables for KNX 10 m bus	1	1	-
KNX connector set and terminal blocks	1	1	-
IP Router	-	1	-
Multitouch Screen	-	1	-
KNX / DALI Gateway	-	1	-
Wiser for KNX Controller	-	-	1
Touch pad	-	-	1
WiFi Adapter	-	-	1
24 V power supply	-	-	1
Single phase energy meter	-	-	1
1 ETS license	-	-	1

References

KNX Pack discovered	**MD1AAKNXD**
KNX Roller Shutter and 7-inch Screen Pack	**MD1AAKNXVR**
KNX Remote Monitoring Add-in Pack	**MD1AAKNXLSS**

The +
- Introduction to home automation functions.
- Create and manage scenarios.
- Actual wiring of a KNX installation.



KNX Pack discovered

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrician CAP**
- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)

Recommended training
For updating your knowledge
KNXC
KNX System
KNX Certification
Scan or click on the QR code

Domestic
Pack | VDI 19"

Learning goals
- Identify and select hardware (ASI, switch, outlets).
- Mount VDI bays, wire RJ45 connectors.
- Perform IP addressing of the switch.
- Identify, mix and test the installation.
- Study different VDI networks depending on office location.

The +
- Pre-defined full set.
- Cost effective.



Presentation
The 19-inch VDI pack is designed for studying VDI functions encountered in industrial or tertiary installations.
It highlights the general organization of a VDI network.
The pedagogy is based on a real specification: the CCTP of an office building.

Description
Composition
- 1x 19" OPB 12U fixed chassis 646 x 600 x 500, glass door.
- 1 rear shutter plate for 12U 19" OPB cabinet.
- 1 shutter plate with air vents top.
- 1 shutter plate with brush seal bottom part.
- 1 sliding panel with 24 RJ45 FTP STP ports.
- 1 TELECOM sliding panel 50 ports on 2 rows.
- 1 panel 8 sockets FR 230 V / 16 A, interr. brightness protected.
- 2 guide panels cords with 4 rings.
- 2 UPS rack pack kits.
- 1 fixed depth shelf 250 mm load 15 kg.
- 3 metal spacer panels.
- 3 rings for vertical organization of cords.
- 1 DLINK switch 24 Ethernet ports manageable 10/100 BASETX.
- 1 APC SmartUPS 1500 VA.
- 1 set of 24 RJ45 shutter blades blue.
- 1 set of 24 shutter panel RJ45 green.
- 1 set of 10 grounding kits for 19" panel.
- 1 stripping tool for connecting LSA connectors.
- 24x 1m cords, RJ45/RJ45 category 6, F/UTP shielding.
- 24x RJ45 category 6 FTP connectors.

Characteristics
- Power supply: 230 V
- Dimensions (H x L x P): 800 x 600 x 600 mm
- Weight: 12 kg

References

19" VDI box pack	**MD1ALVDIC19**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrician CAP**

Modular bench | Measuring building energies

Learning goals

- Apply RT 2012: measure, understand, act.
- Implement communication buses and networks.
- Set up the web server to define consumption indicators.
- Create energy tracking curves

The +

- Fast and secure implementation.
- Secure and robust wiring.
- No software installation required.



Presentation

The bench simulates the electrical energy and water consumption of a building, as well as environmental data such as indoor temperature. This data is collected by the Universal Panel Server. Its integrated web server makes it possible to present them for local or remote viewing.

Description

Composition

- 1 support structure ref. MD1AM000.
- 1x 24 VDC power module ref. MD1AM4001
- 1 Panel Server Universal Module ref. MD1AM2031.
- 1 Modbus distribution module ref. MD1AM0011.
- 1 central measuring module ref. MD1AM2003.
- 1 module with 3 current sensors ref. MD1AM2004.
- 1 temperature acquisition module ref. MD1AMP018.
- 1 water meter module ref. MD1AMP017.

Characteristics

- Power supply: 230 V AC / 60 W
- Support structure:

- dimensions (H x L x P): 910 x 1030 x 400 mm
- Weight: 6.5 kg

- Simple modules:

- dimensions (H x L x P): 245 x 150 x 70 mm
- Weight: 0.7 kg

- Dual modules:

- dimensions (H x L x P): 245 x 300 x 70 mm
- Weight: 1.4 kg

References

Modular offer for measuring building energies	**MD1AMLEEX**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)
- **Pro MEEC Level** (Electrical Connected Environments)

Electric vehicle

System | Charging terminal for electric vehicle

Learning goals

- Preparing a construction site
- Installing and connecting a charging station
- Test installation
- Parameterizing the power
- Parameterizing the power limiting and delayed start functions

Presentation

The terminal is used to charge an electric vehicle in the apartment or small building. The components supplied as a kit allow the cabinet to be wired with power management. The installation will be tested with the test tool. Load operation will be simulated with a simulation kit.

Description

Composition

- Smart Wallbox terminal with 1 T2 plug + 1 home plug
- 10 RFID badges
- 32 A mono 7 kW (residential) or 22 kW (tertiary) protection
- Energy management components: energy meter, time switch, off-peak switch
- 1 or 2 row waterproof case

Option

- Pedestal for 1 or 2 Smart Wallbox terminals
- Simulation box vehicle presence + mono and sorting cables
- Test Tool (Installer)
- Static or dynamic energy management box for installations up to 5 load points

References

Load terminals	residential (mono)	**MDGVE050M**
	small tertiary (sort)	**MDGVE050T**
Pedestal for 1 or 2 load terminals		**MDGVE050P**
Simulation boxes vehicle presence + cable	mono + sort	**MDGVE050C**
Test Tool (Installer)		**EVA1SADS**
Energy management box		**MDGVELMS**

The +

- Contextualization in a residential installation.
- Operation possible without electric vehicle.



Stand-up charging station



Test Tool



Energy management box

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **BTS Fluides Énergies Domotique Option C DBC** (home automation and connected buildings)

Recommended training

For updating your knowledge

IRVEQ2

Tertiary charging station infrastructure - IRVE and EV/ZE Ready 1.4 P2 certification

Scan or click on the QR code

Electrical installation
Pack | 3D Mini Cell Box

Learning goals
- Install and Connect
- Configure and configure with Bati-Résí Suite
- Edit Installation
- Testing and provisioning
- Communicate with your customer through the MIE3C application

The +
- Cost effective.
- Scalable hardware package.



Presentation
This hardware pack allows you to start working on 3D cells.
It corresponds to the equipment prescribed for a T1 apartment according to the latest edition of the NFC15100.
The protective devices to be installed in the cabinet use combable technology (screw connection).
The MIE3C application (my installation in 3 clicks) makes it possible to very quickly produce a complete estimate of an electrical installation for a house or an apartment conforming to the standard NF C 15-100 (electrical panel, communication box...).

Description
Composition
- Electrical panel:
- 1 box 2 rows of 13 modules,
- 2x 40 A - 30 mA differential switches,
- 1x 2 A circuit breakers,
- 2x 10 A circuit breakers,
- 3x 16 A circuit breakers,
- 2x 20 A circuit breakers,
- 1x 32 A circuit breakers,
- 1 modular socket,
- 1x 10 kA lightning arrester,
- accessories.
- Equipment:
- 2 back and forth,
- 2 power outlets,
- 1 double back and forth,
- 1 push button,
- 1 RJ45 socket,
- 6 boxes 1 airtight station,
- 1 center box (ceiling) with DCL (light connection device),
- 1 wall-mounted bracket with DCL,
- 10 sheath plugs,
- 1 bell saw,
- 1 plotting tool.

References

3D Mini-Cell Box Pack	**MDG9912**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Packs | Equipment

Learning goals

- Install and connect.
- Acquire the gestures of the professional.
- Edit an installation.
- Communicate with your client.

Presentation

These hardware packs complement your 3D Cell Home Installations and Networks with a set of appliances from one of the following ranges:
- recessed installation for new installations: Odace,
- projected installation for renovation: Alrea,
- projecting installation for renovation or new installation in gray premises (cellar, garage...): Mureva Styl.

These aim at equipping several cells, in resupply or acquisition.

Description

Odace recessed gear pack (ref. MDG99UTO)
- 25 push-pull switches.
- 25 simple push buttons.
- 10 double push buttons.
- 25x 2P + T 10/16 A outlets.
- 15 RJ45 outlets.
- 5 controls for roller shutters.
- 5 cable outlets 20 A.
- 10 DCL (connection device for lighting).
- 200 air-tight mounting boxes ø 67 mm depth 40 mm.
- 50 meters of ICA flexible ducts.

Alréa protruding equipment pack (ref. MDG99UTR)
- 20 single switches.
- 20 push-pull switches.
- 10 simple push buttons.
- 20 double push buttons.
- 20 2P+T 10/16 A outlets.
- 5 RJ45 outlets.
- 10 simple TV outlets.
- 100 finishing frames.
- molding and accessories.

Pack Waterproof equipment Mureva Styl (ref. MDG99UTE)
- 10 double to and fro.
- 20 back and forth light.
- 20 simple push buttons.
- 20 double push buttons.
- 20 illuminated double push buttons.
- 10 2P + T 10/16 A outlets.
- ICT tube assembly and branch boxes.

References

Odace recessed gear pack	**MDG99UTO**
Alréa protruding equipment pack	**MDG99UTR**
Mureva Styl Waterproof Equipment Pack	**MDG99UTE**

The +

- Cost effective.
- Scalable hardware package.



Odace Equipment Pack

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Pack | Control by pilot wire

Learning goals

- Install and Connect
- Configure and set up
- Edit Installation
- Testing and provisioning
- Communicating with your customer

Presentation

This package allows you to implement products using pilot wire technology:

- on the one hand, for a small home automation involving the centralized control of the lighting and roller shutters with the pilot wire PlusLink®. This technology makes it possible to parameterize using the commands directly.
- on the other hand, for heating management with a built-in thermostat. Easy to wire, just install an extra wire as a complement to the traditional wiring.

Description

Composition

Odace + central lighting and roller shutters:

- 2 roller shutter controls,
- 4 electronic switches for all loads,
- 1 standard controller,
- 2 group commands,
- 1 general order,
- 1 protective aid.

Odace Heating Management Equipment:

- 1 touch screen thermostat with pilot wire.

Installation and finishing accessories:

- 10 airtight boxes ø 67 mm depth 40 mm,
- 10 finishing plates 1 white post.

Feasible Functions

- scenarios for roller shutters and/or lighting,
- local, group and general commands (can be set directly from commands)
- memorizing lighting environments and roller shutter openings/closures.

Characteristics

- Odace + appliances:
  - color: White
  - screw fastening
- The protective aid to be used when the Odace + controls are protected by several circuit breakers. This enables automatic cutting of the pilot wire.
- The thermostat comes with a probe for a heated floor.

References

Control package by pilot wire	**MDG99ODACP**

The +

- Cost effective.
- Introduction to home automation functions.
- Creation and management of scenarios by simple extended support.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Modular benches | Residential

Learning goals

- Implement a distribution board.
- Studying and wiring the components:
  - single/double ignition, back and forth, power outlet,
  - serial/parallel connection.
- Studying and wiring the components of the T3/T4 package:
  - remote switch,
  - programmable time switch.

The +

- Fast and secure implementation.
- Robust wiring on safety sockets.



T1/T2 Modular Bench

Presentation

The residential modular bench allows for rapid study and implementation of the components of a residential electrical installation.
The modules are complementary, ranging from the simplest functions in a housing to the most complex.
The composition may be supplemented by energy efficiency modules: see sub-section "Components for modular benches and accessories".

Description

Modules		Modular benches	
Designation	Reference	Batch T1 / T2	Batch T3 / T4
Support structure	MD1AM000	1	1
Circuit breaker module + counter	MD1AM6001	1	-
10 A Circuit breaker module	MD1AM6002	3	1
16 A Circuit breaker module	MD1AM6003	1	1
Inter Module diff. 16 A / 30 mA	MD1AM6004	2	2
Inter Module diff. 20 A / 30 mA	MD1AM6005	1	-
Remote switch module	MD1AM6006	-	1
Center code remote switch module.	MD1AM6007	-	1
Inter Module programmable timetable	MD1AM6008	-	1
Modular contactor module	MD1AM6009	-	1
Inter Module come and go	MD1AM6014	5	2
Push button module	MD1AM6015	-	6
Dual BP module	MD1AM6017	-	1
16 A plug module	MD1AM6018	4	2
15W lamp holder module	MD1AMP004	4	5

The modular benches can be supplemented with other modules: see chapter "Modules and accessories".

Characteristics

- Power supply: 230 VAC
- Dimensions (H x W x D) and weight:
  - structure: 1030 x 910 x 400 mm - 6.5 kg
  - modules : 245 x 150 x 70 mm - 0.7 kg

References

Residential modular bench T1/T2	**MD1AM6121**
Residential modular bench T3/T4	**MD1AM6122**

Competencies covered

- **Understanding and Use**
- **Study and realization**
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Modular bench | Residential and small tertiary

Learning goals

- Optimize energy consumption by using suitable components: programmer, twilight switch, timer, time switch...
- Understand the concepts of energy efficiency.
- Studying and wiring the components of the RPT package: remote switch with LP indicator, timer with advance notice, twilight switch.
- Study and wire the components of the RPT EE package: motion detector, thermostat with offset probe.

The +

- Fast and secure implementation.
- Robust wiring on safety sockets.



Presentation

The modular “Residential and small tertiary” benches make it possible to study the energy management in a relatively complex electrical installation, of the residential or small tertiary type.
The energy saving and optimization aspects can be illustrated on the heating and lighting functions.

Description

The modular bench is available in two versions:

Modules		Modular benches	
Designation	Reference	RPT	TOR EE
Support structure	MD1AM000	1	1
Circuit breaker module + counter	MD1AM6001	-	1
10 A Circuit breaker module	MD1AM6002	1	2
16 A Circuit breaker module	MD1AM6003	4	2
Inter Module diff. 16 A / 30 mA	MD1AM6004	-	1
Inter Module programmable timetable	MD1AM6008	-	1
Contactor module	MD1AM6009	4	2
Timer module	MD1AM6010	2	2
Intertwilight Module	MD1AM6012	1	1
1-port ballast module	MD1AM6013	1	1
Inter Module come and go	MD1AM6014	-	2
Push button module	MD1AM6015	-	2
Light push button module	MD1AM6016	3	3
16 A plug module	MD1AM6018	-	2
Motion detector module	MD1AM6036	-	1
Timer module with notice	MD1AM6020	1	-
Ambient sensor module	MD1AM6029	-	1
Thermostat module	MD1AM6030	-	1
15W lamp holder module	MD1AMP004	-	4
Instructed radiator operating part	MD1AMP010	-	1

The modular benches can be supplemented with other modules: see chapter "Modules and accessories".

Characteristics

- Power supply: 230 V / 2 kVA
- Dimensions (H x W x D) and weight:
- structure: 1030 x 910 x 400 mm - 6.5 kg
- modules : 245 x 150 x 70 mm - 0.7 kg

References

Residential and small tertiary modular bench	**MD1AM6123**
Modular bench for residential and small tertiary "energy efficiency"	**MD1AM6130**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)
- **Electrician CAP**

Pack | Connected Habitat

Learning goals

- Install and Connect
- Configure and set up
- Edit Installation
- Testing and provisioning
- Customer communication (demo)
- Use the Resiclic and MIE3C encryption tools and calculate the cost of a construction site

Presentation

This packaged set of products makes it possible to simulate the cases encountered by installers in the case of new dwellings (or rehabilitation), in particular buildings. It is used to produce a GTL with electrical switchboards for the residential scenario in accordance with RT2012 and NF C 15-100, open on new services to users.
This pack consists of:
- 4 boxes: arrival, distribution, communication, home automation,
- a batch of traditional equipment and KNX.

It performs the following functions in the 3D cell equivalent to a T1:
- lighting control (on/off and variation),
- control of roller shutters, power outlet and heating,
- energy measurement,
- Alarm management
- VDI distribution.

Description

- Arrival box: control panel and circuit breaker.
- Distribution box:
  - Resi9 chute and box,
  - 1x 30 mA differential switch
  - 2x 30 mA differential switches AC type,
  - 16 plug-in circuit breakers: 1x 32 A, 4x 20 A, 5x 16 A, 3x 10 A, 3x 2 A,
  - 1 lightning arrester,
  - 2 power outlets,
  - 1 Wiser measuring station, 5 TC with Ethernet connectivity.
- 2TV grade communication box:
  - 6 departures (RJ45 ports),
  - switch manual mixing,
  - coaxial distributor,
  - WiFi router,
  - DTI and DTIO.
- Home cabinet:
  - lighting controls TOR (4), Variation (2), Shutters (2), Heating (1), Ventilation,
  - Wiser for KNX IP controller (supervision, scheduling, KNX and EnOcean compatible).
- Traditional appliances: 10 power outlets, 3 push-pull, 3 RJ45 outlets,
- KNX appliances: 5 push buttons 2 keys, 3 push buttons 1 key, 2 temperature sensors, 1 camera.
- Airtight fitting boxes.

References

Connected Home Pack	**MDG99ETAB**

The +

- Connected to smartphone/tablet tools.
- RT2012 compliant.
- Positioning against an actual project.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Pack | GTL complete RT2012

Learning goals

- Install and connect.
- Configure and set up.
- Edit an installation.
- Testing and provisioning
- Communicate with your client.

Presentation

This hardware pack enables training in the implementation of a projecting of technical housing sheath (GTL).
The GTL, sockets and switches will be mounted on partitions or in a 3D cell.
The assembly makes it possible to carry out a residential electrical installation in accordance with RT2012 and NF C 15-100.
It can be completed with equipment, an FTTH riser ...

Description

Composition :

- a chute kit,
- a control panel and its circuit breaker
- a distribution box:

- 1 box 2 rows of 13 modules and its accessories (transparent door, document door...),
- 2x 40 A 30 mA differential switches ,
- 5 circuit breakers (1 x 2 A - 1 x 10 A - 2 x 16 A - 1 x 20 A),
- 1 lightning arrester,
- 1 modular socket,
- connecting combs,
- 1 counter RT2012 Wiser Link and its IP connection module,

- 1 communication box grade 2 with a box or optical converter slot:

- 1 switch,
- 1 DTIO (optical connection),

- Odace equipment and their white finishing plate:

- 2 fiber optic sockets and their SC APC through-hole,
- 4 RJ45 outlets,
- 1 coaxial TV jack,
- 4 back and forth,
- 2 power outlets,
- 25 airtight boxes,
- 1 projecting junction box.

This pack can be augmented with:

- an Odace equipment pack (ref. MDG99UTO) see page C19
- one control pack per pilot wire (ref. MDG99ODACP) see page C20

References

Housing Technical Sheath Pack RT2012	**MD1ALFOGTL1**

The +

- 1 integrated e-learning prof access 1 year.
- RT2012 measurement system connected in Ethernet for access via smartphone or tablet.
- Fiber optic connection possible in the communication box.



GTL Pack



GTL Example

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Pack | Measurement in the habitat RT2012

Learning goals

- Install and connect.
- Configure and set up.
- Edit an installation.
- Test and implement.
- Communicate with your client.

Presentation

This hardware pack fits easily into any residential electrical switchboard. It can complement an existing electrical box in the 3D cell. It enables the implementation of an energy measurement solution:
- measurement of electricity consumption for the 5 uses referred to in Article 23 of the RT2012 thermal regulation,
- remote data access via smartphone or computer, with SMS or email alarm management and gas and water consumption metering.

Description

Composition:
- 1 Wiser Link meter and its five 80 A current transformers,
- 1 IP connection module for remote information retrieval,
- pulse counting modules from counters gas/fuel oil, thermal energy, hot water or cold water (with pulse output):

- a wired solution,
- a wireless solution consisting of a transmitter and a receiver.

Characteristics
- Power supply: 230 V
- Wiser Link counter:

- width: 10 steps of 9 mm
- interface: 2 LEDs, LCD, 5 push buttons
- Wired metering module:

- width: 3 steps of 9 mm
- power supply by association with the Wiser Link counter

Wireless receiver:
- width: 2 steps of 9 mm
- power supply by association with the Wiser Link counter
- Wireless transmitter:

- ATEX certified
- to be wired to the pulse output of the meter

References

Wiser Link energy measurement package	**MDG99WISLK**

The +

- Equipment for wiring training.
- Ethernet connection for access via smartphone or computer.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)

Facilities and networks

Pack | Wireless home renovation

Learning goals

- Implement and parameterize this pack as part of an educational project to simulate a dwelling.
- Look for solutions to improve comfort.

Presentation

This pack consists of products using wireless Zigbee technology. It makes it possible to:

- move a simple control back and forth,
- create a new light spot without pulling a cable for controls,
- centralize the control of roller shutters.

Description

Pack composition:

- 1 WiFi / zigbee gateway for all devices of the Wiser system,
- 1 push button / actuator TOR 10 A Wiser with white finishing plate,
- 1 push button / actuator roller shutters 4 A Wiser with white finishing plate,
- 1 push button / controller 150 VA Wiser with white finishing plate,
- 1 heating actuator 16 A Wiser.

References

Wireless home renovation package	**MDG99ODACE**

The +

- Create back and forth without jobs or dust.
- Easy to implement.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Pack | Energy Efficiency Controls

Learning goals

- Install and Connect
- Configure and set up
- Edit Installation
- Testing and provisioning
- Communicating with your customer

The +

- Cost effective.
- Scalable hardware package.



Presentation

This hardware pack makes it possible to implement equipment to energy savings:
- lighting control,
- heating control,
- hourly rate management.

It allows you to carry out up to 5 improvement activities related to active energy efficiency.

Description

Composition
- External motion detector.
- Presence detector.
- CE Contactor for off-peak hour.
- Programmable time switch.
- Twilight switch.
- Thermostat 2 FIP zones.
- Click Delimiter: it shall keep under constant surveillance the notifications that appear on exceeding the rate emitted by the EDF electronic meter on the bus information.

References

Energy Efficiency Controls Package	**MDG99CDEE**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Craftsman Electrician Campus

In the service of education [new]



Presentation

The objective of the Campus Artisan Electricien offer is to learn the basic principles of the electrician's profession through professional support for students throughout their studies.

To do this, we offer:
- individual access to the Schneider Electric Digital Campus for electricians,
- 3 Resi9 hardware kits for 3 skills to be developed.

Each year, the offer provides access to:
- practice exercises,
- skills assessment,
- professional documentation (prescription booklet, renovation guide, etc.),
- E-design software,
- Schneider Electric monthly e-magazine,
- E-learning certification,
- …

Benefits

Hand-holding of students
with a training by a visiting professional.

A training manual in the repositories
with a student progression.

Manufacturer's products
for current and future residential buildings.

An offer that contributes to the development of skills for the following courses:
- MELEC Pro Level
- Digital System Pro Level (VDI Offer)
- Electrician CAP

Do you have any questions about this offer?
Our team can help you.
Scan or click on the QR code:

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Pack Composition by Level



Level 1

Digital Campus Support:

- guide NF C 15-100,
- Level 1 practice:
  - TP installation of hardware Distribution table,
  - Résí9 apartment T1 with electric heating,
  - TP wiring,
  - TP commissioning of the installation,
  - TP Maintenance.

Hardware Kit:

- 1 single-phase control panel,
- 1 branch circuit breaker,
- 1 box,
- 2 differential switches,
- 5 modular circuit breakers,
- 2 pluggable system splitters,
- 1 vertical comb for XE differential switch.

Level 2

Digital Campus Support:

- prescription booklet,
- E-Design software,
- Level 2 practice:
  - TP HC contactor installation + power outlets in the existing installation
  - TP wiring,
  - TP commissioning of HC contactor,
  - TP Maintenance.

Hardware Kit:

- Combined circuit breakers + contactors.

Level 3

Digital Campus Support:

- Residential renovation guide,
- business development training: understanding customer needs, support proposals, master commercial components...
- Level 3 practice:
  - VDI Integration Pack TP,
  - TP wiring.

Hardware Kit:

- 1 2TV Grade Box Essential.

References

14 access to Campus digital level 1 to 3	basic kit	**MDCAE3LOT**
	lightning arrester option	**MDCAE3LOTP**
24 access to Campus digital level 1 to 3	basic kit	**MDCAE5LOT**
	lightning arrester option	**MDCAE5LOTP**
chute kit		**MDCAELOTG**



Electrical distribution and energy

Selection aid D2

Electrical safety D6

Installation wiring D11

Protection of property and persons D16

Energy quality D19

Energy production D22

Selection aid
Electrical distribution and energy

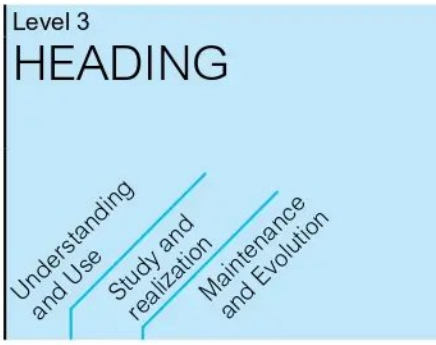
Different types of educational solutions

Pack
Business skills training through student projects.

Modular bench
Learning concepts and knowledge.

Model
Implementation of advanced technologies.

System
Complete understanding of a business environment.



Electrical safety

System	Clearance / Authorization	■		
Models	Clearance / Authorization			
	BS Clearance / Authorization	■		
Bench	Clearance / Authorization	■		
Model	Wiring for intermediate certification	■	■	
System	High voltage HTA	■		

Installation wiring

Models	TGBT cabinet	for CAP	■	■	■
		for CAP and Bac pro	■	■	■
		for Bac Pro and BTS			
	TGE Cabinet				
	TGBT to TGE upgrade kit				

Protection of property and persons

Model	Study of TLS and selectivity	■	■	
Bench	Study of earth-connection patterns			
	Study of protection selectivity			

Energy quality

Benches	Study of reactive energy compensation			
	Study of electromagnetic disturbances			
	Study of harmonic disturbances			

Energy production

Modular bench	Solar power generation	■	■	
Benches	Micro power plant for isolated site			
	Photovoltaics and wind for isolated site			
	EnR Production Study			
Model	Photovoltaic production simulation [new]			
Bench	Solar water pumping			

	Level 4 Bac pro			Level 5 BTS			Level 6 Bachelor, Licence Pro, Master, Engineer			Page
	Understanding and Use	Study and realization	Maintenance and Evolution	Understanding and Use	Study and realization	Maintenance and Evolution	Understanding and Use	Study and realization	Maintenance and Evolution	
	■		■	■						D4
	■			■						D6
	■			■						D7
	■			■						D8
	■	■		■	■					D9
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	■	■		■	■					D27

Electrical safety
System | Enabling

Learning goals

HABILIS System
- Study an industrial system.
- Understand logging issues.
- Perform practical work corresponding to professional tasks.
- Train in authorization interventions: B1V, B2V, BC, BE, BR, BS according to NF C18-510.
- Identify components
- Analyze risks.
- Intervene near live nude room.
- Make adjustments.
- Perform maintenance and troubleshooting in the electrical cabinet.

Augmented reality
- Identify components
- Use augmented reality (AR) tools.
- Pass instructions.
- Perform a safe maintenance procedure.
- Implement Zigbee wireless communication.

Presentation

HABILIS System
This authorization system simulates mixing equipment that is used in the agri-food industry. It replicates a process that requires business continuity. The purpose of this equipment is to put the student in a situation that calls for intervention on industrial equipment. The student will have to apply the procedures for securing the electrical clearance.

Augmented reality
Augmented reality is an enhanced view of the real physical world.where virtual elements are juxtaposed on the actual scene views.
It provides dynamic, contextual information to onsite workers.
It works on the basis of image recognition or TAG. It allows students to re-visualize safety instructions through videos on VAT, safety equipment, intervention procedures.
Augmented reality requires the automation option of the system Physical Authorization (HABILIS) to operate (ref. MD1AA516MR or MD1AA516SO)

Cabinet and control box

- Wheeled electrical cabinet with brake.
- 1 disconnector with external locking control.
- 1 lockable circuit breaker.
- Power distribution by bar set protected by removable screen.
- Control and signaling circuits in 24 V.
- 3 returnable and departures with padlock option:
- 1 motor starter with speed controller assisted by an inverter,
- 1 motor starter cover (contactor-inverter),
- 1 starter heating.
- 1 free slot for mounting and wiring an additional circuit.
- 1 UPS.

Characteristics
- Power supply:
400 V AC - 3P+N+T - 1 kVA
- Dimensions : 1970 (without tag during transport) / 2160 (with tag) x 860 x 670 mm
- Weight: 186 kg

The +
- Industrial equipment certification.
- Clearance in the presence of a rescued circuit.
- Use in automation systems.
-
- Speeds up operator training.
- Improves operator security.
- Reduces maintenance time.
- Reduces production downtime.



Cabinet



Mixer

Mixer

- 1x 90 W motor-operated tank cover opening/closing mechanism.
- 1x 90 W motor operated mixing blade.
- 1 resistance heating.
- Inductive and end-of-stroke sensors required for proper operation

Characteristics

- Power supply: from cabinet
- Dimensions (H x L x P): 600 x 600 x 600 mm
- Weight: 43 kg

Automation console

- 1 dialog terminal.
- 1 M340 or M221.

Characteristics

- Power supply: 220 V AC
- dimensions (H x L x P): 1150 x 340 x 430 mm
- Weight: 15 kg

AR Server and Application (Augmented Reality)

In front of a closet, without opening the door, augmented reality allows one to:

- see the device status, the value of API variables,
- have access to documents, videos, and Internet links,
- make a rapid diagnosis without logging,
- Detect operational anomalies,
- perform energy measurement using the Smartlink gateway (by reference)
- provide access to other measurements such as temperature measurements through the ZBRN (IIoT) gateway

Composition

- 1 HMI PC server.
- 1 "Augmented Operator Advisor" app for iOS or Android.
- 1 application for HABILIS authorization system.
- 1 WiFi access point.
- 1 ZigBee wireless energy measuring point to be installed (as per reference).
- 1 Ethernet / ZigBee gateway (as per reference).

Equipment to order separately

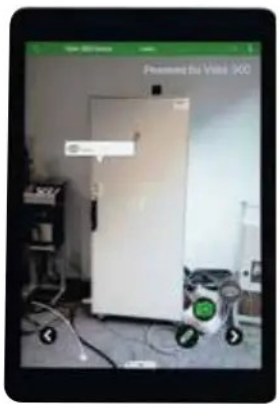
- Safety Response Kit ref. MD1AA518 see Page F8.

References

HABILIS cabinet and control box		**MD1AA513**
Mixer		**MD1AA514**
Automation console	Modicon M340	**MD1AA516MR**
	Modicon M221	**MD1AA516SO**
AR Server and Application	without measurement	**MD1SAA50**
	with wireless energy measurement via SmartLink	**MD1SAA5**
	with wireless energy measurement via ZBRN	**MD1SAA5Z**



Automation console



Augmented Reality of the cabinet



Augmented reality of the mixer

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge

AOADEV

Programming - EcoStruxure Augmented Operator Advisor

Scan or click on the QR code

Model | Entitlement

Learning goals

- Understand and identify BT electrical risks.
- Identify components
- Analyze risks.
- Intervene near live nude room.
- Make settings/adjustments and troubleshoot.
- Prepare for low voltage electrical clearance: B0, B1V, BE and BS according to NF C 18-510.

Presentation

The suitcases are intended for the training of non-electricians, such as painters, plumbers, air conditioning installers... They make it possible to address electrical risks on elementary tasks under low voltage.
The two cases are complementary and simulate electrical installations of the tertiary and industrial type.

Description

- The first suitcase has 2 domestic outlets and 1 lighting outlet, for carrying out verification, locking, connection and replacement operations.
- The second suitcase connects to the first. It is based on Motor starting. It makes it possible to perform interventions in the presence of voltage.

Characteristics

- Power supply: 230 V AC / 3 A
- Suitcase 1:
- dimensions (H x L x P): 450 x 460 x 290 mm
- Weight: 10 kg
- Suitcase 2:
- dimensions (H x L x P): 450 x 460 x 290 mm
- Weight: 12.5 kg

Equipment to order separately

- Safety Response Kit ref. MD1AA639 see Page F8.

References

Set of 2 VALHABILIS security cases	**MD1AA630**

The +

- Mobile and compact equipment.
- Developed for the preparation for electrical clearance of building systems.



Clearance / AUTHORIZATION cases



Security Response Kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge

SEBT

Low voltage general procedures, work and logging

Scan or click on the QR code

Electrical safety
Model | BS Entitlement

Learning goals
- Perform routine electrical procedures on low-voltage installations.
- BS Preparation: Perform the clearance tasks according to NF C 18-510.

The +
- Cost effective.



Presentation
This kit allows simple electrical tasks such as the identical replacement of a lamp or a fuse, for the BS clearance. It complements older generations (marketed before the evolution of the regulations defining the BS) of the following equipment:
- VALIDATION security case ref. MD1AA630
- HABILIS Enabling System ref. MD1AA513.

Description
Package Composition
- 1 cable outlet protected by a 10 A circuit breaker, designed to be replaced by a 2P+T socket.
- 1 start lighting protected by a 10 A fuse holder.
- 1 socket for lamp replacement operation.

Supplied Accessories
- Set of 5 2P+T outlets.
- 1 lamp.
- Fuses.
- 2 logging devices.

Characteristics
- Power supply: 230 V AC / 10 A
- Dimension (H x W x D): 230 x 300 x 120 mm
- Weight: 2.5 kg

References

BS Clearance Box	**MD1AA638**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Recommended training
For updating your knowledge
SEBT
Low voltage general procedures, work and logging
Scan or click on the QR code

Electrical safety
Bench | Entitlement

Learning goals
- Understand and identify BT electrical risks.
- Identify components
- Analyze risks.
- Intervene near live nude room.
- Make settings/adjustments and troubleshoot.
- Perform wiring operations (non-wired version)
- Prepare for low voltage electrical clearance: BO, B1V, BR, BS according to NF C 18-510.

Presentation
This bench was developed to prepare electricians for electrical clearance on equipment reproducing a tertiary environment and industrial.
The bench has two independent faces: a housing/tertiary face and an industry face.
The bench is offered in two versions: mounted and not wired, or mounted and wired.

Description
- The bench is mounted on a chassis with locking wheels.
- Housing-tertiary:
- electrical switchboard,
- 2 electrical outlets,
- 1 lamp,
- BAES,
- technical housing sheath,
- EDF plate,
- modular cabinet.
- Industry side:
- industrial box,
- motor start plate,
- 2-way control box,
- electric motor,
- ball screw actuating two ends of travel,
- 1 emergency shutdown case.

Characteristics
- Power supply: 400 V AC 3P+N+T / 16 A
- Dimension (H x W x D): 1800 x 1100 x 700 mm
- Weight: 100 kg

Equipment to order separately
- Safety Response Kit ref. MD1AA639 see Page F8.

References

Enabling bench with motor and ball screw	**MD1AAHABILAV**
Enabling bench with motor and ball screw, non-wired	**MD1AAHABILAVNC**

The +
- Real-life.
- **The two faces can be used simultaneously.**
- Developed for the preparation for electrical clearance of building systems.



Industry side



Housing-tertiary side

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrotechnical BTS**

Recommended training
For updating your knowledge
SEBT
Low voltage general procedures, work and logging
Scan or click on the QR code

Model | Wiring for intermediate certification

Learning goals

- Set up the measurement center.
- load the test program into the machine.
- Test general operation.
- Unwired version for:
  - Implementing components according to plan
  - wiring power and control components,
  - wiring Ethernet components
  - setting up the measuring center,
  - loading the test program into the machine,
  - testing the general operation.

Presentation

The wiring plates reproduce the control and power circuits of a 2-carriage conveyor system. They serve as a medium for intermediate certification on the two professional units UP1 (preparation for the realization of an electrical installation) and UP2 (verification of the operation of an electrical installation).

These plates are available in non-wired version (kit to be assembled) and cable-mounted version. They can only be used after being installed in a containment cabinet. The control plate produced by the student may be connected to various operating parts (motors, resistors, etc.) by means of an industrial connector.

Description

Composition

- 1 wiring board.
- 1 power terminal block.
- 1x 24 V AC transformer.
- 1x 24 VDC power supply.
- 1 set of protective circuit breakers.
- 1 disconnector.
- 1 switch-disconnector.
- 1 quadrupole busbar.
- 1 switch.
- 1 switch-inverter.
- 1 magneto-thermal circuit breaker.
- 1 motor departure TeSys U with Modbus port.
- 1 TM211 controller with Ethernet port and Modbus.
- 1 measuring station with 3 TIs.
- 2 control boxes with buttons and lights.
- 1 connecting terminal block for end of travel boxes and contacts.
- 5 end of travel contacts.

Optional learning motors: see chapter "Modules and accessories".

References

Intermediate certification plate BAC PRO wired	**MD1AAPCBP**
BAC PRO Intermediate Certification Plate	**MD1AAPCBPNC**

The +

- Plate specially designed for intermediate level V certification.
- Choice of wired or non-wired version.
- Can be mounted in a containment cabinet.



Containment cabinet-mounted plate with training motors

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge

SEBT

Low voltage general procedures, work and logging

Scan or click on the QR code

System | High voltage HTA

Learning goals

- Discover an HTA installation and its various components.
- Identify risks.
- Operate and manipulate an HTA job.
- Discover the different types of cuts.
- Perform maintenance operations (fuses...).
- Apply safety requirements C18-510.
- Prepare for HTA clearance.

Presentation

The purpose of this equipment is to provide training in the procedures and interventions performed on HTA structures. For educational reasons, these equipment are powered by 400 V while enjoying the same functionalities as in 20 kV. The transformer is supplied without oil and without windings. The standard offer consists of two IM cells, a QM cell and an HTA/BT transformer. Other combinations are also possible (e.g. 1 IM + 1 QM with transformer, 1 IM + 1 QM without transformer...). TGBT is available as an option for the interlock chain.

Description

IM switch cell

- 1 set of 400 A tripolar bars.
- 1 switch-disconnector + earth disconnector with cut-off under SF6.
- 1 CIT manual control.
- 3 voltage presence indicators.
- 3 connection pads for unipolar dry cable.

Motorized QM combined switch-fuse cell

- 1 set of 400 A tripolar bars.
- 1 switch-disconnector + earth disconnector with cut-off under SF6.
- 1x 24 VDC motorized control.
- 1 set of 3x 24 kV Solefuse fuses.
- 1 protection Sepam series 20.
- 1 HTA/transfo/TGBT C4 Profalux lock.

Supplied accessories

- Connection cables.
- Safety accessories batch: perch, VAT, stool, gloves, fire extinguisher...

Options

- 100 kVA HTA/BT oil type transformer.
- TGBT with detachable and interlocking circuit breaker.
- Primary/secondary injection case for protection release tests.

Characteristics

- Cells 2 IM + QM: 2400 x 1125 x 950 mm - weight: 480 kg
- Transformer: 1400 x 940 x 720 mm - weight: 300 kg
- TGBT: 2310 x 1000 x 530 mm - weight: 214 kg

Installation and commissioning at the customer's premises are not included and must be quantified by our services: contact us.

References

100 KVA transformer for learning	**MDGHTATRF**
TGBT with detachable circuit breaker + 3 starts + cables	**MDGHTATGBT**
Locking device for HABILIS cabinet	**MDGHTAHBLIS**
Primary/Secondary Injection Case	**MDGHTAINJ**
Additional IM cell	**MDGHTAIM**
HTA configuration: IM + QM + security accessories + cables	**MDGHTAIMQM**

The +

- Behavior of the HTA equipment in reality.
- Complete sentence sequence up to TGBT.



SM6 QM cell



Overview with transformer and TGBT



Primary/Secondary Injection Case

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training

For updating your knowledge

SEHT

General procedures, works and logging in low voltage and HTA

Scan or click on the QR code

Models | TGBT cabinet for CAP

Learning goals

- Perform wiring and clearance tasks with busbar intervention.
- Identify components
- Perform wiring tasks according to the rules of the art.
- Mechanical and electrical control of the wiring.
- Connect an educational system for energy measurements.

Presentation

This TGBT cabinet makes it possible to carry out the wiring operations of a low voltage switchboard.
It has a rear access door with a key different from the front door, in order to avoid electrical risks.
The cabinet is delivered assembled with the components mounted in place, not wired or already wired depending on the version.
A set of accessories and a set of tools are offered for wiring operations.

Description

Cabinet composition

- 1 differential circuit breaker NS160.
- 1 switch with visible cut-off.
- 1 set of Linergy BW bars.
- 1 measuring station with 3 TIs.
- 1 emergency stop device on the cabinet.
- 6 departures (circuit breakers + Vigi blocks + contactors):
  - 1 x 10 A - 2P - 30 mA - curve C,
  - 1 x 16 A - 2P - 30 mA - curve C,
  - 1 x 32 A - 2P - 30 mA - curve C,
  - 1 x 32 A - 3P - 30 mA - curve C,
  - 1 x 50 A - 4P - 30 mA - curve C,
  - 1 x 63 A - 4P - 30 mA - curve C.
- 2 modular plug.
- On/off push buttons with signage for departure control.
- 1 light beacon indicating power on.
- power connection terminals.
- 2 BT/BT transformers.

Characteristics

- Power: 400 V AC - 3P+N+T - 63 A max.
- Dimensions (H x L x P): 2310 (with beacon) x 1000 x 530 mm
- Weight: 214 kg

Tools and accessories to order separately

- Lot of accessories: wires, lugs, tips and sheaths.
- Tool kit: screwdriver, pliers, 6-sided key set.

References

TGBT cabinet for CAP	cord	**MD1AA720**
	non-wired	**MD1AA720NC**
Lot of TGBT cabinet wiring accessories for CAP		**MD1AA728**
TGBT cabinet tooling kit for CAP		**MD1AA729**

The +

- Cabinet identical to the actual TGBTs.
- Power to real systems.
- Power and control wiring activity.



Cabinet



Accessory set



Tool kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- Electrician CAP
- Pro MEEC Level (Electrical Connected Environments)
- Electrotechnical BTS

Recommended training

For updating your knowledge

G2

Electrical distribution equipment

Scan or click on the QR code

Installation wiring

Model| TGBT cabinet for CAP and Bac pro

Learning goals

- Identify components
- Perform wiring tasks.
- Set up and check.
- Set up a measurement center.

Presentation

This cabinet makes it possible to carry out the wiring of electrical equipment, using the example of a model. It comprises the following:
- a high-performance TGBT which is mounted without wiring, with the power supply simulated by a cable end on a lower part of the cable path,
- a standard TGBT, mounted and wired in our workshops, powered by Canalis connector.

Description

Composition
- 1x 125 A general switch.
- 1x 63 A general circuit breaker .
- 1 central measuring unit at the head of departures.
- 1 divisional lighting circuit breaker.
- 1 lighting departure by Canalis.
- 1 departure security lighting.
- 1 power circuit breaker.
- 1 Heating start with energy metering.
- 1 water heater.
- 1 motor departure.
- 1 departure access control.

Characteristics
- Power: 400 V AC - 3P+N+T - 63 A max.
- Dimensions (H x L x P): 1930 (1800 without tag) x 900 x 880 mm
- Weight: 170 kg

References

TGBT cabinet for CAP Pro	**MD1AA725**

The +

- Stallion side, elevation side.
- Feed possible.
- Easy to move system.





Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge

G2

Electrical distribution equipment

Scan or click on the QR code

Models | TGBT cabinet for Bac Pro and BTS

Learning goals

- Analyze TGBT functions.
- Identify constituents.
- Perform TGBT commissioning and maintenance.
- Configure and set up the communication network.
- Record a departure.
- Study the UPS.
- Prepare for electrical clearance.

Presentation

This cabinet is designed for the discovery and implementation of the different technologies used in a TGBT: source inverter, measuring center, inverter, automatic, load shedding...
It allows the distribution and control of electrical energy on a teaching platform. A controller centralizes information over Modbus and/or Ethernet links.

Description

Composition

- 1 Prisma P cabinet with sheath.
- 1 normal/standby power supply by 100 A disconnector switches.
- 1 NS160N reversing circuit breaker with protection relay.
- 1 remote control with BA automatic source inversion.
- 2 sets of bars.
- 2 control relays phases RCP.
- 1 voltage control relay RCU.
- 10 departures:

- 3 x 25 A - 4P - 30 mA - curve C - without ballast,
- 16 A - 1P+N - 30 mA - curve C - without ballast,
- 10 A - 1P+N - 30 mA - curve C - without ballast,
- 25 A - 4P - 30 mA - curve C - with ballast,
- 2 x 25 A - 3P - 30 mA - curve D - without ballast,
- 16 A - 1P+N - 30 mA - curve C - with ballast,
- 10 A - 1P+N - 30 mA - curve C - with ballast.

- Acti9 Smartlink communication system.
- 1 M340 or M221 PLC with server web coupler and HTML pages.
- 1 UPS 1 kVA.
- 1 general measuring station.

Characteristics

- Power: 400 V AC - 3P+N+T - 63 A max.
- Dimension (H x W x D): 2540 (2110 without tag) x 1260 x 530 mm
- Weight: 260 kg

Options for ordering separately

- Measuring kit with meters.
- Measuring kit with radio frequency measurement sensors

Installation and commissioning

- If necessary, contact us for a quote.

The +

- Mounted, wired, tested and validated by Schneider Electric.
- Remote supervision.



TGBT cabinet

References

TGBT cabinet for Bac pro and BTS	with Modicon M221	**MD1AA780SO**
	with Modicon M340	**MD1AA780MR**
Reactive energy compensation package for TGBT cabinet for Bac pro and BTS LEVELS		**MD1AA739**
Measuring kit with meters		**MD1AA786**
Measuring kit with radio frequency measurement sensors		**MD1AA787**
IT Network Island		**MD1AA710**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrotechnical BTS**

Recommended training

For updating your knowledge
G2
Electrical distribution equipment
Scan or click on the QR code

Models | TGE Cabinet

Learning goals

- Study the equipment.
- Implement and record departures.
- Study Ethernet and Modbus communication.
- Study RT2012.
- Implement data driven energy efficiency actions.
- Manage Alarms and Preventive Maintenance

The +

- Full integration of RT2012.
- Driving from a tablet.



Presentation

This TGE (energy management board also called Smart panel) incorporates the latest technologies in energy-efficient electricity distribution.
It comes with the RT2012 "Analyses and Solutions" guide and Schneider Electric's energy efficiency white paper.
A version to be edited by you will be offered as part of an educational project.

Description

Composition

- Prisma P cabinet with sleeve.
- Active 9Smartlink Ethernet communication system.
- Compact NSX head breaker with Ethernet interface.
- Communication interface for modular products (circuit breakers, meters...).

- 6 departures:
- 1 x 25 A - 3P+N - 30 mA - curve C with RCA remote control
- 1 x 16 A - 1P+N - 30 mA - curve C with iCT switch
- 1 x 10 A - 1P+N - 30 mA - curve C with iTL remote switch
- 1 x 25 A - 3P+N - 30 mA - C curve Reflex
- 1 x 25 A - 3P - 30mA - C curve Reflex
- 1 x 10 A - 1P+N - 30mA - C curve Reflex

- Tetrapolar energy meter with impulse on start 1
- Single-phase energy meter with impulse on start 2
- Single-phase PowerTag on start 3
- Tetra-polar PowerTag on Start 4
- Three-phase PowerTag on start 5
- Single-phase PowerTag on start 6

Features

- Information gathering and departure control.
- Measurement and control of energy consumption.
- Real-time control by touch screen.
- Web pages embedded in products with display on PC.
- Remote viewing of operating screens by tablet application.

Characteristics

- Power supply: 400 V AC - 3P+N+T - 63 A max.
- Dimensions (H x L x P): 2080 x 900 x 250 mm
- Weight: 250 kg

References

TGE Cabinet	**MD1AA790SP**
TGE cabinet kit	**MD1AA790SPK**

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- Electrotechnical BTS
- Pro MEEC Level (Electrical Connected Environments)

Installation wiring

Model| Box for the evolution of a TGBT in TGE

Learning goals

- Organize the operation in context.
- Perform an installation.
- Choose a technical solution.
- Implement measurement tools.
- Interpret indicators, measurement results and tests.

Presentation

This box allows you to transform a TGBT into a TGE (energy management table) thanks to the measurement of energy on different departures. It is installed near the TGBT and is to be completed with a measurement kit that is to be installed in the TGBT.
3 solutions are proposed for visualizing the electrical consumption.
These configurations make it possible to install measurement equipment in the TGBT.

Configuration 1: MD1AA786 + MD1AA787
The supervision is performed with a computer connected to the TGBT.

Configuration 2: MD1AA788 + MD1AA787
Supervision is carried out by a Magelis FDM128 terminal, and a WiFi terminal allows the screens to be monitored remotely by a smartphone.

Configuration 3: MD1A785 + MD1AA786+ MD1AA787
The supervision is carried out via a computer or on a WiFi tablet.

Measurement box for TGBT

Composition

- 1 EcoStruxure Panel Server Universal
- 1 waterproof Kaedra box 1 row.

Characteristics

- Power: 230 V single phase 30 VA
- Dimensions (H x L x P): 280 x 448 x 160 mm
- Weight: 5 kg

Measuring kit with energy meters

- 1 single-phase counter 63 A - direct measurement - pulses.
- 1 single-phase meter 63 A - direct measurement - Modbus.
- 1 three-phase counter 63 A - direct measurement - pulses.
- 1 three-phase counter 63 A - direct measurement - Modbus.
- 1 three-phase meter - separate TI measurement - Modbus.
- 3 TI 100/5 A.

Measuring kit with radio-frequency measuring sensors

- 1 Smartlink radio frequency Ethernet interface
- 2 sensors for iC60 - 1P+N.
- 2 universal sensors - 3P+N.
- 1x 24 VDC power supply and protective circuit breaker.

Measurement display kit

- Front-side display modules for tables for Enerlin'X FDM128 low voltage circuit breakers.
- Ethernet switch.

References

Measurement box for TGBT		**MD1AA785**
Options	metering kit	**MD1AA786**
	Measuring kit with radio-frequency measuring sensors	**MD1AA787**
	measurement display kit	**MD1AA788**

The +

- Adaptable to any type of TGBT.
- Measurement by wireless meters or sensors
- WiFi communication with a smartphone.



Measurement box and measuring kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Protection of property and persons
Model | Study of TLS and selectivity

Learning goals
- Study the different ground connection patterns.
- Study the usefulness and functioning of safeguards.
- Choose the most appropriate protection for an installation.
- Determine fault currents.
- Study ampere and chronometric selectivities.

Presentation
This kit is intended for the study of the protection of people and property in an Earth Link Scheme (TLS) facility type TT.
The equipment consists of different electrical protection devices and resistors to simulate the human body or different equipment connected to the network.

Description
Package Composition
- 1 isolation transformer.
- 1 set of resistors.
- 1 Vigirex differential relay.
- 1 circuit breaker with voltage-emitting trip device.
- 1 circuit breaker with differential 300 mA.
- 1 circuit breaker with differential 30 mA.
- 1 push button to create the defect.
- 1 general protection circuit breaker.
- 1 power cable.

Accessories to be ordered separately
- Set of 4 mm secure cords.

Characteristics
- Power supply: 400 V / 250 VA
- Dimension (H x W x D): 240 x 720 x 600 mm
- Weight: 20 kg

References

A2E SLT and selectivity study kit	**MD3BPSLTSC**
Bundle of connecting cords	**MD1AMLCORDONS**

The +
- Compact equipment.
- Cost effective.
- Robust wiring on safety sockets.



SLT box + bundle of cords

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Recommended training
For updating your knowledge
G3
Design of an electrical installation BT - Standard NF C 15-100
Scan or click on the QR code

Protection of property and persons
Study bench for grounding schemes

Learning goals
- Study the different ground connection patterns: TN, TT and IT.
- For each type of SLT, apply the protection standards for a BT electrical distribution.
- Apprehend the search for defects.

Presentation
These benches are designed for studying different schemas for linking to earth (SLT):
- neutral regimes TN and TT on one side,
- IT neutral regime on the other.

Receptors are simulated by charges implanted in the lower part of the bench. Two versions are available:
- the IM400 version allows for automatic defect detection,
- the IM20 version allows the defect to be checked manually.

Description
Ground-connection diagram study bench
- The benches are mounted on a chassis with blocking wheels.
- Bench composition:
  - 1 distribution architecture summary,
  - 3 single or three-phase receivers representing an individual person,
  - protection by magnetothermal and differential circuit breakers,
  - differential switches and contactors,
  - 1 permanent isolation controller for IT (IM400 type)or IM20),
  - IFL12 locater integrated into the structure (on IM400 version).
  - resistors and power transformers in the lower part.
- Supplied accessory: 1 set of secure cords

Fault Search Kit
- To be ordered with the IM20 version ground connection schematics bench.
- Composition:
  - XP15 ammeter clamp,
  - 1 XGR leakage current generator,
  - 1 mobile XRM receiver.

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

References
SLT (IM400) Ground Binding Pattern Tank	**MDG99603**
SLT (IM20) Ground Binding Pattern Tank	**MDG99605**
Fault search kit for STL IM20 study bench	**MDG99609**

The +
- The two sides can be used simultaneously.
- 1 single equipment for the 3 neutral speeds.
- Secure and robust wiring.



IT Side



TT + TN side



Fault Search Kit

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- Electrotechnical BTS
- Pro MEEC Level (Electrical Connected Environments)
- Electrician CAP

Recommended training
For updating your knowledge

G3

Design of an electrical installation BT - Standard NF C 15-100

Scan or click on the QR code

Bench | Study of the selectivity of protection

Learning goals

- Use an adjustable differential relay with separate torus.
- Analyze the causes and effects of short-circuit currents (calculation modes, choice of safeguards/protection).
- Study the principles of operation of an MCB (trip curves, cut-off power).
- Use and plot the trigger curve for a given size.
- Implement selectivity between upstream and downstream protections.
- Simulate situations of total selectivity, partial selectivity and non-selectivity.
- Study the concepts of selectivity at 2 or 3 stages (consequences and effects on a facility).
- Choose the impedance of the fault loop by variable value selfs.
- To present in a simplified manner the arc cut-off at very low voltage.
- Limit short-circuit current.

Presentation

This bench is designed for studying and implementing two strategies for the selectivity of protection in low voltage distribution:
- ammeter selectivity,
- and chronometric selectivity.

Two isolation transformers limit the energy involved in the intentional defects required for the study.

Description

- The bench is mounted on a chassis with locking wheels.
- Composition:

- 2 synoptic panels: ammeter selectivity and chronometric selectivity,
- circuit breakers with different trip curves (B, C or D),
- 2x 230 V / 48 V AC insulation transformers in the lower part,
- 1 set of selfs (for amperometric selectivity),
- 1 rheostat (for chronometric selectivity).

- Supplied accessory: 1 set of secure cords.

Characteristics

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

References

Protection selectivity study bench	**MDG99610**

The +

- The two sides can be used simultaneously.
- Only 1 equipment for the 2 types of selectivity.
- Secure and robust wiring.



Timing side



Amperemetric side

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Pro MEEC Level** (Electrical Connected Environments)
- **electrotechnical BTS**

Recommended training

For updating your knowledge

G3

Design of an electrical installation BT - Standard NF C 15-100

Scan or click on the QR code

Energy quality
Bench | Study of reactive energy compensation

Learning goals
- Measuring the power factor on linear and non-linear loads:
- influence of line lengths,
- remedies for power factor correction.
- Highlight the pull currents associated with capacitor switching: measurement and reduction.
- Highlight overloads on capacitors (antiresonance) related to harmonic phenomena.

The +
- Compact system for REB study.
- Use in applied physics.
- Secure measurement points.



REB Study Package

Presentation
This box is representative of a reactive energy compensation installation. It has the following functions:
- phase-shifting linear loads for factor variation power of the installation,
- varimetric measurement system,
- step-based reactive energy compensation system capacitors controlled by the varimetric relay,
- static contactor for suppressing the ringing current connected to the capacitors,
- a system of non-linear charges for demonstrating antiresonance phenomena related to harmonic circulations in capacitors,
- corrective device with antiresonance inductor.

Note: the performance of the measurements and practical work requires the use of a universal RMS type controller or specific instruments (harmonic analyzer).

Description control box
- 1 synoptic panel.
- 1 VarPlus Logic measuring system.
- 1 set of 3 capacitors.
- 1 set of 3 selfs.
- Measurement points on the right side.

Characteristics
- power supply: 230 V AC - 3.2 kVA
- dimensions (H x L x P): 950 x 700 x 370 mm
- Weight: 70 kg

Description lamp box
- 3 controller controlled 500 W halogen lamps.

Characteristics
- dimensions (H x L x P): 420 x 800 x 300 mm
- Weight: 18 kg

Description of the trolley
- Its castors facilitate the handling of the reactive energy study cabinet.



Study box on trolley

References

REACTIVE ENERGY COMPENSATION STUDY BOX CER + LAMP BOX	**MDG99160**
Trolley for ERC reactive energy compensation study cabinet	**MDG99169**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training
For updating your knowledge

G3

Design of an electrical installation BT - Standard NF C 15-100

Scan or click on the QR code

Energy quality
Bench | Study of electromagnetic disturbances

Learning goals
- Identify harmonics linked to different receptors.
- Identify disturbances related to the co-existence of low/high currents (CEM).
- Measure radiated and conducted EMF.
- Implement the appropriate solutions according to the wiring rules.

The +
- Use in applied physics.
- Secure measurement points.



HARMOCEM Bench

Presentation
This bench comprises two boxes that allow make it possible to reproduce the phenomena of electromagnetic disturbances encountered in an industrial environment, and to assess the performance of the solutions used.
The proposed measurements and practical work require the use of a spectrum analyzer (HF) and harmonics analyzer (BF).

The bench consists of 2 boxes.

Order box
- Synoptic selection of the components to be implemented.
- 1 set of 3 selfs.
- 1 set of 3 capacitors.
- Speed controller.
- Filters, compensators, selfs, capacities.
- Measurement points.

Characteristics
- Power supply: 230 V AC - 1.5 kVA
- Dimensions (H x L x P): 810 x 700 x 350 mm
- Weight: 60 kg

Load box
- Non-linear loads: controllers, lamps, fluorescent tubes...
- 1 asynchronous motor with load.
- Cords and probes.

Characteristics
- Power supply: 230 V AC - 1.5 kVA
- Dimensions (H x L x P): 750 x 700 x 330 mm
- Weight: 42 kg

Trolleys
- 1 set of 2 trolleys:
- one with a lockable drawer for the control cabinet,
- the other to support the load box.

Measurement apparatus not included, necessary for operating the study bench
- RF spectrum analyzer from 150 kHz to 1 GHz.
- Single-phase power and network analyzer for measuring harmonics of rank 2 to 50.

References

HARMOCEM Electromagnetic Disturbance Study Bench	**MDG99150**
Trolleys for electromagnetic disturbance study bench	**MDG99158**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training
For updating your knowledge
EMC
Electromagnetic compatibility
Coexistence of strong/weak currents
Scan or click on the QR code

Energy quality
Bench | Study of harmonic disturbances

Learning goals
- Investigate disturbance issues on a three-phase facility.
- Analyze Harmonic and EMC phenomena and neutral heating.
- Implement appropriate solutions.

The +
- Applicable to industrial and tertiary installations.
- Mobile equipment.
- Secure measurement points.



HARMOTRIS Bench

Presentation
This bench is in the form of an electrical cabinet and a cabinet containing lighting charges.
The electrical architecture simulates the installation of a theater.
It consists of two separate supply lines, which make it possible to manage a lighting circuit and to control the motorization of the scenery.
The measurement and practical work requires the use of a spectrum analyzer (HF) and harmonics analyzer (BF).

Study bench
- The bench is mounted on a chassis with wheels.
- The upper part comprises:
  - 1 synoptic with selection of components to be used,
  - 1 lamp measuring and power control panel,
  - protective circuit breakers and differentials,
  - line selfs,
  - anti-harmonic filter salts,
  - resonant selfs,
  - three-phase capacitors,
  - 1X 2 kVA 400/240 V decoupling transformer ,
  - 1 Altivar controller for 1.5 kW motor.
- Bottom box:
  - 1x 500 W 3-halogen light rail,
  - 1 fluorescent, compact or induction lamp boom,
  - 1 temperature monitoring probe,
  - 2 cooling fans,
  - 1 set of cords and probes.

Characteristics
- Power supply: 400 V AC - 3P+N+T - 3.3 kVA
- Dimension (H x W x D): 1860 x 900 x 570 mm
- Weight: 230 kg

Measurement apparatus not included, necessary for operating the study bench
- RF spectrum analyzer from 150 kHz to 1 GHz.
- Low Frequency Three-Phase Network and Power Analyzer: power and energy quality (harmonics).

References

HARMOTRIS harmonic disturbance study bench	**MDG99190**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Recommended training
For updating your knowledge
HARM
Harmonics
Technical solutions
Scan or click on the QR code

Energy production
Modular bench | Solar power generation

Learning goals
- Discover and identify constituents.
- Study, size and implement solar panels.
- Study the influence of solar masks.

The +
- Discovery of solar production.
- Prototyping an energy chain.
- Fast and secure implementation.



Presentation
This modular bench is designed to discover the basics of solar panel power generation. To view the state of charge, the regulator module is equipped with 2 LEDs:
- green for fully charged battery,
- red for battery charging.

Description
Composition
- 1 support structure ref. MD1AM000.
- 1 solar panel ref. MD1AMS005.
- 1 measurement module with 1 voltmeter and 1 ammeter ref. MD1AMS001.
- 1 battery charge regulator module ref. MD1AMS002.
- 1x 12 V DC battery module ref. MD1AMS003.
- 1 inverter module 12 V DC / 230 V AC ref. MD1AMS004.
- 1x 15 W lamp holder module ref. MD1AMP004.

References

Modular solar energy production bench	**MD1AMLSOL**

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **Pro MEEC Level** (Electrical Connected Environments)
- **Electrician CAP**

Energy production

Bench | Micro power plant for isolated site

Learning goals

- Connect the photovoltaic panels to study the different series/parallel combinations.
- Understand the different components of an isolated photovoltaic production line.
- Measure energies at different points in the installation.
- Study battery charge and discharge constraints.

Presentation

This bench allows you to implement a solar power production chain, from photovoltaic panels to 230 V AC receivers.

Description of the photovoltaic structure

One or two photovoltaic structures may be combined to form the production field.
Each structure can be adjusted to determine the best exposure. Each of these comprises two panels of six photovoltaic cells.
Each panel has an MC4 connection which must be connected (series or parallel) according to the electrical constraints of the conversion chain.
The connection is made by means of a coupling box connected to the main box by means of a 10 m cable (thus allowing the studies to be carried out indoors).
The combination of two structures will thus allow for greater diversity of connection and greater production power.

Characteristics

- Photovoltaic panel:
- dimensions (L x P x H) : 820 x 670 x 50 mm
- Weight :7 kg
- Coupling box:
- dimensions (L x P x H) : 190 x 140 x 110 mm
- Weight: 2 kg

Conversion box description

It is equipped with: one regulator, one battery, one inverter, two selectable 230 V AC charges and protective and measuring equipment.
The regulator powers the 12 V DC battery and the 12 V DC /230 V AC inverter. This provides power to two LED lamps of different powers.
Measurement points and ammeters make it possible to visualize and measure the charge and discharge current.

Characteristics

- dimensions (L x P x H) : 530 x 360 x 180 mm
- Weight: 11 kg

References

Photovoltaic structure for a micro-power station	**MD3BPPV**
Conversion box for central microphone bench	**MD3BPSOLI**

The +

- High-performance photovoltaic panels.
- Fast and secure implementation.



Photovoltaic structure



Conversion box and coupling box

Competencies covered

- **Understanding and Use**
- **Study and realization**
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Energy production
Bench | EnR Production Study

Learning goals
- Implement different power generation and storage configurations.
- Study electrical energy storage.
- Study the regulator and inverter functions.
- Compare production and efficiency between fixed PV panels and a solar tracker.
- Study wind function.

Presentation
This bench is designed for studying the different components of an energy chain. From DC production, to internal AC or DC and external use on home outlet. The bench may incorporate storage batteries and/or programmable power supply to simulate a renewable energy source. Renewable energy sources are offered as an option, see chapter "Modules and accessories". They are of four types:
- fixed photovoltaic panels,
- photovoltaic panels tracker,
- motorized bench wind turbine,
- outdoor wind turbine on mast.

A set of interchangeable plugs is provided with the bench. Each plug represents one possible configuration and places the measurement points in the energy chain.

Description
Basic version
- 1 production, storage and consumption sequence controller.
- 1 display for displaying U/I/P electrical quantities.
- 1 inverter for isolated site.
- 230 V and 24 V lamp loads or external load.

The following versions have the following additional features:
- basic version with simulation: 1 programmable variable DC power supply,
- basic version with storage: 1 set of 24 V/27 Ah gel-lead batteries with charger,
- basic version with simulation and storage: 1 programmable power supply and battery storage.

Renewable energy sources
These modules are offered as an option: see chapter "Modules and accessories".

References
EnR bench version with power supply and batteries	**MDG99403**

The +
- Operation is possible regardless of weather.
- Many different configurations.
- Remote monitoring possible by touch-sensitive tablet application.



Front View



Back View



Configuration sheets

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- Electrotechnical BTS
- Pro MEEC Level (Electrical Connected Environments)

Energy production

Model | Photovoltaic production simulation [new]

Learning goals

- Design and implementation of a photovoltaic production simulator.
- Understand the concept of photovoltaic power generation.

Presentation

- The RE 2020 standard aims to make homes neutral in terms of energy balance.
- Photovoltaic energy is the easiest to use in housing and therefore the most widespread.
- This kit can be used in addition to all product packs that simulate a residential or small tertiary installation.

Description

Composition

- ?.

Characteristics

- ?

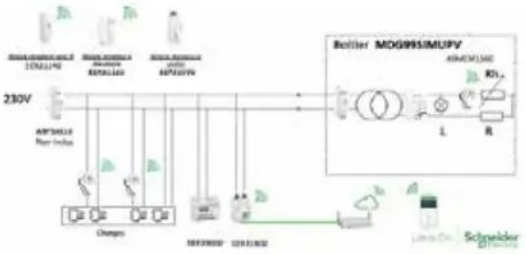
References

Photovoltaic production simulation kit	**MDG99SIMUPV**

The +

- Easy wiring.
- Compatible with all installations.





Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **Electrotechnical BTS**
- **Pro MEEC Level** (Electrical Connected Environments)

Energy production
Solar Water pumping bench

Learning goals
- Discover and implement the drawing bench.
- Study the operation, setup and maintenance of the Solar ATV 312 controller.
- Dimension the photovoltaic panels necessary for the operation of the bench.

Presentation
This bench reproduces a stand-alone solar pumping solution proposed by Schneider Electric, in areas where connection to the electricity grid is not possible. The electrical energy supplied by photovoltaic panels directly feeds a specific variable speed drive. The system operates without batteries, the aim being to ensure the permanent supply of water by dimensioning the tank according to the water needs and the daily sunshine. To facilitate an educational use, this model is supplied with energy:
- either by a PV panel field with 300 V DC output,
- a 24 V DC laboratory power supply,
- or by the 230 V AC mains.

Description
Composition
- 1 Altivar 312 Solar 180 W.
- 1 centrifugal pump.
- 1 high tank with level sensor.
- 1 low reservoir to simulate the water table.
- 1 on/off switch pump.
- 1 rotary knob to vary the voltage.
- 1 pump power indicator.
- 1 pump fault light.
- 1 emergency stop punch.
- 1 power cord.
- Protective circuit breakers.

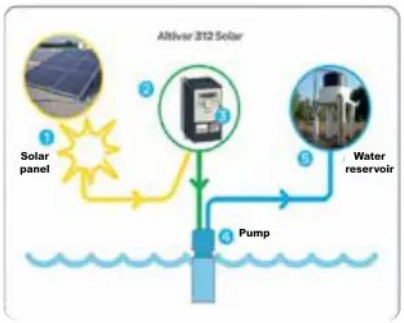
References

Solar Water pumping bench	**MD3BPODS**

The +
- Compact equipment.
- Operation indoors or outdoors.



SUN AND WATER



Principle

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- Electrotechnical BTS
- Pro MEEC Level (Electrical Connected Environments)



Digital

Selection aid E2

Augmented reality E4

Cybersecurity E5

Industrial production simulation E6

Simulation of residential buildings E7

Selection aid
Electrical distribution and energy

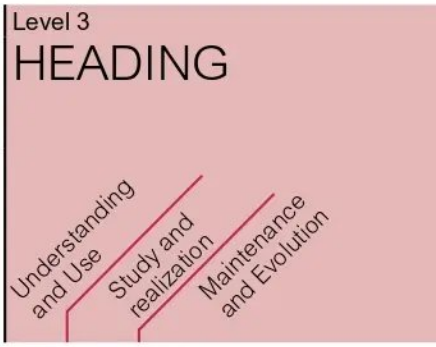
Different types of educational solutions

Pack
Business skills training through student projects.

Modular bench
Learning concepts and knowledge.

Model
Implementation of advanced technologies.

System
Complete understanding of a business environment.



Augmented reality

Model	Augmented Reality Development [new]			

Cybersecurity

Model	Cybersecurity Study [new]			

Industrial production simulation

Software	Factory I/O			

Simulation of residential buildings

Software	Home I/O			

	Level 4 Bac pro Understanding and Use	Study and realization	Maintenance and Evolution	Level 5 BTS Understanding and Use	Study and realization	Maintenance and Evolution	Level 6 Bachelor, Licence Pro, Master, Engineer Understanding and Use	Study and realization	Maintenance and Evolution	Page
				■	■	■	■	■	■	E4
				■	■		■	■		E5
				■	■		■	■		E6
				■	■		■	■		E7

Augmented reality

Model | Augmented Reality Development [new]

Learning goals

- Understand the benefits and challenges of augmented reality.
- Develop all applications of augmented reality and implement them.

Presentation

- Augmented reality is becoming an inescapable tool in all areas of personal and professional life.
- It increases learning efficiency and enriches the user experience.
- The augmented reality application development kit will enrich your processes or activities with real-time visualization, document content, efficiency data, learning tutorials and more.

Description

- The augmented reality development kit includes:
- One WiFi server PC (screen and keyboard not included),
- Ecostruxure Augmented Operator Advisor 3D development software (training not included: see suggestion at the bottom),
- an Ecostruxure Augmented Operator Advisor 3D Builder license (the cloud or local license must be renewed annually: click here),
- Ecostruxure Operator Terminal Expert runtime software (used for its drivers),
- One Ecostructure Operator Terminal Expert Runtime license,
- a Zigbee receiver for coupling wireless measurement sensors.
- An Android or iOS tablet for operation can be provided as an option.

References

Augmented Reality Development Box		**MD4STPKDEVRA**
Tablets for operation	Android	**MD1ACTABA**
	iOS	**MD1ACTABI**

The +

- Applicable to all business areas.



Augmented reality application development kit

Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS SN** (digital systems)
- Engineering Degrees

Recommended training

For updating your knowledge

AOADEV

Programming - EcoStruxure Augmented Operator Advisor

Scan or click on the QR code

Cybersecurity

Model | Cybersecurity study [new]

Learning goals

- Understand industrial networks and their applications.
- Understand the risks associated with equipment networking.
- Implement industrial communication buses
- Set up a machine and an industrial firewall to prevent cyber security risks.

Presentation

- In a world where all equipment is connected and communicating through various and varied protocols, cybersecurity becomes indispensable.
- Cybersecurity research equipment helps raise awareness of the risks of hacking and implement techniques to counter attacks.

Description

- The equipment includes:

- 1 M580 process controller,
- 1 HMI of the Magelis range,
- 1 fire wall Stormschield SNi40,

References

Cybersecurity Study Board	**MD1AE58ECYB**

The +

- Industrial solution Schneider Electric Stormschield.
- Simple and complete pedagogy.



Competencies covered

- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees

- **BTS SN** (digital systems)
- **DUT GEII** (Electrical Engineering and Industrial Computing)
- **Engineering Degrees**

Recommended training

For updating your knowledge

CYBINDUS

Cybersecurity of industrial systems Implementation

Scan or click on the QR code

Industrial production simulation
Software | Factory I/O

Learning goals
- Understand the programming of automation (Modicon M340 or M221 automatons).
- Interactively drive virtual operational parts.
- Diagnose a malfunction.

Presentation
Factory I/O is a software for simulating operational parts animated by an automated program developed on EcoStruxure Control Expert or EcoStruxure Machine Expert Basic.
The virtual environments offered are realistic thanks to total interactivity and the quality of real-time 3D graphic animations, dynamics and sounds.
Factory I/O allows you to build, simulate and troubleshoot virtual industrial systems. The systems are electrically connected to the APIs. The simulator provides access to a control console with Auto mode, emergency stop and 3 push buttons (Start, Stop and Reset).
This software is designed and developed by RealGames in partnership with the University of Reims Champagne Ardenne and distributed by Schneider Electric.

Description
Each reference consists of:
- 1 Factory I/O software,
- 1 DAQ interface box,
- 1 complete Modicon PLC with pre-wired terminal blocks or pre-wired terminal blocks alone (requires the PLC).

Factory I/O Software
- Software rights by code.
- Virtual machines simply configured from 60 basic objects.
- 20 pre-configured machines.
- 80 industrial parts.

Factory I/O can also be associated with other controllers.
In this case, order the modular offer reference with case with secure sockets.

These software packs can be associated with the interface module for Factory I/O software ref. MD1AM0030.

References

FACTORY I/O software without DAQ	**MD1S3DF**
FACTORY I/O software without DAQ license 1 student 1 year	**MD1S3DF1E**
FACTORY I/O software with full Modicon M221	**MD1S3DM221APF**
FACTORY I/O software with full Modicon M340	**MD1S3DM340APF**
FACTORY I/O Software with Modicon M340 I/O Cards	**MD1S3DM340ESF**
FACTORY I/O software with Modicon M340 terminal blocks	**MD1S3DM340BF**

The +
- Configurable operating parts.
- Wired I/O links for maintenance.
- Ability to simulate failures.



I/O Factory Screen



Interface module for Factory I/O software

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS CRSA** (design and realization of automatic systems)
- **Engineering Degrees**

Simulation of residential buildings
Software | Home I/O

Learning goals
- Discover the value of home automation compared to the conventional wired solution.
- Implement a KNX installation.
- Control installation remotely.
- Optimize energy consumption.
- Study the information chain.
- Perform a remote controlled home automation project.

Presentation
The HOME I/O software with its 8E/8S interface box makes it possible to realize a virtual 3D house controllable by an external equipment.
The assembly advantageously replaces the actual operating parts, while retaining the connections to the home sensors and actuators.
Energy consumption changes according to the steering and climatic conditions. The time can be accelerated for modeling the operations.
Developed in partnership with the University of Reims Champagne Ardenne and Real Games, the HOME I/O software is distributed by Schneider Electric.
This software was recognized as of educational interest by the Ministry of National Education in 2014.
The external control can be carried out through a KNX bench using the included CONNECT I/O software.
The optional 8-bit KNX module allows KNX bench connection.

Description
Composition
- 1 license for HOME I/O software.
- 1 interface module 8 inputs and 8 outputs TOR.

Option
- 1 KNX connector module

References

HOME I/O software and interface box	**MD1AM0029**
KNX module 8 binary inputs	**MD1AM3051**

The +
- Using 3D tools.
- Combination of real and virtual.
- Progressive movement of the residential building.


HOME I/O Software


Interface module 8 inputs and 8 outputs TOR


KNX connector module

Competencies covered
- Understanding and Use
- Study and realization
- Maintenance and Evolution (scaling)

Target degrees
- **BTS FED** (home energy fluids) option C HBD (home automation and interconnected buildings)
- **Engineering Degrees**

Recommended training
For updating your knowledge
KNXC
KNX System
KNX Certification
Scan or click on the QR code



Additional offer

Operational parts

Containment cabinet F2

Ventilation simulator for a building.....F3

Bench | Wiring of industrial components F4

Training motors.....F5

Other equipment F6

Accessories

Service Kit F8

Containment cabinet

Learning goals

- Implement an electro-mechanical control panel in a secure environment.
- Allow electrical tests to be carried out without any direct contact with live parts.

Presentation

These cabinets are designed to receive control plates wired by students to power them up safely. The cabinet can be connected to external operating parts.
The test voltages of 400 V AC and 24 V DC shall be supplied only if the cabinet door is closed.

Description

- Composition:
- key switch for maintenance,
- extractable protection and control block,
- plates made by the students supplied with safety sockets,
- quick connection of the student control panel,
- outward connections by safety bushings (2 motor outputs).
- Containment cabinets come with:
- 4 sets of Telemetry plates,
- 4 PVC plates to be drilled to pass the cables (dimensions 295 x 200 x 3 mm),
- 24 detachable terminals 5 female poles.
- The containment cabinet can also be provided pre-mounted on a trolley equipped with an asynchronous electric motor with its various protection and control components.

References

Containment cabinet	**MD1AA685**
Containment cabinet on motor trolley	**MD1AA695**

The +

- Secure and robust wiring.
- High control console accessible closed door.
- Pre-wiring for TSX machine.



Containment cabinet



Containment cabinet on motor trolley

Ventilation simulator for a building

Learning goals

- Study the characteristics of a centrifugal fan.
- Perform flow measurements and power consumption measurements.
- Show the contributions of variable speed to energy savings.
- Study ATC with energy recovery.
- Calculate head losses.
- Check facility EMC levels.
- Use ECO2 software to calculate economic data.

The +

- Mobile equipment.
- Sound trap to reduce noise.
- Demountable chimney for handling.



Presentation

This operating part is sold without the order that can be adapted.

- The fan is driven by an electromechanical sequence or by a pump/ ventilation specific controller.
- The flow rate is regulated mechanically by means of a valve.
- An air flow sensor at the top of the chimney allows you to compare the different settings.

Description

- Bench mounted on chassis with locking wheels.
- Composition:

- 1x 0.75 kW motor fan,
- 1 electrical box with built-in protections and controls
- 1 pressure controller with its diaphragm probes.

- Characteristics :

- power supply: 400 V AC / 0.75 kVA,
- dimensions (H x L x P): 2500 (1850 chimney row) x 1200 x 850 mm,
- mass: 133 kg.

References

Building ventilation simulator	**MD1AA750**

Bench | Wiring of industrial components

Learning goals

- Implement and cable components.
- Adjust safeguards/protections and test the installation.
- Check the operation of the assembly.
- Implement an electromechanical control panel in a secure environment.
- Associate this plate with an operative part.
- Perform tests safely.

Presentation

This bench consists of a containment cabinet, with a hinged and foldable wiring grid at the rear. The lower part is composed of three pre-wired charges: a compressor, three resistors and a fan. The compressor is used to supply air to a pneumatic circuit.
The student must do the power wiring on a removable grid and then connect the control box and loads by connectors. The rear gate makes it possible to produce a pneumatic circuit. The assembly is used to reproduce the electrical installation of a compressor room.
An optional hardware kit is available for the production of a control panel.

Description

Composition

- Bench mounted on chassis with locking wheels.
- 1 test cabinet.
- 1 protection circuit and 24 V AC power supply.
- 3 removable Téléquick grids.
- 1 control box to cable.
- 1x 0.34 kW single-phase compressor.
- 1x 0.126 kW three-phase fan.
- 3x 0.25 kW resistors.

Hardware kit option to cable

- 1 Téléquick plate.
- 7 contactors and auxiliary units.
- 1 thermal relay.
- 8 magnetothermal circuit breakers.
- 1 switch-disconnector.
- Pneumatic cylinders and distributors.
- Electrical and pneumatic wiring accessories.
- Wiring terminals.

References

Wiring bench for industrial components	**MD1AA200**
Hardware kit for IC wiring bench	**MD1AA209**

The +

- Mobile equipment.
- Use both sides simultaneously.
- Self-contained in compressed air.



Wiring bench

Training motors

Motors with brake

• Motors used to simulate different types of electromechanical equipment:
- blower fan,
- electric pump,
- hoist...

Reference

Three-phase asynchronous motors	230 / 400 V - 750 W	**MD1AA529**
	400 / 690 V - 750 W	**MD1AA529LT**



230 / 400 V motor



400 / 690 V motor

Motors

• Stand mounted
• Equipped with connecting sockets.

References

Three-phase asynchronous motors	230 / 400 V - 180 W	**MD1AMP001**
	400 / 690 V	**MD1AMP013**



230 / 400 V motor



400 / 690 V motor

Other equipment

Centrifugal fan

• Variable air flow fan with a transparent column for displaying the exhaust air flow.

Reference

Centrifugal fan	**MD1AMP014**



Centrifugal fan

Conveyors

• Conveyor equipped with a geared motor and a photoelectric cell that makes it possible to regulate in 2 directions of operation.

References

Conveyors tape	1 m	**MD1AMP002**
	2 m	**MD1AMP024**



Belt conveyor (1 m)



Belt conveyor (2 m)

Training radiator

• 2000 W training radiator with 4mm safety sockets for easy connection to different control modules.

Reference

Training radiator	**MD1AMP010**



Training radiator

Other equipment (continued)

Venetian blind and roller shutter

- Venetian blind:
  - swiveling strips,
  - with a 24 V DC motor to ensure the up, down and orientation movements of the slats,
  - with self-locking brake to stop the blind at any height.
- Roller shutter with up and down control.

Reference

Venetian blind	**MD1AASTORE**
Roller shutter	**MD1AAVOLETR**



Venetian blind



Roller shutter

Fixed solar panels

- Photovoltaic panel for the study and production bench supply by EnR.

Reference

Fixed solar panels	**MDG99410**



Fixed solar panels

Motorized wind turbine

- Bench with wind turbine with autonomous drive to power the study and production bench by EnR.

Reference

Motorized wind turbine	**MDG99430**



Motorized wind turbine

Cords

- Set of secure well cords.

Reference

Cords	**MD1AMLCORDONS**

Service Kit

Security intervention kit for a bench and a security case

This kit consists of:
- Absence of voltage check (VAT),
- Personal Protective Equipment (PPE):
- insulating gloves,
- side shield,
- consignment accessories,
- signal tape.

Reference

Service Kit	**MD1AA639**



Security intervention kit for a bench and a security case

Security intervention kit for a bench and a security case

This kit consists of:
- Absence of voltage check (VAT),
- Personal Protective Equipment (PPE):
- insulating gloves,
- side shield,
- consignment accessories,
- signal tape.

Reference

Service Kit	**MD1AA518**



Security intervention kit for a bench and a security case

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se.com/fr/edu

Schneider Electric France
Marketing Communication France
35 Joseph Monier Street - CS 30323
F92506 Rueil-Malmaison Cedex

Tips: 0 825 012 999*
Services: 0810 102 424**

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Life Is On: life lights up - Design, realization: DMCF, Emmanuel Froger

02/2022
ZZ6118-B