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Equipment and solutions for technical education and vocational training

CATALOGUE 2017

ERM AUTOMATISMES
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About us

ERM provides technical systems and services in the fields of education, robotics, manufacturing laboratories (FabLabs), energy and industry. Founded in 1990 in southern France, ERM first focused on industrial automation. Overtaken by its educational culture, ERM quickly became the precursor of introducing industrial production lines within technical training institutions. Upon request by these educational institutions, ERM then extended its offer to other areas, such as electronics, electrical engineering, power engineering and renewable energy.

Today, ERM has become a market leader in didactic solutions and systems for technological and vocational training in France, and is developing its export markets.

More than 1500 academic institutions are equipped with ERM technical teaching equipment in France: Secondary schools for vocational training, Vocational training centers, Universities, Universities of Technology, Major engineering schools, etc.

Abroad, many vocational training institutions are using our systems:

- French overseas territories: Guadeloupe, Guyana, Reunion, Martinique, Mayotte, New Caledonia, French Polynesia, Wallis & Futuna
- Africa : Algeria, Burkina, Cameroun, Gabon, Ivory Coast, Morocco, Mauritania, Senegal, Tunisia, …
- Asia : Vietnam, Korea…
- America : Mexico, Colombia…
- Europe : Belgium, Luxembourg, Romania, Hungary, Slovakia, Switzerland…

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Electrotechnics & Renewable Energy

Rotating machines test bench with speed drives and active load

Retractable bollard
(Web server, optical fiber and video surveillance camera)

Photovoltaic and wind generator kit

KNX enocean

EnOcean Smart Home – Home automation wiring and installation in a full-scale 3D structure

Measurement and maintenance tools : See pages I1 to I9

New

GREENSTICK
STICK & FOLLOW

UNIQUE AU MONDE
MADE IN FRANCE

Follow up and reduce your consumption

Stick it: it is connected

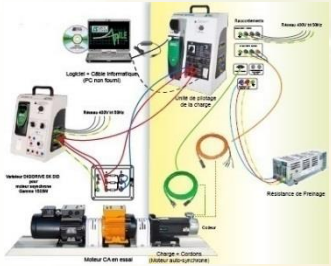
Innovative

Plug & Play

Savings

Motors, Speed drives & Energy savings

Rotating machines test bench with speed drives and active load – Studying and testing of industrial rotating machines with simulation of multi-quadrant loads



➢ *Features:*

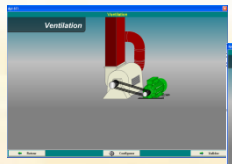
- **Flux vector drive** (Leroy Somer)
- Motors (**asynchronous, synchronous and DC**)

➢ *Training activities:*

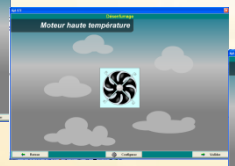
- Introduction to **different types of loads** (pump, fan, lifting, conveyor, etc.)
- Introduction to **different types of torques** (constant, linear, quadratic, hyperbolic, manual)
- **Comparison of motor characteristics**
- Introduction to the **basic principles of a speed drive**
- Operation and **adjustments of a speed drive**
- **Study of energy savings** generated by high-efficiency motors and speed drives

Enter the plant and use the main applications available

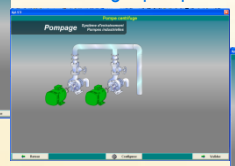
Centrifugal fan



Helical fan



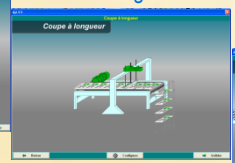
Centrifugal pump



Belt conveyor

Bridge crane

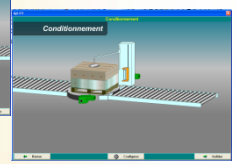
Cut-to-length line



Roller conveyor

Palletizer

Stretch wrapper



Activities for vocational training

➢ *Key points:*

- Compact and economical solution for studying electric motors and speed drives
- **Speed drive configuration and operational measurement acquisition software**
- "Active Load" approach (replacing brake, torquemeter, dynamo-tachymeter) offering more possibilities for studies and data acquisition with a specific software for acquisition of mechanical and electrical data from the machine being tested (motor speed, torque, inertia, voltage, current, power factor, efficiency losses…) and simulation or visualization of industrial applications (conveyor, lift, pumps…).
- **Customized loads** can be created

➢ *References for active load:* **LS00+LS01:** Active load bench for 300W machines on stand with ApiLe software – **LS05:** Active Load bench for 1500W machines with ApiLe software – **LS06:** Support stand – **LS07:** Support frame on casters

➢ *References for drives:* **LV00:** LeroySomer Digidrive flux vector drive for training use – **LV02:** Leroy Somer Digidrive speed drive in kit (for wiring activities) – **LV05:** LeroySomer Unidrive universal flux vector drive for training use

➢ *References for motors:* Many references for asynchronous motors with or without encoder, synchronous and DC motors, 300W or 1500W, IE1, IE2 or IE4

LEROY SOMER®

Leroy Somer Digidrive flux vector drive for training use

→For 300W and 1500W asynchronous motors

→Input/output available on stackable safety plugs

→Reference: **LV00**

Leroy Somer Unidrive universal flux vector drive for training use

→ For 300W and 1500W asynchronous and synchronous motors, with or without encoder

→ Input/output available on stackable safety plugs

→ Reference: **LV05**

New

Optical Fiber – Study, laying and testing of optical networks for the residential, tertiary and industrial sectors

➢ *Features:*

- **Optical fiber connection** (Fusion splicing or Cold welding)
- Installation control by reflectometry
- Connectors inspection and cleaning
- Continuity test and photometry measurements
- **Architecture and laying of FTTH, FTTO and industrial networks**
- **Active network simulation**

2D structure (FF17)

➢ *Training activities:*

- Learning the basics of optical fiber and its applications
- **Functional study of FTTH, FTTO and industrial networks**
- Optical fiber sheathing, **"vertical" cabling**
- Optical fiber laying in **"horizontal" structures** (upstream of the building)
- **Optical cable connection to an active terminal** "client connecting, BOX commissioning"
- Connection and configuration of optical/copper switches
- **Interconnection/welding of optical fibers**
- Tests and measurements (**Photometry and Reflectometry**) of network connections on multimode and single-mode fibers
- Assessment, measurement and validation of **functional characteristics of networks**
- **Test report generation**

➢ *Key points:*

- Selection of equipment that allows a **comprehensive approach of the different types of technologies, architectures and tools**
- **Teaching guide** containing procedure files and tutorials

➢ *References for Optical fiber **connection tools**:* **OF00:** Core-alignment fusion splicer and cleaver – **OF01:** Clad-alignment fusion splicer and cleaver – **OF02:** Optical fiber mechanical splice kit (3M Fibrlok) – **OF03:** Optical fiber technician toolkit

➢ *References for Connector **inspection and cleaning**:* **OF10:** Optical connector inspection probe – **OF11:** Optical connector cleaners

➢ *References for Fiber **fault location** :* **OF15:** Optical fiber visual fault locator – **OF16:** Optical fiber digital fault locator

➢ *References for **Optical link budget**:* **OF20:** Single/multimode photometry kit for optical link budget – **OF30:** Single/multimode optical fiber reflectometer/OTDR pack – **OF31:** Single-mode optical fiber reflectometer/OTDR pack

➢ *References for Network **qualification and certification**:* **OF40:** Ethernet and Optical fiber wiring and network qualifier – **OF50:** Single and multimode optical fiber certifier – **OF51:** Singlemode optical fiber certifier

➢ *References for Fiber / Ethernet **media converters**:* **OF60:** Set of 2 Gigabit media converters 1000Base-T to 1000Base-SX singlemode with SC fiber connector – **OF61:** Set of 2 Gigabit media converters 1000Base-T to 1000Base-LX multimode with LC fiber connector

➢ *References for **Solutions commissioning and simulation kit**:* **FF10:** Optical fiber FTTH tool kit – **FF11:** Installation structure for optical fiber FTTH tool kit (Optional) – **FF12:** Optical fiber subdistributor & operator conveyance box (Optional) – **FF20:** Optical fiber FTTO tool kit – **FF30:** Urban monitoring and control networks kit ("industrial" optical fiber)

FTTH (Fiber To The Home) optical fiber tool kit for individual and collective housing

→Contents of the FTTH optical fiber tool kit for individual and collective housing:

- 1x **Basement box**
- 2x **12-port landing junction box**
- 4x **Subscriber optical terminal outlet with 4 SC/APC connectors and 2 pigtails**
- 4x **Subscriber optical terminal outlet with 2 SC/APC connectors on 25m cable**
- 8x 2-slot universal tray for 12 splices
- 12x Single-mode SC/APC pigtail
- 16x Fibrlok connector for mechanical splice
- 12x Prefibered SC/APC NPC connector
- 12x SC-APC connector
- 4x Connection box for junction
- 250m 2-optical fiber cable
- 100m cable with two 12-fiber compact tubes
- 1x 1Gb media converter 1000Base-T
- 1x Configurable optical fiber box
- 12x RJ45 connector

→Reference: **FF10**

Option: Optical fiber subdistributor & Operator supply box (FF12)

→Operator commissioning of optical fiber networks

Option: 3D structure for Optical fiber FTTO toolkit (FF11)

Urban monitoring and Control networks kit ("Industrial" optical fiber)

→ Contents of the Urban monitoring and control networks kit ("industrial" optical fiber)

- 3x **100Mb RJ45 4-pin manageable micro-switch + 100Mb SC multimode optical fiber**
- 1x **Professional IP camera and configuration/supervision software**
- 1x **Siemens S7-1200 PLC pack**
- 1x Counting sensor
- 1x lighting terminal
- 100m 50/125 OM3 multimode 4-optical fiber cable
- 12x SC multimode pigtail
- 12x SC duplex multimode connector
- 12x SC simplex multimode connector
- 3x Watertight connection box with coiling
- 12x Prefibered SC NPC simplex multimode connector
- 1x Crimping tool for NPC connectors
- 12x 3M Fibrlok 2529 universal optical fiber splice
- 100x Heat-shrink splice protector
- 20m 1Gbit Ethernet cable
- 12x RJ45 connector

→ Reference: **FF30**

KNX eco-energy – KNX energy management and efficiency

- Learning home automation in a real situation scenario
- Introduction to the main electrical functions (lighting, intruder and fire security, thermal, supervision...)
- Study of the KNX bus (frames, addressing, settings…)
- Energy optimization scenarios with measurement of electrical consumption
- Projects with bus extension kit for outdoor lighting

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KNX Dali lighting unit – Studying lighting techniques and control

➢ *Features:*

- **Electrical distribution** (KNX, KNX/DALI gateway…)
- PLC (Siemens Programmable Logic Controller LOGO)
- Lighting control (dusk-to-dawn switch, DALI electronic ballast, presence detector)
- Lighting (compact fluorescent, fluorescent, halogen, LED, high-pressure sodium, metal iodine, incandescent)
- **Communication** (USB / KNX interface)
- Bus configuration (ETS4 Lite) and supervision

➢ *Training activities:*

- Setting up and operating KNX and DALI components
- Wiring and connecting lights
- Addressing and configuration of components (ETS4 Lite software)
- Estimation of energy savings, installation and maintenance time compared to a traditional installation
- Logic module programming
- Failure diagnostics on KNX and DALI components

Domovea supervision software

Spotlight on tripod

➢ *Key points:*

- Introduction to DALI, intelligent and communication-capable lighting management system
- Handling of **KNX, new standardized inter-operable communication bus for building control**
- Studying the **main types of lighting**
- Possibility of **adapting the product in the 3D wiring cells**
- **Programming and supervision applications are supplied**

➢ *References:* **KN11:** KNX Dali Lighting unit (with ETS4 Lite license) – **KN22:** Domovea license with KNX/USB gateway - **KN13:** KNX configuration software ETS4 Professional (Professional Edition)

KNX Smart Home – KNX home automation wiring and installation in a full-scale 3D structure

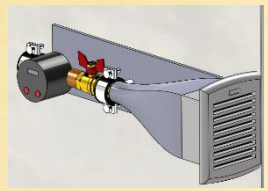
New

➢ *Features:*

- **Electrical distribution** (residential wiring cabinet with KNX low-voltage switchgear, service shaft, RT2012 flush-mounted cases, etc.)
- Management of opening elements (**KNX-commanded shutters,** window **opener**)
- HVAC (heating, thermostat, ventilation)
- Lighting (energy-saving, LED)
- Lighting control (light variator, light sensor, presence detector)
- **Communication** (Ethernet / KNX)
- **Energy and fluid metering** (water simulation) and consumption monitoring
- Bus configuration (ETS4 Lite) and supervision (Domovea)
- **Touchscreen tablet** for home automation control
- **Video surveillance** (IP camera connected to home automation supervision)

➢ *Training activities:*

- **Installation and complete wiring** of the 3D cell (cabinet, service shaft, home automation components, etc.)
- Commissioning of KNX automation components
- Addressing and configuration of components via ETS4 Lite software
- Configuration of the Domovea server for touchscreen tablet supervision
- **Measurement of water and energy consumption and power**
- Introduction to different types of lighting and lighting control
- Estimation of energy, installation and maintenance savings compared to a traditional installation



Water meter: Flow simulation via ventilator

Supervision touchscreen tablet (KN21)

Video surveillance IP camera (KX22)

➢ *Key points:*

- Real-life installation conditions (“actual” components in a 3D cell) and initiation to the main electrical functions of residential buildings
- Introduction to **building control** solutions**, thermal regulation** and **standards for disabled persons**
- **Use of the KNX standardized communication-capable bus for intelligent buildings**
- Modularity that enables multi-user work (Case/Service shaft – Electrical network)
- Upgradable solution: Sensors/actuators may be added (8 KNX participants)

➢ *References:* **KN30+KN31:** KNX Smart Home (already assembled/wired) – **KN30+KN31-k:** KNX Smart Home (assembly kit) – **KN30:** KNX Smart Home component kit – **KN31:** 3D structure for KNX Smart Home assembly – **KN32 :** Supervision touchscreen tablet – **KX22:** Video surveillance IP camera – **FF15:** Optical fiber subscriber connection from the operator’s delivery point (Optional)

« Building & Home automation » applications

New

EnOcean Smart Home – EnOcean (wireless, battery-free) home automation waring and installation in a full-scale 3D structure

➢ *Features:*

- **Electrical distribution** (residential wiring cabinet with EnOcean low-voltage switchgear, service shaft, RT2012 flush-mounted cases, etc.)
- Management of opening elements (**EnOcean-commanded shutters, EnOcean opening contact and window opener**)
- HVAC (heating, thermostat, ventilation)
- Lighting (energy-saving, LED)
- Lighting control (light variator, light and occupancy sensors)
- **Communication** (Ethernet / EnOcean)
- **Energy and fluid metering** (water simulation) and consumption monitoring
- EnOcean component configuration and supervision (Home automation box)
- **Touchscreen tablet** for home automation control
- **Video surveillance** (IP camera)

➢ *Training activities:*

- **Installation and complete wiring** of the 3D cell (cabinet, service shaft, home automation components, etc.)
- Commissioning of EnOcean components
- Configuration of components according to home automation scenarios
- Configuration of the home automation box for touchscreen tablet supervision
- **Measurement of water and energy consumption and power**
- Introduction to different types of lighting and lighting control
- Estimation of energy, installation and maintenance savings compared to a traditional installation

Home automation & supervision box

➢ *Key points:*

- Initiation to a **booming home automation technology**, adapted to both residential and tertiary sector
- Introduction to **building control** solutions**, thermal regulation** and **standards for disabled persons**
- Real-life installation conditions ("actual" components) and exposure to electrical functions of residential buildings
- **Use of the EnOcean standardized radio communication-capable bus for intelligent buildings**
- Modularity that enables multi-user work (Case/Service shaft – Electrical network)
- Upgradable solution: Sensors/actuators may be added

➢ *References:* **EN20+KN31:** EnOcean Smart Home (already assembled/wired) – **EN20+KN31-k:** EnOcean Smart Home (assembly kit) – **EN20:** EnOcean Smart Home component kit – **KN31:** 3D structure for KNX Smart Home assembly – **KN32 :** Supervision touchscreen tablet – **KX22:** Video surveillance IP camera

EnOcean wireless, battery-free home automation – Study and implementation of EnOcean wireless, battery-free home automation solutions (assembly kits)

Magneto-resistance

Solar energy

Heat science

→Initiation to a **booming home automation technology**, adapted to both residential and tertiary sector

→Initiation to the main electrical functions of the tertiary sector (lighting, fire safety, intrusion detection, heating, supervision, etc.)

→Study of energy optimization scenarios based on power consumption measurements

→Ideal for activities and projects with 3D structures

Page H13

New

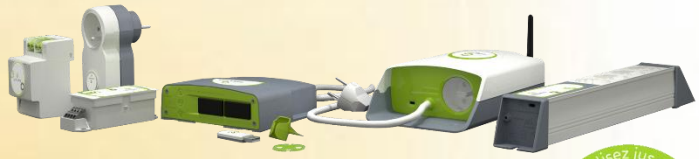
GreenPriz – Monitoring, control and optimization of electricity consumption in the tertiary sector

In partnership with

GREENPRIZ
INNOVATIVE ELECTRIC SOLUTIONS

➢ *Description of GreenPriz:*

- **Wireless control** modules for the **power supply of electrical equipment**, by means of customizable schedules (15-minute slots) stored in their memory
- Innovative solution for professionals, from the **DIN module** for the electrical cabinet to the **wall socket,** which provides **simple**, effective and affordable answers to your questions on the monitoring, control and optimization of electricity consumption
- Consists of **autonomous modules** that require no Internet connection, no permanent radio transmission, and **no additional wiring**
- Up to 43% of energy is saved, with a fast return on investment.



➢ *Training activities:*

- **Consumption measurement for single-phase electrical equipment**
- **Audit and optimization of electricity consumption**
- **Installation and configuration** of GreenPriz modules
- Application of the 2012 French Thermal Regulations and of the French decree dated 1 July 2013 imposing night-time turn-off of lighted signs

Create/Configure

Schedule/Control

Monitor/Optimize

➢ *Key points:*

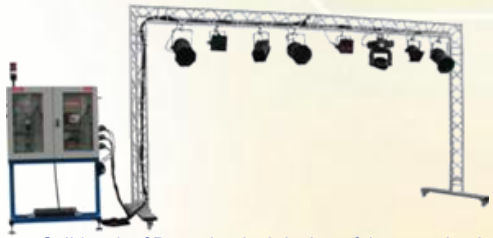
- **GreenPriz enables real energy saving** (no more invisible consumption such as the standby mode, close hourly control of electric heating, etc), **while conducting training activities**
- Monitoring, control and analysis of electricity consumption (**consumption data is stored on a 40-day sliding scale**)
- **ON/OFF control schedule** over 3 years with a precision of 15 minutes and various schedule deviation modes (delay, forced switch-on or forced switch-off)
- Up to 100 slave modules managed by a single Master Box
- **Theoretical range up to 300m in free space** or 100m in constrained environments
- **Maximum permissible load of 16A** (~ 3,600 W under 230Vac)
- **MyGreenPriz software for PC and tablet** enabling communication with all the modules, as well as consumption monitoring and optimization

➢ *References:* **GZ01:** GreenPriz starter kit (1x Master module – 3x Wall socket – MyGreenPriz software) – **GZ02: GreenPriz deployment kit** (1x Master module – 3x Wall socket – 1x Integrated module – 1x DIN module– 1x Multi-socket – 1x Trunking/screw-in module – MyGreenPriz software) **– GZM000A:** GreenPriz Master Box **– GZE0003:** GreenPriz wall socket **– GZE0004:** GreenPriz integrated box **– GZE0002:** GreenPriz multi-socket **– GZE0001: GreenPriz** trunking/screw-in module **– GZE0005:** GreenPriz DIN Module **– GZA0012:** USB dongle for the Shutdown PC software

« Building & Home automation » applications

Ermalux – Stage lighting

Best Seller



➢ *Features:*
- **Lighting technology** with LED new technologies
- **Communication** (Web server)
- PLC
- Low-voltage switchgear (static relay, **remote dimmer switch**…)

➢ *Training activities:*
- Diagrams and **electrical wiring**
- Studying **2 communication networks (DMX and Ethernet)**
- Solidworks 3D mechanical design of the motorized moving head
- Studying **harmonics and phase balance**
- Programming and controlling
- Setting up and operating a communication network

Removable mounting plate

➢ *Key points:*
- **Powering** (**4kW**) and connecting dimmer switches
- **More wiring workstations** with the **removable mounting plate** of the control cabinet

➢ *References:* **EL20+DM10+LE10+3xLE11:** Stage lighting with 3m support structure, DMX moving head, 3xspotlights LED color changing projectors controlled by DMX, 2 LED spotlight, detectors, tertiary cabinet with communication, web server, LED spotlight controllers and DMX controllers (with 3D stage light software) – **EL21:** Electric protection box with control (assembly kit) – **LE11:** PAR56 spotlight LED color-changing projector controlled by DMX – **AQ14**: Power box with 2P+T plugs and measuring unit for control signals and power – More DMX references: consult us

« Industry » applications

Conveyor belt – Studying sensors and motor start techniques

➢ *Features:*
- Low-voltage switchgear
- Bi-directional conveyor (belt conveyor with adjustable rails)
- **Motor starters** (three-phase motor, contactor, speed drive…)
- **Sensors** (close-up photoelectric, inductive, capacitive)

➢ *Training activities:*
- Wiring of the motor starter on removable plates
- Studying **different sensor technologies and motor starters**

➢ *Key points:*
- Operating part can be connected to the control cabinet
- **Wiring workstations** with the **removable mounting plate** of the control cabinet

➢ *References:* **CV10-CV11-CV12** Conveyor belt with control cabinet - **CV10** Conveyor belt without control cabinet – **CV11** Control cabinet with mounting plate – **CV12** Components for direct motor start (assembled) – **CV13:** Components for direct motor start (assembly kit) – **CV15** Components for motor start with speed drive (assembly kit) – **CV16** Components for motor start with progressive starter (to be assembled) – **PA10** Bare removable mounting plate

Removable mounting plate

Retractable bollard - Parking access control

Best Seller

➢ *Features:*
- Low-voltage switchgear
- **Pneumatic** energy (compressor, distributors, cylinders…)
- PLC
- **Communication** (Web server)
- Sensors (inductive and Reed switch)

➢ *Training activities:*
- Diagrams and **electrical and pneumatic wiring**
- Measurements
- Mechanical 3D study on Solidworks
- PLC **programming**
- Studying action, acquisition and communication chains...

Removable mounting plate

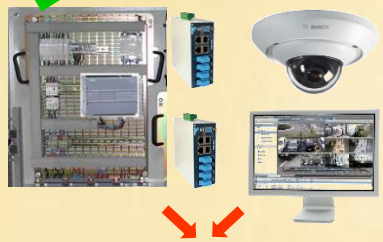
➢ *Product strengths:*
- **Tutorials** on electrical and pneumatic wiring and industrial communication
- **Multiple wiring workstations** with the **removable mounting plates** of the control cabinet

➢ *References :* **BT40-PA10-PA11:** Bollard 230v (with PLC) – **BT22:** (Optional) Electrical mounting plate with assembly kit of components (compressor motor starter) – **BT13:** (Optional) Pneumatic mounting plate with assembly kit of components – **PA10:** Bare removable mounting plate

Option for the Retractable bollard

New

Urban monitoring and control optical fiber network & Web server controller, with removable mounting plate – Retractable bollard control revamping



➢ *Features:*
- Optical fiber (manageable fiber/copper switches)
- **PLC & Communication** (Siemens S7-1200 with web server)
- Video surveillance (IP/PoE camera and video surveillance software)

➢ *Training activities:*
- **Implementation**, **addressing and configuration** of an industrial optical network
- Switch configuration and communication tests
- Connecting and configuration of an IP/PoE camera
- Setting up **supervision (alarm control, etc.) on a video surveillance software**
- Wiring and electrical connections
- Programming (or modification) of PLC programs
- Development (or modification) of the supervision application

➢ *Key points:*
- Introduction to an **industrial optical fiber application**
- Solution to **modernize** the control unit of the **Retractable bollard** with **technological update**

➢ *References:* **BT41+PA10**: Removable mounting plate with Siemens S7-1200 PLC web server - **FF30**: Urban monitoring and control optical fiber network (optional)

« Industry » applications

Thermoforming oven - Energy transfer through infrared radiation

➢ *Features:*
- **Electrothermics**
- **Pneumatic** energy (vacuum pump, distributors, cylinder…)
- **Communication** (Web server)
- PLC
- Low-voltage switchgear
- Sensors (Reed switch, pyrometric)
- Control (**dimmer**)

Removable mounting plate

➢ *Training activities:*
- Diagrams and **electrical and pneumatic wiring**
- Voltage, current and temperature measurements
- 3D mechanical modeling on Solidworks
- **Temperature control**
- **Programming** on TSX 37 PLC...

➢ *Key points:*
- **Tutorials** on electrical and pneumatic wiring
- **Multiple wiring workstations** with the **removable mounting plates** of the control cabinet
- Thermoforming cycle duration: **3min**

➢ *References:* **FR10:** Thermoforming oven – **FR11:** (Optional) Measuring instruments– **FR12:** (Optional) Electrical plate (assembly kit for motor starter wiring) – **FR13:** (Optional) Pneumatic mounting plate (assembly kit) – **FR14** (Optional) Dimmer – **PA10:** Bare removable mounting plate

Pneumatic removable mounting plate

Compressor test bench – Studying a compressor and pneumatic components (Reference: **CM10**)

Page C21

Industrial fan - Industrial air extraction system

➢ *Features:*
- Low-voltage switchgear (**communication-capable motor starters**…)
- Propelling force (three-phase motor **1.1kW**…)
- PLC
- Supervision
- Sensors (**torquemeter**, CO sensor)

Removable mounting plate

➢ *Training activities:*
- Communication and control through a **supervision software**
- Diagram and electrical wiring
- Tests and measurements (voltage, current, torque, speed…)
- Maintenance
- Programming

Operating part (VE40)

➢ *Key points:*
- **2 versions** to meet your needs
- Power implementation (1.1kW)
- **Multiple wiring workstations** with the **removable mounting plates**

➢ *References:* **VE30-PA10-PA11:** Communication-capable industrial fan bench for test and measurement – **PA10:** Bare removable mounting plate – **UC12:** Software and supervision for VE30 (Optional) – **VE40:** Fan (operating part) with torquemeter

ErmaPompes – Study, maintenance and testing bench for industrial pumps

New

- → Bench adapted to electro-technics, control and maintenance training activities
- → Hydraulic connection, commissioning, tightness testing and pump performance testing (flow/pressure, vibration, acoustics, etc.)
- → Monitoring, inspections, diagnostics, corrective maintenance and improving maintenance
- → (Direct or speed drive) motor starter wiring
- → Studying the speed drive configuration and performance
- → Energy consumption and efficiency study (with / without speed drive)
- → Analysis of the test device (information chain) and controller and embedded Web supervision programming

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Electrical distribution

Basic low voltage board - Electrical distribution board

➢ *Features:*
- Low-voltage switchgear (main circuit breaker 160A, 4 tetrapolar line feeders, 3 single-phase line feeders, bus, etc.)

➢ *Training activities:*
- **Commissioning**
- Maintenance
- Industrial measurements…

➢ *Key points:*
- Its open architecture gives free space for further development and improvement (**30% free space**)
- Transparent door

➢ *References:* **ER30:** Basic LV board Ermadis

Electrical distribution

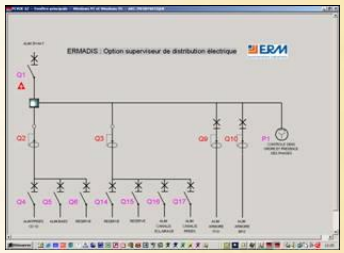
Low voltage board - Electrical distribution and communication board with transfer switch

➢ *Features:*
- Low voltage switchgear (main circuit breaker 100A, 6 tetrapolar line feeders, 3 single-phase line feeders, **bus**, etc.)
- Transfer switch
- Industrial communication (PLC with TCP/IP port)
- Teleprocessing **(industrial supervisor)**
- Energy quality (**power meter**, **capacitor stacks**)

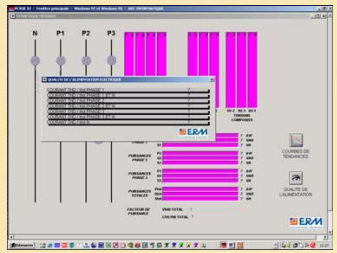
➢ *Training activities:*
- Study (eg. Energy quality, load shedding)
- Construction and **commissioning**
- Maintenance (eg. Bus replacement)
- **Industrial measurements**
- **Communication**
- Programming...

➢ *Key points:*
- Its open architecture gives free space for further development and improvement (**30% of free space**)
- Industrial supervision over Ethernet, for monitoring and remote control
- Transparent door for better observation.

➢ *References:* **ER40** LV board with communication (electrical distribution and communication board, with transfer switch) – **ER23** simulated power board for transfer switch



Supervision with ER20



Analysis of power quality

Iterm – Sub-distribution board for studying the neutral point connection

➢ *Features:*
- **Grounding system** (three-phase transformer 4kVA)
- First and second insulation defects (**permanent insulation controller** with first defect indication)
- Low-voltage switchgear (main switch-disconnector, 2 tetrapolar line feeders…)

➢ *Training activities:*
- Commissioning
- Studying grounding systems and **insulation defects**...

➢ *Key points:* 50% of free space for further upgrades

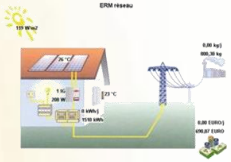
➢ *Reference:* **IT10:** Sub-distribution board for studying the neutral point connection

Photovoltaics & Wind generators

Grid-tied Solerm - Instrumented grid-tied photovoltaic system

Grid-tied Eolerm - Instrumented grid-tied wind generator (<12m - 0.9 to 3kW)

➢ *Features:*
- Direct and alternating current (230V **grid-tied inverter** 1500 to 3000W)
- Photovoltaic power generation (starting from 1kWp)
- Wind power generation (wind generator from 0.9 to 3kW on a 12m guy-wire mast)
- **Communication** and supervision
- Metering and **power quality**
- Security (lightning arrester…)
- Sensors (sunlight, temperature)



➢ *Training activities:*
- **Constructive solutions of wind generators**
- Transformation and displacement of energy
- **Dimensioning** the installation and energy balance
- **Economical and environmental analysis**
- Analyzing and operating the system
- System modifications (**projects**…)
- **Diagnostics** and preventive maintenance
- Measurements and efficiency study
- Configuration and **communication**...

➢ *Key points:*
- Feasibility study and system adjusted to each site
- **Putting production data online**
- Use of reliable industrial components

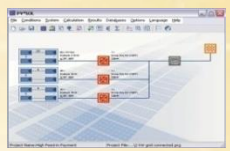
➢ *References:* **CR20:** Grid-tied Solerm 1500Wp (flat roof) – **CR05:** Data logging & Communication (Optional) – **CR06:** Backup battery (Optional) – **CR07:** Display for production data (Optional) – **CR08:** Electric meter set (Optional)

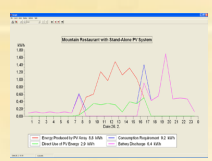
Other types of roof: Contact us

Wind generators projects : Contact us

For your solar and wind generators projects, you also may purchase the components (panels, batteries, regulators, inverters…) on our website www.erm-energies.com

Software for calculation and dynamic simulation of photovoltaic systems





→ Dimensioning, performance and efficiency of grid-connected and off-grid photovoltaic systems

→ **Studying the impact of parameter changes**

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3,5kW wind generator characterization bench – Studying a grid-connected 3,5kW wind generator

➢ *Features:*

- Direct and alternating current (**grid-tied inverter** 230V 3600W)
- Wind power production (3,5kW wind generator)
- **Communication** and supervision
- Security (lighting arrester…)
- Measurements (voltage and current in the energy chain, rotation speed, turning torque of the wind generator)

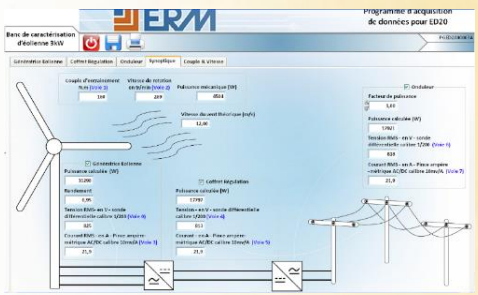
➢ *Training activities:*

- **Constructive solutions of wind generators** (mechanical control of the rotation speed)
- **Transformation and displacement of energy**
- Analysing and operating the system
- Measurements and **efficiency** study of each part of the system: wind generator, regulator, inverter
- Effect of **modifying the load curve of the inverter on power production by the wind generator**
- Configuration and **communication...**

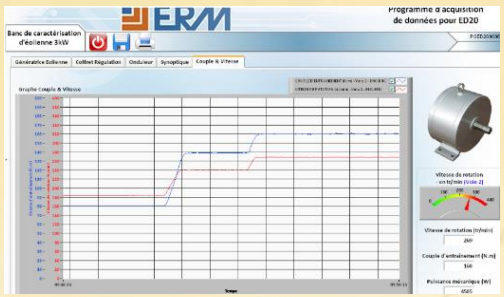
➢ *Key points:*

- Use of reliable industrial components
- Inverter with 16-point load curve

➢ *Reference:* **ED20:** Characterization bench for 3,5kW wind generator – **AQ10**: USB data logger
AQ11: Differential voltage probe for USB data logger – **AQ12:** AC current clamp for USB data logger



Screenshots on Labview (overview)



Screenshots on Labview (torque / speed)

New

Solerm Self-supply – Photovoltaic kit with micro-inverters and gateway for cloud datalogging

➢ *Features:*

- Direct and alternating current (230V 250W Enphase **grid-tie inverter**)
- Photovoltaic power generation
- **Communication** and supervision via cloud (Enphase Envoy gateway)
- Security of photovoltaic systems (Lightning arrester, etc.)

➢ *Training activities:*

- Study of power **generation** and **distribution**
- Installation **dimensioning** and **energy balance**
- Economical and environmental analyses of self-supply
- **Full wiring, configuration and commissioning of the system**
- Measurements and efficiency study

➢ *Key points:*

- User-friendly, **already assembled and ready for use**, adapted to most users
- Hybrid! It may be used both as "**Self-Supply**" and "**Full reinjection**"
- **Mobile and easy to transport**
- **Cloud-based data registration system enabling analyses of system production and efficiency depending on insolation**
- Multi-users (internet database), no specific software is required

➢ *References:* **AX10:** Solerm 500Wp Self-Supply – **AX11:** Solerm 1000Wp Self-Supply – Other power: Contact us

Laser sighting infrared thermometer (Kimo Kiray200)

Page I4

TRMS AC+DC compact digital clamp multimeter (Chauvin Arnoux F205)

Page I7

Solarimeter (Kimo SAM20)

Page I5

Solar power installation analyzer (Chauvin Arnoux FTV100)

Page I7

Photovoltaic module and string tester (Chauvin Arnoux FTV200)

Photovoltaics & Wind generators

ModuloSolaire – Modular system for off-grid solar study

→ « Plug and Play » modular and safe system

→ Comparison of **4 solar panels** (mono, poly, amorphous, thin-film), **2 different charge controllers** (standard, MPPT), and **2 different inverters** (quasi-sine, sine)

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Photovoltaic and wind generator kit - Projects for photovoltaic solar and wind energy production

Best Seller

➢ *Features:*

- Direct and alternating current (12-230v 200W inverter)
- Electrical power generation (2 solar panels 12V 90Wp, wind turbine 12V 400W and mast)
  - **Energy storage** (1 battery 12V 75Ah)
  - **VLV LV switchgear** and **configurable PLC**
  - **Communication** and **supervision**
  - Sensors (sunlight, temperature)

➢ *Training activities:*

- **Student projects** for setting up a stand-alone system
- Transformation, storage and displacement of energy
- **Dimensioning** of a photovoltaic system
- Wiring, connecting and operating the system
- **Technical, economical and environmental analyses**
- Preventive maintenance and certification
- Measurements and efficiency study
- Carrying out a modification (adding another source of energy)
- Programming (eg. Load shedding) and **communication**...

➢ *Key points:* Assembled or assembly kit, to conduct projects from A to Z with students

➢ *References:* **CH15+CH16:** Photovoltaic kit - **EO11+EO15+CH16:** Wind turbine kit (without mast) – **EO11+CH15+CH16+CH17** Photovoltaic and wind turbine kit (without mast) – **EO12:** 6m guy-wired mast for 400W wind generator (Optional) – **EO13:** Wall-mounting with 3m mast for 400W wind generator (Optional) – **CH18:** Battery charger controlled by PLC (Optional) – **CH19:** Lighting kit VLV and 230V (Optional)

Off-grid 500Wp photovoltaic assembly kit – Dimensioned for 55W continuous power consumption during 24h (battery autonomy: 3 days)

➢ *Features:*

- 2x 250Wp polycrystalline modules with support structures
- 1 Control cabinet MiniPowERM 24V (PV controller 30A 800Wc max, batteries monitoring and Phoenix inverter 800W)
- 2x sealed solar batteries AGM 200Ah C20 12V with protective box
- Components for installation and connection

➢ *Reference:* **PW00:** Off-grid 500Wp photovoltaic assembly kit

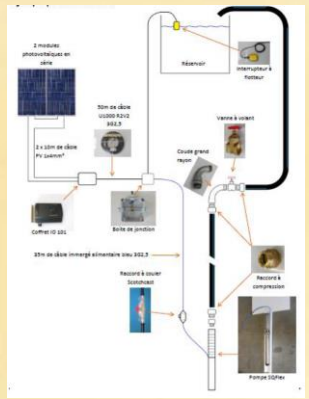
Solar streetlight assembly kit – Street lighting kit, with 5 days autonomy without sunlight

➢ *Components:*

- 30W high efficiency LEDs (3420 lumens), incl. holder, bracket, module mounting structure
- 1x MPPT solar charge controller with time program function
- 1x top-of-pole mount battery box
- 1x 135Wp photovoltaic module
- 2x 100Ah sealed batteries (no pole)

➢ *Reference:* **WL30-135:** Solar lighting kit (supplied without a post).

Solar powered pumping station– Assembly kit for setting up a small solar powered water pumping station (from a well or tank)



➢ *Components:*

- 2x 200 to 250Wp polycrystalline modules
- 1x Submersible pump with a capacity of 2.5m3/h, max depth 120m
- 1x Automatic inverter for the submersible pump
- 1x High/low-level float switch
- 1x 90° DN50 galvanized steel tube
- 1x 2" FF brass gate valve
- 3x M2" union connections - HDPE DN50
- 10m DN50 HDPE blue-stripe pipe
- 10m blue underwater food contact cable 4G1.5 PBS-R
- 1x 15° aluminium triangular ground structure for 2 modules

➢ *Reference:* **PO00:** Solar pumping assembly kit

Electrotechnics Fundamentals

Electrotechnics AutomationXpert

➢ *Contents:*

- Theoretical and practical courses extensively covering topics in Electrotechnics

Magnetism	AC and DC Motors	Switches
Sensors	Relays	Motor Drives
Electrical Contacts	Circuit Breakers	PLCs
Electrical Control Circuits		

- Many simulators

➢ *Key points:*

- 612 pages, 730 pictures and images, 400 animations
- Guide to meet the requirements of all technical and vocational training levels, basic and continuing education
- Site license (unlimited number of stations)
- e-learning sessions configurator and multiple choice quiz generator

➢ *Reference:* **PO//GdE**: Electrotechnics AutomationXpert

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