



**SMART**  
SMART Industry 4.0 Platform



**exxer** Skills for  
the Future


## THE UNION OF EXPERIENCES AND COMPETENCES, A NEW LEVEL OF EXCELLENCE IN EDUCATION!

EXXER arises from the merger of two companies passionate about **technology, innovation, and education.**

With the purpose of offering increasingly excellent tools to assist in technological education, we believe that the combination of practical and theoretical teaching makes a difference in accelerating human and global development.




TECHNOLOGY ● INNOVATION ● EDUCATION



# SMART


## SMART Industry 4.0 Platform

 Industrial processes are undergoing a significant transformation with the advent of Industry 4.0. The fourth industrial revolution is characterized by the intensive use of information and communication technologies in manufacturing processes, integrating automation with management systems.


This transformation requires a significant revision of curricula, with a multidisciplinary approach, including topics in the field of information technology and its integration with the latest automation technologies. The SMART 4.0 series was developed with the aim of facilitating the teaching process of enabling technologies for Industry 4.0. SMART 4.0 is a modular platform that allows different configurations and future expansions.

With SMART, it is possible to address topics such as:


- Internet of Things;
- Collaborative Robotics;
- Augmented Reality;
- Digital Twin;
- Edge and Cloud Computing;
- Big Data and Data Analytics;
- Systems Integration.

 SMART 4.0 is not just a hardware platform with the latest in automation. It also consists of a series of software resources, including:

- Digital Twin (simulation);
- MES (Production Management);
- SCADA (supervisory software);
- Integration with online store and other web applications;
- IoT Platform;
- Databases and historians.

 All kits in this series include complete didactic material, focused on competency-based teaching and easy for teachers to use.

We have comprehensive solutions for teacher training and updating, ensuring the maximum use of kit resources.

 [Consult our experts for more information and detailed technical characteristics of each device in the series.](#)



## CORE SKILLS AND COMPETENCIES

- Develop programming logic to tackle practical challenges;
- Understand the operation of sensors and actuators used;
- Comprehend and apply RFID technology;
- Access and configure sensors through the IO-Link network;
- Create projects involving controllers and PROFINET devices;
- Develop HMI (Human–Machine Interface) and SCADA (Supervisory Control and Data Acquisition) displays;
- Understand and use the MQTT protocol;
- Send data from controllers to the cloud platform: configure IoT devices and display their data on dashboards;
- Create projects using collaborative robots;
- Utilize collaborative robots and grippers for assembly processes;
- Configure computer vision applications;
- Understand and use MES (Manufacturing Execution System) software;
- Integrate MES with other applications through APIs;
- Understand and use computer network concepts;
- Understand and use virtualization concepts;
- Configure manageable switches, routers, and firewalls;
- Implement factory network architectures according to standards and best practices.



## PROJECT

Due to its multidisciplinary conception and application to technology, the SMART series is ideal for project-oriented studies, which can be carried out with a gradual increase in the complexity of challenges. Additionally, it is possible and advisable to work with teams that tackle independent challenges but must integrate to find a final solution, thus allowing exploration of relevant topics in projects such as teamwork, communication, negotiation, and requirement specification.



## TECHNOLOGICAL HIGHLIGHTS

**Collaborative Robotics and Computer Vision:** Collaborative robots are industrial robots designed to interact safely with humans. Paired with computer vision systems using artificial intelligence, we obtain safe, autonomous, and flexible robotic systems. In the SMART series, these resources are available for learning manipulation, assembly, and quality control processes.

**Industrial IoT:** IoT (Internet of Things) is one of the most crucial technologies in the fourth industrial revolution. In this context, it is referred to as Industrial IoT, distinguishing it from other use cases. In the SMART 4.0 series, this technology is applied in both sensor device communication and PLC communication using the MQTT protocol. In both cases, data is sent to cloud platforms where dashboards can be created for presentation.


**Cybersecurity and Virtualization:** These are increasingly present IT technologies in the industry, including cybersecurity, corporate networks, edge computing, and virtualization. All these topics are present and can be practically addressed in the SMART 4.0 platform.

**Production Management System (MES):** In Industry 4.0, not only the production process is automated, but also production management. This is achieved through software called MES (Manufacturing Execution System). This technology integrates orders from online sales systems with automated production processes, managing and sequencing these orders, and handling inventories. In the SMART 4.0 series, this technology is also present and available for study and practice.

**System Integration:** One of the main challenges of Industry 4.0 is the integration of all systems and protocols present in the industry. Competencies to tackle this challenge are developed in the SMART 4.0 series through connectivity technologies and databases.

**Digital Twin:** The use of digital twins is a crucial factor in increasing productivity and optimizing manufacturing processes. This simulation technology is also present in SMART 4.0, with an additional benefit: it can be used for student practices even in their homes, facilitating distance or hybrid courses.



 The usability and learning process of each student are of utmost importance, so educational solutions have been developed and designed with distinct benefits and features for users.

## KEY BENEFITS

- Modular system allowing different configurations and future expansions;
- Enabling technologies for Industry 4.0;
- Continuous learning with a gradual increase in challenges and involved technologies;
- Compliance with safety requirements (NR-12).

## KEY DISTINCTIVE FEATURES

- Multidisciplinary conception with an emphasis on project-based learning;
- Integrated and validated hardware and software solution;
- Educational materials and teacher training;
- Digital twins of the system with web licenses allowing for use in distance education (DE).

## DEVICE SETTINGS

| PARTNUMBER                             | DESCRIPTION       | SPECIFICATION                           | OPTIONS                          | USE  |
|--|-------------------|---|----------------------------------|--|
| SMART4000-L21-001<br>SMART4000-L21-002 | Smart 4.0 Concept | Compact configuration in one station    | Control Siemens<br>Control Altus | 3 to 4 students per team<br>1 kit per team |
| SMART4000-L11-003<br>SMART4000-L11-004 | Smart 4.0         | Modular Configuration Across 5 Stations | Control Siemens<br>Control Altus | 3 to 4 students per team<br>1 kit per team |

| PARTNUMBER          | SMART4000-L11-003<br>SMART4000-L11-004  |
|---------------------|---|
| Storage Station     | Vertical inventory of raw materials, XYZ Cartesian electropneumatic manipulator, RFID   |
| Process Station     | Sheet movement and recording process, XY plotter with electric actuators  |
| Assembly Station    | Assembly of the final product and quality inspection, collaborative robot and gripper, computer vision, RFID  |
| Dispatch Station    | Inventory of finished products, XYZ cylindrical electropneumatic manipulator, RFID  |
| Integration Station | Server with process management and control software, using virtual machines and containers; network security devices such as manageable switches and routers. |



## FEATURES

With modular configuration, NR-12 safety compliance, included development software, protection of main components, and included educational materials.

### SMART 4.0

Smart Process



### Configurations

- Natural anodized aluminum rear closure;
- Plastic side closure;
- Front panel with TS type and indelible identification.

#### DIMENSIONS

|        |        |
|--------|--------|
| Width  | 3050mm |
| Height | 1620mm |
| Depth  | 985mm  |
| Weight | 550Kg  |

#### ELECTRICAL FEATURES

|              |                                 |
|--------------|---------------------------------|
| Power Supply | Single-phase 110/220Vac 50/60Hz |
| Connections  | 4mm safety terminals            |

## FEATURES

With modular configuration, NR-12 safety compliance, included development software, protection of main components, and included educational materials.

## SMART 4.0 CONCEPT

Smart Concept



### Configurations

- Natural anodized aluminum rear closure;
- Plastic side closure;
- Front panel with TS type and indelible identification.

### DIMENSIONS

|        |        |
|--------|--------|
| Width  | 803mm  |
| Height | 1500mm |
| Depth  | 980mm  |
| Weight | 130Kg  |

### ELECTRICAL FEATURES

|              |                                 |
|--------------|---------------------------------|
| Power Supply | Single-phase 110/220Vac 50/60Hz |
| Connections  | 4mm safety terminals            |

## Main Devices – PLC (Programmable Logic Controller):

The Smart platform can be equipped with Siemens or Altus controllers.

|                      | S7-1200 PLC<br>SIEMENS CPU 1215   | S7-1500 PLC<br>SIEMENS CPU 1512C   | NEXTO XPRESS PLC<br>ALTUS CPU XP340   | NEXTO PLC<br>ALTUS CPU NX3008  |
|----------------------|---|--|---|--|
| Interfaces           | 2 RJ45 Ethernet ports   | 2 RJ45 Ethernet ports  | 1 RJ45 Ethernet port<br>1 USB 2.0 port<br>1 RS-485 serial port<br>1 CAN port  | 1 RJ45 Ethernet port<br>1 USB 2.0 port<br>1 RS-485 serial port<br>1 CAN port N   |
| Industrial Networks  | PROFINET IO e CBA, MODBUS/TCP<br>ISO on TCP;                                  | PROFINET IO e CBA, MODBUS/TCP,<br>ISO on TCP;  | PROFINET, MODBUS/TCP, EtherCAT<br>EtherNet/IP, Modbus/RTU (master<br>and slave), and CANOpen;   | PROFINET, MODBUS/TCP, EtherCAT,<br>EtherNet/IP, Modbus/RTU (master<br>and slave), and CANOpen;   |
| Internet Protocols   | TCP/ IP, SNMP, DCP, LLDP, UDP, WEB<br>Server ;                                | TCP/ IP, DHCP, SNMP, DCP, LLDP, UDP<br>WEB Server  | TCP/ IP,DHCP, SNMP, DCP, LLDP, UDP<br>WEB Server  | TCP/ IP,DHCP, SNMP, DCP, LLDP<br>UDP, WEB Server   |
| IoT                  | OPC-UA Server e MQTT.   | OPC-UA (Client/Server) e MQTT  | OPC-UA Server e MQTT  | OPC-UA (Client/Server) e MQTT.   |
| Digital Inputs       | 14 (24VDC), including 6 high-speed<br>counting inputs                         | 32 (24VDC), including 4 high-speed<br>counting inputs  | 16 (24VDC), including 4 high-speed<br>counting inputs   | 8<br>24VCC;  |
| Digital Outputs      | 10 (24VDC, Transistor), including<br>4 fast outputs (PWM)                     | 32 (24VDC, Transistor), including<br>4 fast outputs (PWM)  | 16 (24VDC, Transistor), including<br>4 fast outputs (PWM)   | 8 (24VCC, Transistor)  |
| Analog Inputs        | 2 (0..10Vcc)  | 4 (0..10Vcc / 4..20mA)<br>1 RTD  | 5 (0..10Vcc / 4..20mA)<br>2 RTD   | –  |
| Analog Outputs       | 2 (0..10Vcc / 4..20mA)  | 2 (0..10Vcc / 4..20mA)   | 4 (0..10Vcc / 4..20mA)  | –  |
| Programming Language | LD – Ladder Diagram<br>FBD – Functional Block Diagram<br>ST – Structured Text | LD – Ladder Diagram<br>FBD – Functional Block Diagram<br>ST – Structured Text<br>IL – Instruction List<br>SFC – Sequential Function Chart<br>CFC – Continuous Function Chart | LD – Ladder Diagram<br>FBD – Functional Block Diagram<br>ST – Structured Text<br>IL – Instruction List<br>SFC – Sequential Function Chart | LD – Ladder Diagram<br>FBD – Functional Block Diagram<br>ST – Structured Text<br>IL – Instruction List<br>SFC – Sequential Function Chart<br>CFC – Continuous Function Chart |

## DEVELOPMENT TOOLS

Our educational solutions are complemented by the necessary development tools and professional software for comprehensive student training.

Licenses Included

### TIA Portal:

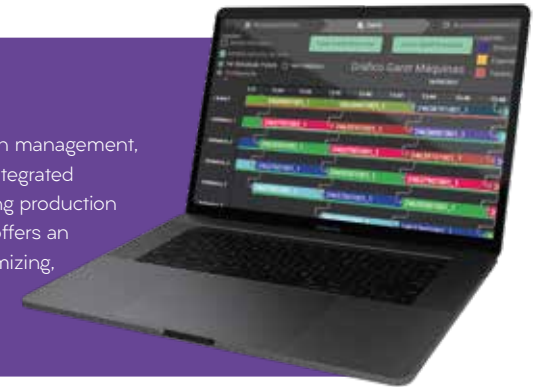
- Development and simulation tool for PLC; programinha;
- Platform: Windows;
- Licensing: 1 license per kit.



Free Licenses

### Elipse F4 (MES)

- Elipse F4 is a web platform for production management, optimization, and control, providing an integrated environment for modeling and monitoring production processes in manufacturing settings. It offers an excellent solution for programming, optimizing, and controlling your company's production tasks.



Licenses Included

### WinCC Unified


- Development tool for HMI (Human-Machine Interface);
- Platform: Windows;
- Licensing: 1 license per kit.





# USAGE

## Guidelines on the recommended use of the Kit.

 We suggest this configuration to achieve the best performance in class. The kits and activities are designed considering the sizes of the equipment mentioned alongside.

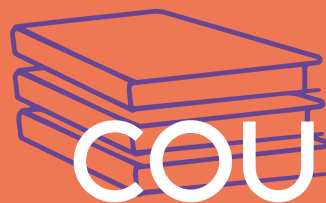
The minimum necessary infrastructure is a prerequisite to fully leverage the functionalities of the didactic kits.

We recommend the computer and connectivity requirements mentioned alongside to use the programs and applications that accompany the kit.

| Infrastructure |  |  |
|----------------|--|--|
|                | SMART4000-L21-001<br>SMART4000-L21-002 | SMART4000-L11-003<br>SMART4000-L11-004       |
| Electrical     | 1 single-phase 220Vac outlet           | 5 single-phase outlets, 110Vac or 220Vac     |
| Pneumatics     | Not required (compressor included)     | 1 pneumatic point, minimum pressure of 6 BAR |

| Information Technology — IT |  |  |
|-----------------------------|--|--|
|                             | SMART4000-L21-001<br>SMART4000-L21-002                           | SMART4000-L11-003<br>SMART4000-L11-004                           |
| Computer                    | 1 computer per team. Minimum requirements for development tools. | 1 computer per team. Minimum requirements for development tools. |
| Networking                  | The kit already includes a WiFi router                           | The kit already includes a WiFi route                            |

| Conectivity                          |   |   |
|--------------------------------------|---|---|
|                                      | SMART4000-L21-001<br>SMART4000-L21-002  | SMART4000-L11-003<br>SMART4000-L11-004  |
| Ethernet Connections per Workstation | optional                                | optional                                |
| Internet Access                      | Required                                | Required                                |
| WiFi Network                         | The kit already includes a WiFi router. | The kit already includes a WiFi router. |



# COURSEWARE

The didactic kits come with a comprehensive educational material with a practical focus, presenting practice proposals aimed at developing skills and competencies.

In addition to the User Manual, which contains information about operation and maintenance, the **Student Guide** is provided, including practical activity proposals to be carried out with the kit, and the **Educator Guide**, with answers to the proposed activities and guidance on the didactic use of the kit. Furthermore, video **tutorials** are offered to assist in the easy mastery of development tools and the use of the kit.

All this content is digitally available on our website in the **Educator Portal**.



## SKILLS AND COMPETENCIES

### Programmable Logic Controllers (PLCs)

- Program PLCs using Ladder and structured text languages;
- Create projects in controller development tools;
- Develop programming logics for practical challenges.

### Electropneumatic Sensors and Actuators

- Understand the operation of the sensors and actuators used;
- Understand and apply RFID technology;
- Access and configure sensors through the IO-Link network.

### Industrial Networks

- Understand and use PROFINET networks;
- Create a project involving PROFINET controllers and devices;
- Create a project involving IO-Link controllers and devices.

### Supervisory Systems (HMI and SCADA)

- Develop HMI screens;
- Develop SCADA (supervisory) software screens;
- Establish communication between controllers and HMI/SCADA systems.

## IoT

- Understand and use the MQTT protocol;
- Send data from controllers to a cloud platform;
- Configure IoT devices and present their data on dashboards.

## Collaborative Robotics and Computer Vision

- Create projects using collaborative robots;
- Use collaborative robots and grippers for assembly processes;
- Configure computer vision applications.

## Manufacturing Management Systems

- Understand lean manufacturing concepts;
- Understand and use MES (Manufacturing Execution System) software;
- Integrate MES with other applications through APIs;
- Automatically input orders from an online store.

## Networks and Cybersecurity

- Understand and use computer network concepts;
- Understand and use virtualization concepts;
- Configure managed switches, routers, and firewalls;
- Implement factory network architectures according to standards and best practices.



# MOBILE APPLICATIONS

A contemporary didactic solution is not complete without software and applications. Alongside the kits in this series, exclusive licenses for PC and mobile applications are provided to complement and enhance the use of the kits.

## Exxer App

### AUGMENTED REALITY KITS

- Solutions can be visualized in 3D through augmented reality, allowing students to have an initial encounter and identify their key features.



## Exxer App

### EDUCATIONAL ANIMATION

- Augmented reality animations showcasing the main devices in a dissected view and their assembly/disassembly process;
- Visualization of operational principles;
- Animations aiding in the understanding of the involved physical processes and the application of technology.



## DESKTOP APPLICATION

A contemporary didactic solution is not complete without software and applications. Alongside the kits in this series, exclusive licenses for PC and mobile applications are provided to complement and enhance the use of the kits.

**Desktop**  
Online Store



**Desktop**  
Smart Digital Twin





# FORMATION

**As important as didactic resources and tools is the training of the teacher. We have a comprehensive package of solutions to meet your training and updating needs.**

## Quick Start and Tutorials

The Quick Start is a quick video guide to understand, test, and set up the product. Tutorials are videos that teach common procedures needed in classes using the kit.

## Technical Delivery

During technical delivery, our specialists present the product, its features, maintenance and safety precautions, and operate it alongside the customers.

## Operational Training

The goal of operational training is to educate instructors on kit usage. The didactic materials of the kit are presented, and some proposed practices are carried out. It also includes all activities from technical delivery.

## Technological Training

Technological training is a deeper study of applied technology and concepts. These courses do not focus on the kits but on technical topics and competencies for teacher updates.



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