AUNET
Industrial Networks

exxer
Skills for the Future

THE UNION OF EXPERTISE AND SKILLS A NEW LEVEL OF EXCELLENCE IN EDUCATION!

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

With the purpose of offering more and more excellence tools to assist in technological education, we believe the union of practical and theoretical learning is what makes the difference in accelerating human and world development!

TECHNOLOGY ● INNOVATION ● EDUCATION

AUNET
Industrial Networks

If the PLC is the brain of modern automated systems, industrial networks are the nerves. In addition to being a fundamental technology in current industrial installations, industrial networks are a prerequisite when thinking about connectivity, systems integration and IoT in Industry 4.0. Thus, this important topic cannot be ignored by a laboratory that intends to prepare professionals for the challenges of the present and future

The AUNET series provides kits designed for practice with various technologies for industrial networks and IT in an industry environment, which address the following topics

– Industrial networks
– IoT (Internet of Things)
– Industrial IT and cybersecurity infrastructure

In the kits of the AUNET series, students can learn different technologies of industrial networks. They will learn how to apply the different interface technologies (which define the physical and electrical features), based or not on Ethernet and compare the different characteristics of the different protocols (which define the logical behavior and the exchange of information).

The kits in this series address the IT/AT integration (information technology / automation technology) and cybersecurity topics, key aspects for Industry 4.0.

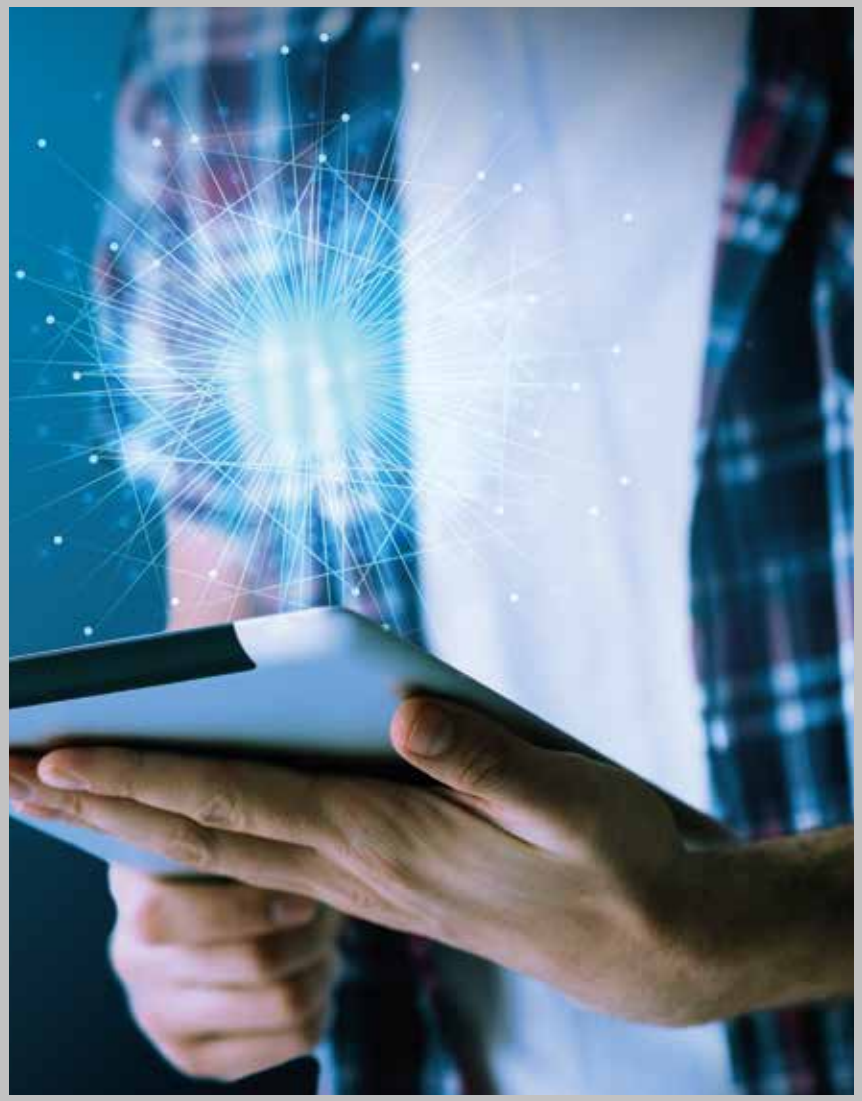
The development tools with included licenses are professional and their use is facilitated by learning material and tutorials.

Software and applications complement the learning solution, ensuring greater effectiveness through more dynamic and modern learning.

All kits in this series have a comprehensive courseware, focused on teaching by skills and easy to use by teachers.

We have complete solutions for training and updating teachers, ensuring the best use of the kit's resources.

Ask our experts for more information and the detailed technical features of each equipment in the series.



MAIN SKILLS AND COMPETENCIES

– Understand the different physical interface technologies;
– Implement different network device topologies;
– Parameterize network devices;
– Configure and program controllers (PLC) for communication in different networks;
– Create functional applications involving network communication;
– Understand and use the OPC/UA protocol;
– Integrate controllers from different manufacturers via OPC/UA;
– Understand and use the MQTT protocol;
– Create dashboards on cloud–based IoT platforms;
– Implement communication between PLC and cloud platforms;
– Know and configure industrial switch and managed switch;
– Implement VLANs;
– Know and configure industrial routers;
– Implement firewall rules;
– Implement network topologies meeting cybersecurity requirements;
– Understand and apply virtualization fundamentals.

TECHNOLOGY HIGHLIGHTS

In industrial network kits it is possible to explore applications with indus–trial networks:

– Modbus/RTU (serial) and Modbus/TCP;
– CANopem;
– PROFINET;
– IO–Link.

These networks are operated in a practical way through PLCs, inverters, and intelligent sensors.

Siemens is one of the most well–known and used brands in the world, presen–ting a development platform for all its Automation solutions, the TIA Portal.

Altus is a Brazilian automation company that operates in important markets such as oil and sanitation.

The PLCs used support the OPC/UA protocol, the *de facto* standard for communication between the controllers.

The PLCs used also support the MQTT protocol, the most used in Indus–trial IoT applications, and enable direct communication with cloud platforms.

The IT/AT integration kit provides several devices to industrial network infras–tructure, allowing to work with topics such as fundamentals of IP networks and cybersecurity. This kit complements the other ones of the series to create a complete environment.creación de un ambiente completo.

The usability and learning process of each student are extremely impor–tant, so we developed learning solutions to provide benefits and differentials for users.

KEY BENEFITS

- Modular;
- Industrial devices;
- Easy Storage.

KEY DIFFERENTIALS

- Ergonomics certificate;
- No tools required;
- Courseware.

DEVICE SETTINGS

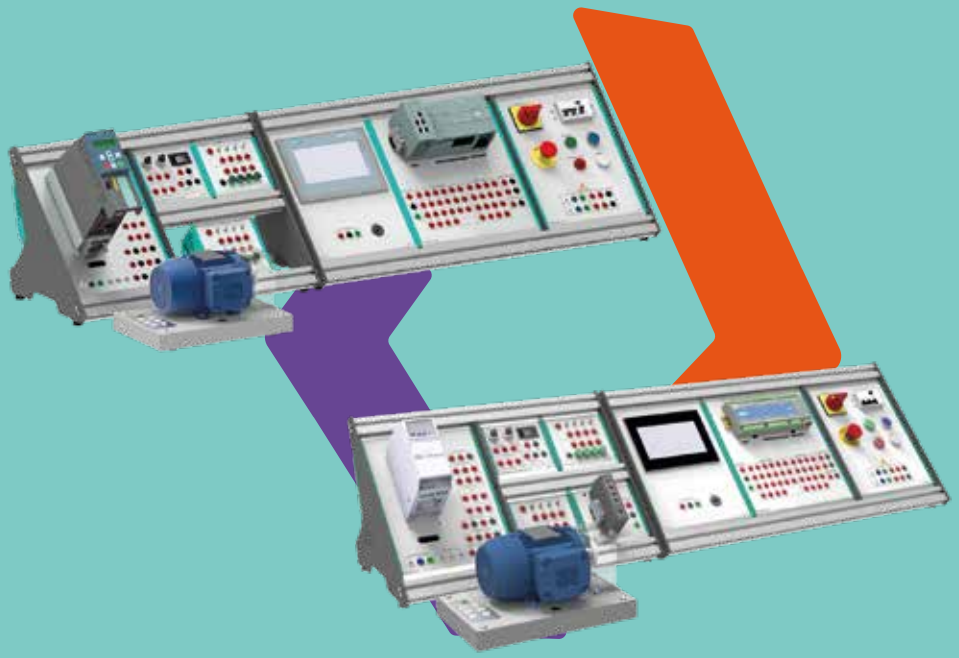
PRODUCT	DESCRIPTION	OPTIONS	DEVELOPMENT TOOLS	APPLICATION
AUNET2000-Lxx-001 AUNET2000-Lxx-002	desktop shelf Industrial networks	PROFINET Modbus	TIA Portal + WinCC Mastertools + FVDesign	SimMaq Exxer App
AUNET3000-Lxx-001	Bank of Industrial networks	–	TIA Portal + WinCC Mastertools + FVDesign	SimMaq Exxer App
AUNET4000-Lxx-001	Bank of IT/TA integration	–	–	SimMaq Exxer App

FEATURES

With modular configuration, Safety with NR-12, development software included, protection of main components and courseware included.

AUNET2000

Desktop Rack for Industrial Networks



Settings

- Desktop rack: modular structure;
- Made of steel with electrostatic coating and aluminum profile;
- AUNET2000-Lxx-001 (Siemens controller).
  - PROFINET
  - IO-Link

- AUNET2000-Lxx-002 (Altus controller).
  - Modbus/RTU (serial) and Modbus/TCP
  - CANopem

DIMENSIONS	
Height	330mm
Width	1470mm
Depth	330mm
Weight	30Kg

ELECTRICAL FEATURES	
Energy	220Vav – 50/60Hz
Connections	4mm safety terminals

FEATURES

With modular configuration, Safety with NR-12, development software included, protection of main components and courseware included.

AUNET3000

Industrial Networks Workbench

Settings

- Technik+ workbench: structure made of aluminum and steel profile and electrostatic coating;
- Easy-to-connect modules with no tools required;
- Networks supported:
  - PROFINET
  - IO-Link
  - Modbus/RTU (serial) and Modbus/TCP
  - CANopem

DIMENSIONS	
Height	1410mm
Width	2000mm
Depth	840mm
Weight	150Kg

ELECTRICAL FEATURES	
Energy	AUNET3000-L32-001: Three-Phase 220Vca 50Hz AUNET3000-L22-001: Three-Phase 220Vca 60Hz AUNET3000-L42-001: Three-Phase 380Vca 50Hz AUNET3000-L43-001: Three-Phase 380Vca 60Hz
Connections	4 mm safety terminals

FEATURES

With modular configuration, Safety with NR-12, development software included, protection of main components and courseware included.

AUNET4000

IT/AT Integration Workbench

DIMENSIONS	
Height	1100mm
Width	600mm
Depth	700mm
Weight	40Kg

ELECTRICAL FEATURES	
Energy	One-Phase 220Vca 50/60Hz
Connections	4 mm safety terminals

MAIN DEVICES – PLC

The different models are equipped with the devices below, according to each configuration.

	CLP S7–1200 CPU 1215 DA SIEMENS	CLP NEXTO XPRESS CPU XP340 DA ALTUS	CLP S7–1500 CPU 1512C DA SIEMENS	CLP NEXTO CPU NX3008 DA ALTUS
INTERFACES	· 2 Ethernet RJ45 ports	· 1 Ethernet RJ45 ports · 1 host USB 2.0 port · 1 RS–485 serial port · 1 CAN port	· 1 puerta Ethernet RJ45	· 1 RJ45 Ethernet port · 1 port USB 2.0 host · 1 RS–485 serial port · 1 CAN door
INDUSTRIAL NETWORKS	· PROFINET IO e CBA, MODBUS/TCP, ISO on TCP;	· PROFINET, MODBUS/TCP,Ethe CAT · EtherNet/IP,Modbus/RTU (master and slave) and CANOpen;	· PROFINET IO e CBA, MODBUS/TCP, ISO on TCP;	· PROFINET, MODBUS/TCP, EtherCAT, EtherNet/IP, Modbus/RTU (master and slave) and CANOpen;
PROTOCOLOS INTERNET	· TCP/ IP, SNMP, DCP, LLDP, UDP, WEB Server	· TCP/ IP,DHCP, SNMP, DCP, LLDP, UDP, WEB Server	· TCP/ IP, DHCP, SNMP, DCP, LLDP, UDP, WEB Server	· TCP/ IP,DHCP, SNMP, DCP, LLDP, UDP, WEB Server
IoT	· OPC–UA Server and MQTT.	· OPC–UA Server and MQTT.	· OPC–UA (Client/Server) and MQTT	· OPC–UA (Client/Server) and MQTT
DIGITAL INPUTS	· 14 (24VDC) where 6 are quick count	· 14 (24VDC) where 4 are quick count	· 32 (24VDC) where 4 are quick count	· 8 (24VCC);
DIGITAL OUTPUTS	· 10 (24Vdc, Transistor) 4 fast outputs (PWM)	· 16 (24Vdc, Transistor) 4 fast outputs (PWM)	· 32 (24VDC) with 4 fast count	· 8 (24VCC);
ANALOG INPUTS	· 2 (0..10Vcc)	· 5 (0..10Vcc / 4..20mA) · 2 RTD	· 4 (0..10Vcc / 4..20mA) · 1 RTD	· –
ANALOG OUTPUTS	· 2 (0..10Vcc / 4..20mA)	· 4 (0..10Vcc / 4..20mA)	· 2 (0..10Vcc / 4..20mA)	· –
PROGRAMMING LANGUAGE	· LD – Ladder Diagram, · FBD – Function Block Diagram · ST – Structured Text	· LD – Ladder Diagram · FBD – Function Block Diagram · ST – Structured Text · IL – Instructions List · SFC – Sequential Function Chart	· LD – Ladder Diagram, · FBD – Function Block Diagram · ST – Structured Text · IL – Instruction List · SFC – Graphical Sequencing of Func–tions · CFC – Graph of Continuous Functions	· LD – Ladder Diagram, · FBD – Function Block Diagram · ST – Structured Text · IL – Instruction List · SFC – Graphical Sequencing of Functions · CFC – Graph of Continuous Functions

DEVELOPMENT TOOLS

Our learning solutions are complemented with the development tools and professional software necessary for student training.

For Siemens controller

Included Liscenses

TIA Portal:

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

Included Liscenses

WinCC Basic:

- Development tool for HMI;
  - Platform: Windows;
  - Licensing: 1 license per kit.

For Altus controller

Free Liscenses

MasterTools:

- Development and simulation tool for PLC programming;
  - Platform: Windows;
  - Licensing: freeware (free delivery).

Free Liscenses

FVDesing:

- Development tool for HMI;
  - Platform: Windows;
  - Licensing: freeware (free delivery).

USE

Guidelines on the recommended use of the Kit!

We suggest this configuration for better use in class. Kits and activities are designed according to the team sizes listed on the side.

The minimum necessary infrastructure is a prerequisite to fully use all functionalities of the training kits.

We recommend the computing and connectivity requirements below for using the software and applications provided with the kit.

Part number	Use	Team(student/kit)	Use
AUNET2000	desktop shelf Industrial networks	2 to 3	frequent 1 kit per team
AUNET3000	Bank of Industrial networks	3 to 4	Frequente 1 kit por equipe
AUNET4000	Bank of IT/TA integration	3 to 4	Frequente 1 kit por equipe

Infrastructure	AUNET2000	AUNET3000	AUNET4000
electrical	1 take single phase according feeding of the team	1 take Three–Phase according feeding of the team	1 take single phase according feeding of the team

Connectivity	
ethernet connections per workstation	2 Ethernet port (computers and kit)
WiFi	recommended for computers
internet access	Necessary;
Computer	Necessary; according to requirements software minimums

COURSEWARE

The training kits have a rich courseware with a pratical focus, containing pratical proposals aimed at training skills and competencies.

In addition to the **User Manual,** wich contains information on operation and maintenance, the **Student Guide** is also provided, with proposals for pratical activities to be carried out using the kit, and the **Facilitator Guide,** with answers to the proposed activities and guidelines to use the kit in a didactic way. In addition, **Video tutorials** are available to help you easily master the development tools and use the kit.

All of this content is available on our website at the **Facilitator Portal.**

SKILLS AND COMPETENCIES

Industrial networks

– Understand the applications of industrial networks and how they differ from IoT and other networks
– Understand the different physical interface technologies
– Implement different network device topologies
– Parameterize network devices
– Configure and program controllers (PLC) for communication in different networks
– Create functional applications involving network communication

IoT

– Understand the concepts of IoT and how it differs from industrial networks and other networks.
– Understand and use the OPC/UA protocol
– Integrate controllers from different manufacturers via OPC/UA
– Understand and use the MQTT protocol
– Create dashboards on cloud–based IoT platforms
– Implement communication between PLC and cloud platforms

Industrial IT and cybersecurity infrastructure

– Know the main devices of Ethernet networks
– Know and configure industrial switch and managed switch
– Implement VLANs
– Know and configure industrial routers
– Implement firewall rules.

MOBILE APPLICATIONS

A current learning solution is not complete without software and applications. Along with the kits of this series, exclusive licenses are provided for applications on computer and mobile devices that complement and enhance the use of the kits.

Exxer App

AUGMENTED REALITY KITS

The solutions can be visualized in 3D through augmented reality, allowing the student to have a first contact with such technology and identify their main characteristics.

Exxer App

EDUCATIONAL ANIMATION

Augmented reality animations that show the main devices in section, and their assembly/disassembly process.

Viewing of operating principles.

Animations that help to understand the physical processes involved and the application of technology.

TRAINING

As important as teaching resources and tools is teacher training. We have a complete package of solutions for your training and upgrading needs.

Quick Start and Tutorials

Quick start is a quick video guide to learn, test and put the product into operation. Tutorials are videos that teach common procedures needed in classes using the kit.

Technical Delivery

In the technical delivery, our experts present the product, its features, as well as maintenance and safety precautions, and put it into operation together with the customers.

Operational Training

The purpose of operational training is to teach facilitators on how to use the kit. The kit courseware is presented and some proposed practices are carried out. It also includes all technical delivery activities.

Technological Training

Technological training is a deeper learning of technology and applied concepts. These courses are not focused on kits but on topics and technical skills to update trainers.

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