

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Automatización y Robótica Industrial*

## TRANSLATED TITLE OF THE DIPLOMA (EN)<sup>(1)</sup>

*Higher Technician in Industrial Automation and Robotics*

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(1) This translation has no legal status.

## DIPLOMA DESCRIPTION

**The holder of this diploma will have acquired the General Competence with regard to:**

Developing and managing projects of assembly and maintenance of automatic installations of measurement, regulation and processes control in industrial systems, as well as and supervising or assembling, maintaining and implementing these systems, respecting criteria of quality, safety and respect for the environment as well as design.

**Within this framework, the PROFESSIONAL MODULES and their respective LEARNING OUTCOMES acquired by the holder are listed below:**

### “Electrical, Pneumatic and Hydraulic Systems”

The holder:

- Recognizes electromechanical, pneumatic and hydraulic devices, identifying their functionality and determining their technical characteristics.
- Draws sketches and diagrams of wiring electrical, pneumatic and hydraulic control systems, solving automation applications and selecting the elements that compose them.
- Assembles electrical wired automation, pneumatic and hydraulic circuits, interpreting diagrams and facilitating maintenance.
- Integrates sequential wired electrical, pneumatic and hydraulic circuits, selecting the required elements and providing solutions to heterogeneous automation applications.
- Checks the operation of electrical wiring sequential, pneumatic and hydraulic systems, adjusting devices and applying safety standards.
- Repairs breakdowns in sequential electrical wiring, pneumatic and hydraulic systems, recognizing dysfunctions and developing the required documentation.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, the measures and the equipment to prevent them.

### “Programmable Sequential Systems”

The holder:

- Recognizes programmable devices, identifying their functionality and determining their technical characteristics.
- Sets programmable sequential systems, selecting and connecting the component elements.
- Recognizes the control sequences of programmed sequential systems, interpreting the requirements and establishing the necessary programming procedures.
- Programs sequential systems, based on the control sequence and using structured techniques.
- Verifies the sequential programmed system operation, adjusting devices and applying safety standards.
- Repairs breakdowns in programmed sequential systems, diagnosing dysfunctions and developing the required documentation.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, measures and equipment to prevent them.

### “Measurement and Control Systems”

The holder:

- Recognizes the measuring and control devices, identifying their functionality and determining their technical characteristics.
- Assembles and develops measurement and control systems, identifying the process variables, establishing performance requirements and selecting the suitable measurement and control systems according to system requirements.
- Checks the operation of measuring and control systems, applying safety regulations to each particular case.
- Diagnoses breakdowns in measurement and control systems, identifying the nature of the breakdown and applying the most suitable procedures and techniques in each case.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, the measures and the equipment to prevent them.

### **“Power Systems”**

The holder:

- Determines the parameters of electrical systems, performing calculations and measurements in single and three phase AC circuits.
- Recognizes the operation of static and dynamic electrical machines, identifying their application and determining their characteristics.
- Determines the characteristics of power electric and electronic drives, analyzing their performance and identifying their applications.
- Installs electric motors, making automation diagrams and adjusting the drives.
- Checks the operation of the power system, identifying possible failures and developing the required documentation.
- Maintains electrical machines, replacing elements and making adjustments.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks, the measures and the equipment to prevent them.

### **“Technical Documentation”**

The holder:

- Identifies technical and administrative documentation of the facilities, interpreting projects and recognizing the information in each document.
- Represents automatic installations by drawing freehand sketch plans, elevations and details.
- Prepares graphical documentation of automatic installation projects, drawing plans in programs of computer aided design.
- Sets budgets for automatic facilities and systems, considering the list of materials, scales and unit prices.
- Develops project documents from technical information, using computer applications.
- Prepares manuals and appendixes of facilities and system projects, defining procedures for forecasting, performance and control.

### **“Industrial Computing”**

The holder:

- Assembles the elements of an industrial computer system, recognizing its components and configuring the system.
- Installs the software of the computer system, configuring and optimizing the operating parameters.
- Installs local computer networks, configuring the parameters and performing tests for commissioning the system, optimizing the functionality and reliability.
- Programs industrial equipment and systems, using high-level languages and applying the techniques of structured programming.
- Configures web pages for use in industrial control, using oriented programming language.
- Diagnoses breakdowns in systems and computer programmes, identifying the origin of the breakdown and applying the most suitable procedures and techniques to each case.

### **“Advanced Programmable Systems”**

The holder:

- Recognizes programmable devices involved in the control of dynamic systems, identifying its functionality and determining its technical characteristics.
- Assembles regulation systems for physical quantities for control in closed loop, selecting and connecting the component elements.
- Programs logic controllers, identifying the type of process data and using advanced programming and parameterization techniques.
- Verifies the operation of the programmed analogue control systems, adjusting devices and applying safety standards.
- Repairs breakdowns in programmed analogue control systems, diagnosing dysfunctions and developing the required documentation.

### **“Industrial Robotics”**

The holder:

- Recognizes different types of robots and/or motion control systems, identifying the components that form them and determining their applications in industrial automation.
- Configures robotic and/or motion control systems, selecting and connecting the component elements.
- Programs robots and/or motion control systems, using programming and data processing techniques.
- Checks the operation of robots and/or motion control systems, adjusting the control devices and applying safety regulations.
- Repairs breakdowns in industrial robotics and/or motion control systems, diagnosing malfunctions and preparing incident reports.

### **“Industrial Communication”**

The holder:

- Recognizes industrial communication systems and physical rules used, identifying the different elements that compose them and relating their performance to the performance of the system.
- Develops basic programs of communication between a computer and external peripherals of industrial application, using standard protocols and interfaces as well as applying structured techniques.

- Sets a local computer network, configuring the parameters and performing tests in order to set it up.
- Programs and configures the different industrial bus systems, identifying the elements that compose them and relating them to other devices that make up an automatic system.
- Configures the different control and monitoring equipment involved in an automatic system, programming the equipments and integrating communications in a production facility.
- Verifies the operation of an industrial communication system, adjusting the devices and applying safety standards.
- Repairs dysfunctions in industrial communication systems, observing the behavior of the system and using diagnostic tools.

### **“Integration of Industrial Automation”**

The holder:

- Plans the installation of the automatic system, identifying the installation requirements, and managing the supply of material.
- Manages the assembling of automatic installations, following the assembly plan and resolving contingencies.
- Integrates automatic system elements, interpreting technical documentation of the project and following the procedures and safety standards in assembly.
- Executes operations of adjustment, configuration and programming of automatic devices, based on the technical design and using software tools and hardware required.
- Verifies the operation of the machine based according to technical design specifications, rethinking them when necessary and applying safety standards.
- Locates malfunctions in the automatic system, using the technical documentation and establishing performance criteria according to previously established protocols.
- Plans the maintenance of electrical installations in buildings and premises, based on the installation requirements.
- Manages the maintenance of automatic installations based on the maintenance plan and the regulations in force.

### **“Project on Industrial Automation and Robotics”**

The holder:

- Identifies the needs of the production sector, relating them to projects related that may satisfy them.
- Designs projects related to the competences described in the diploma, including and developing their constituting stages.
- Plans the project implementation, determining the intervention plan and the associated documentation.
- Defines the procedures for the monitoring and control of the project implementation, justifying the selection of the variables and the instruments used.

### **“Professional Training and Guidance”**

The holder:

- Selects job opportunities, identifying the different possibilities of labour integration, and the alternatives of lifelong learning.
- Applies teamwork strategies, assessing their effectiveness and efficiency on the achievement of the company's goals.
- Exercises rights and complies with the duties derived from labour relationships, recognising them in the different job contracts.
- Determines the protective action of the Spanish Health Service in view of the different covered eventualities, identifying the different types of assistance.
- Assesses the risks derived from his/her activity, analysing the job conditions and the risk factors present in his/her labour setting.
- Participates in the development of a risk prevention plan in a small enterprise, identifying the responsibilities of all the agents involved.
- Applies protection and prevention measures, analysing the risk situations in the labour setting of the Higher Technician in Industrial Automation and Robotics.

### **“Business and Entrepreneurial Initiative”**

The holder:

- Recognizes skills related to entrepreneurial initiative, analysing the requirements derived from job positions and business activities.
- Defines the opportunity of creating a small enterprise, assessing the impact on the performance setting and incorporating ethic values.
- Carries out the activities for the setting-up and implementation of a company, choosing its legal structure and identifying the associated legal obligations.
- Carries out basic administrative and financial management activities of an SME, identifying the main accounting and tax obligations and filling in documentation.

### **“On the Job Training”**

The holder:

- Identifies the structure and organization of the company, relating them to the production and marketing of the products obtained.

- Applies ethical and work habits in the development of their professional activities in accordance with the characteristics of the job and the procedures established by the company.
- Determines the characteristics of the facilities based on a blueprint or given conditions, enforcing regulations and relevant regulations.
- Plans the assembly of the facility establishing stages and distributing resources, according to the technical documentation of the project.
- Supervises the installation of facilities, assisting in their implementation and in compliance with security and quality protocols established by the company.
- Performs the start-up or service in facilities and equipment, monitoring it and collaborating in its execution by following established procedures.
- Controls the maintenance operations of the facilities, working in their execution, verifying the compliance with the programmed objectives and optimizing the available resources.
- Supervises the repair of breakdowns and malfunctions in equipment and facilities, collaborating in the execution and checking the techniques and corrective maintenance procedures.

### **RANGE OF OCCUPATIONS ACCESSIBLE TO THE HOLDER OF THE DIPLOMA**

The Higher Technician in Industrial Automation and Robotics works in public and private companies, related to industrial automation systems, in the areas of design, installation and maintenance of industrial automation systems.

The most relevant occupations or jobs are the following:

- Department manager for the supervision of assembly of automation systems.
- Department manager for the supervision of maintenance of industrial automation.
- Checker of appliances, electrical panels and equipment.
- Department manager in electromechanical workshops.
- Technician in maintenance organization of industrial automation systems.
- Technician in implementation of industrial automation systems.
- Designer of control systems for industrial automation systems.
- Designer of measurement and control systems for industrial automation systems.
- Designer of communication networks in industrial automation systems.
- Scheduler-industrial robot controller.
- Technician in the design of electrical control systems.
- Designer of integrated circuits and systems in industrial automation.

### **AWARD, ACCREDITATION AND LEVEL OF THE DIPLOMA**

**Name of the body awarding the diploma on behalf of the King of Spain:** Spanish Ministry of Education or the different Autonomous Communities according to their areas of competence. The title has academic and professional validity throughout Spain.

**Official duration of the education/ training leading to the diploma:** 2000 hours.

**Level of the diploma (national or international)**

- NATIONAL: Non-University Higher Education
- INTERNATIONAL:
  - Level 5 of the International Standard Classification of Education (ISCED5).
  - Level 5 of the European Qualifications Framework (EQF5).

**Entry requirements:** Holding the Certificate in Post-Compulsory Secondary Education (Bachillerato) or holding the corresponding access test.

**Access to next level of education/training:** This diploma provides access to university studies.

**Legal basis:** Basic regulation according to which the diploma is established:

- Minimum teaching requirements established by the State: Royal Decree 1581/2011, of 4 November, according to which the diploma of Higher Technician in Industrial Automation and Robotics and its corresponding minimum teaching requirements are established.

**Explanatory note:** This document is designed to provide additional information about the specified diploma and does not have any legal status in itself.

**COURSE STRUCTURE OF THE OFFICIALLY RECOGNISED DIPLOMA**

<b>PROFESSIONAL MODULES IN THE DIPLOMA ROYAL DECREE</b>	<b>CREDITS ECTS</b>
<b>Electrical, Pneumatic and Hydraulic Systems</b>	10
<b>Programmable Sequential Systems</b>	10
<b>Measurement and Control Systems</b>	10
<b>Power Systems</b>	12
<b>Technical Documentation</b>	5
<b>Industrial Computing</b>	5
<b>Advanced Programmable Systems</b>	5
<b>Industrial Robotics</b>	5
<b>Industrial Communication</b>	11
<b>Integration of Industrial Automation</b>	11
<b>Project on Industrial Automation and Robotics</b>	5
<b>Professional Training and Guidance</b>	5
<b>Business and Entrepreneurial Initiative</b>	4
<b>On the Job Training</b>	22
	TOTAL CREDITS
	<b>120</b>
<b>OFFICIAL DURATION (HOURS)</b>	<b>2000</b>

\* The minimum teaching requirements shown in the table above comprise 55% official credit points valid throughout Spain. The remaining 45% corresponds to each Autonomous Community and can be described in the **Annex I** of this supplement.

## INFORMATION ON THE EDUCATION SYSTEM

