

# EUROPASS DIPLOMA SUPPLEMENT TO HIGHER TECHNICAL VOCATIONAL TRAINING

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Sistemas Electrotécnicos y Automatizados*

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

*Higher Technician in Electrotechnical and Automated Systems*

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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 projects, managing and supervising the assembly and the maintenance of electrotechnical installations in accordance with the Spanish electrotechnical low voltage regulation (REBT Spanish initials). He/she also supervises the maintenance of installations in common telecommunications infrastructures, from technical documentation, specifications, established regulations and procedures, ensuring the functioning, the quality, the safety and the preservation of the environment.

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

### “Processes in Common Telecommunications Infrastructure Installations”

The holder:

- Characterises installations in common telecommunications infrastructures, analysing their networks and describing the functions and the characteristics of their equipment and elements.
- Configures telecommunications infrastructures, representing installations on plans and drawing sketches.
- Installs common infrastructures of telecommunications, applying techniques and verifying that they comply with the standards in force and the quality of the installations.
- Verifies that the installations are fully operational, measuring parameters and adjusting their elements.
- Maintains common telecommunications infrastructures, assigning tasks and resources and verifying the quality of the interventions.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and measures and the equipment to prevent them.

### “Electrical Installations Techniques and Processes”

The holder:

- Reconsiders installations and electric networks, interpreting civil works plans, electrical drawings and relating layout diagrams, equipment and elements to their placement.
- Draws assembly programmes of electrical installations, establishing the sequence of activities and identifying the required resources.
- Assembles electrical installations in buildings and their surroundings, applying specific techniques and procedures and complying with safety regulations.
- Applies techniques of assembly and connection of low voltage distribution networks elements and outdoor lighting installations, analysing assembly programmes and describing the operations.
- Verifies that installations are fully operational, carrying out tests, taking measures and checking that the parameters of the installation comply with the regulations.
- Diagnoses breakdowns or malfunctions in electrical installations, identifying the causes that produce them and proposing solutions.
- Repairs breakdowns in electrical installations, applying specific techniques and procedures and checking that normal function returns.
- Carries out preventive maintenance of electrical installations, analysing maintenance plans and the associated regulations.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and the measures and the equipment to prevent them.

### **“Technical Documentation in Electrical Installations”**

The holder:

- Identifies the technical-administrative documentation of installations, interpreting projects and recognising information contained.
- Represents electrical installations, making freehand drawings of floor plans, elevations and construction details.
- Produces graphical documentation of electrical installations projects, drawing plans through computer-aided design programs.
- Manages graphical documentation of electrical projects, reproducing, organising and filing plans in paper or electronic format.
- Generates budgets of electrical installations and systems, considering the items list, the scales and the individual price.
- Prepares the project documentation from technical information, using computer applications.
- Draws manuals and documents attached to projects on installations and systems, defining forecast, performance and control procedures.

### **“Electrical Systems and Circuits”**

The holder:

- Establishes the parameters of electrical systems, making calculations or taking measures in alternating current (a.c.) circuits.
- Establishes the characteristics of alternating current rotary machinery analysing its operation principals and identifying its field of application.
- Characterises third-phase converters, analysing how they work and carrying out tests.
- Takes measurements for verification, bringing into service and maintenance of electrotechnical installations, describing measurement procedures and equipment.
- Characterises analogical electronic circuits, analysing how they work and identifying their applications.
- Characterises digital electronic circuits, analysing how they work and identifying their applications.

### **“Techniques and Processes in Home Automation and Automatic Installations”**

The holder:

- Characterises automation installations and mechanisms in buildings and factories, analysing their function and application fields.
- Plans the assembly stages of automatic installations in buildings and factories, taking into account the assembly plan and the specifications of the elements and systems.
- Assembles electrical automatic installations of industrial use, interpreting plans and drawings and applying specific techniques.
- Implements industrial automated systems, preparing control programmes and configuring the operating parameters.
- Installs automation systems in housings and buildings, carrying out assembly, connection and adjustment operations.
- Diagnoses breakdowns in automated installations, identifying the malfunction and its causes and applying performance protocols.
- Carries out the forecasting and preventive maintenance of automatic installations in buildings and factories, applying the maintenance plan and the related regulations.
- Complies with the rules on labour risk prevention and environmental protection, identifying the associated risks and measures and the equipment to prevent them.

### **“Development of Electrical Networks and Electrical Substations”**

The holder:

- Identifies the elements that configure distribution networks, analysing their function and describing their technical and regulatory characteristics.
- Characterises low voltage electrical distribution networks, analysing their structure and identifying their common parameters and applications rules.
- Configures low voltage aerial and underground networks, analysing preliminary drafts or given conditions and selecting their constituting elements.
- Characterises electrical substations, analysing how they work and describing the characteristics of their elements.
- Configures indoor and outdoor electrical substations preparing drawings and selecting their equipment and elements.
- Defines the tests and trials for the elements of the transformation substations, using the manufacturers' information and preparing the corresponding technical documentation.

### **“Configuration of Domotic and Automatic Installations”**

The holder:

- Characterises automatic installations and systems in buildings and factories, analysing how they work and identifying their mechanisms.
- Determines the characteristics of the elements of the systems used in domotic automation, analysing technologies and their applications and describing the elements integrating the installations.
- Identifies the characteristics of industrial robots based on programmable automata technology analysing mechanisms and identifying the application of the elements of the installation (sensors and actuators, among others).
- Configures domotic systems analysing the technologies and the characteristics of the installation and taking into account the desired degree of automation.
- Characterises automation installations in buildings and large premises, implementing different systems and configuring their elements.

### **“Electrical Installations Configuration”**

The holder:

- Identifies the types of low voltage electrical installations in building surroundings and outdoor lighting, describing their elements, the technical characteristics and the regulations.
- Characterises low voltage electrical installations in premises with special characteristics and installations with specific ends, identifying their structure, how they work and their specific regulations.
- Identifies the characteristics of low voltage electrical installations in premises with specific ends, making calculations and checking the manufacturer’s documentation.
- Configures low voltage electrical installations in the surroundings of buildings with special characteristics, , analysing design conditions and making plans and drawings.
- Characterises outdoor lighting installations, identifying their components and analysing how they work.
- Characterises the elements that configure photovoltaic solar installations, describing how they work and their technical and regulatory characteristics.
- Configures photovoltaic solar installations, specifying their characteristics from the regulations and the design conditions.

### **“Management of the Assembly and the Maintenance of Electrical Installations”**

The holder:

- Organises the supply for the assembly of electrical installations, analysing the requirements for the assembly and the technical documentation.
- Defines the characteristics to accept materials and the means for of housings, premises and distribution networks assembly, analysing procurement plans and applying stock management techniques.
- Plans the assembly of electrical installations in buildings and distribution lines, analysing assembly plans and defining action stages.
- Characterises the processes of assembly management for electrical installations, analysing assembly plans and safety studies.
- Documents the bringing into service of electrotechnical installations, complying with the functional requirements and the applicable legislation.
- Plans the maintenance and the management of waste products of electrical installations in buildings and their surroundings, identifying needs and preparing maintenance and waste products management programmes.

### **“Project on Electrotechnical and Automated Systems”**

The holder:

- Identifies the needs of the production sector, relating them to similar projects 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 variables and 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 protection action of the Spanish Health Service in view of the different eventualities covered, identifying the different types of assistance.
- Assesses the risks derived from his/her activity, analysing the job conditions and risk factors present in his/her labour setting.
- Participates in the development of a risk prevention plan for 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 Electrotechnical and Automated Systems.

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

The holder:

- Recognises the 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 the 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 company’s structure and organization relating them to the production and marketing of the products obtained.
- Applies labour and ethic habits in his/her professional activity according to the characteristics of the job position and the procedures established by the company.
- Defines the characteristics of installations based on a preliminary plan or given conditions, applying specific regulations.
- Plans the assembly of installations establishing stages and distributing resources, from the technical documentation of the project.
- Supervises the assembly of installations, assisting in their implementation and complying with the protocols on safety and security established by the company.
- Start up or brings installations and equipment into service, supervising them and collaborating in the process, following established procedures.
- Monitors maintenance interventions in installations, assisting in their implementation verifying they comply with the goals established and optimising the available resources.
- Supervises breakdowns repairs and dysfunctions in equipments and installations, assisting in their implementation and verifying the application of techniques and corrective maintenance procedures.

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

The Higher Technician in Electrotechnical and Automated Systems works in, mainly private, companies, focused on the development of projects, assembly management and supervision and maintenance of electrical installations in building surroundings with specific ends, installation of home and building automation systems, telecommunication infrastructures of buildings, low voltage electrical networks and automated systems, either as a self-employed person or as an employee.

The most relevant occupations or jobs are the following:

- Technician role in Electrotechnical projects.
- Electrotechnical draughtsperson.
- Draughtsperson of low voltage electrification in houses and buildings installations.
- Draughtsperson of low voltage electrification in special premises.
- Draughtsperson of outdoor lightning installations.
- Draughtsperson of power lines of medium voltage electrical energy distribution and electrical substations.
- Draughtsperson of aerial and telephone installations in houses and buildings.
- Technical coordinator of low voltage electrotechnical installations in buildings.
- Supervision, verification and monitoring technician of electrotechnical and automated installations.
- Supervising technician of outdoor lighting installations.
- Building works foreperson of electrotechnical installations.
- Team manager of low voltage fitters in buildings.

- Technical coordinator of low voltage electrical networks and outdoor lighting.
- Supervision, verification and monitoring technician of low voltage distribution electrical networks and outdoor lighting.
- Building works foreperson of low voltage distribution electrical networks and outdoor lighting.
- Building works manager of low voltage distribution electrical networks and outdoor lighting.
- Team manager of low voltage distribution electrical networks and outdoor lighting fitters.
- Maintenance manager of distribution electrical networks and outdoor lighting.

### **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: Post-Compulsory Secondary Education
- INTERNATIONAL:
  - Level 5 of the International Standard Classification of Education (ISCED 5).
  - Level 5 of the European Qualifications Framework (EQF5).

**Entry requirements:** Holding the Certificate in Compulsory Secondary Education or holding the corresponding access test.

**Access to next level of education/training:** This diploma may provide access to Higher Technical Cycles provided that an entrance exam is passed.

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

- Minimum teaching requirements established by the State: Royal Decree 1127/2010, of 10 September, according to which the diploma of Higher Technician in Electrotechnical and Automated Systems 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>MÓDULOS PROFESIONALES DEL REAL DECRETO DEL TÍTULO</b>	<b>CRÉDITOS ECTS</b>
<b>Processes in Common Telecommunications Infrastructure Installations</b>	8
<b>Electrical Installations Techniques and Processes</b>	12
<b>Technical Documentation in Electrical Installations</b>	6
<b>Electrical Systems and Circuits</b>	8
<b>Techniques and Processes in Home Automation and Automatic Installations</b>	12
<b>Development of Electrical Networks and Electrical Substations</b>	10
<b>Configuration of Domotic and Automatic Installations</b>	11
<b>Electrical Installations Configuration</b>	11
<b>Management of the Assembly and the Maintenance of Electrical Installations</b>	6
<b>Project on Electrotechnical and Automated Systems</b>	5
<b>Professional Training and Guidance</b>	5
<b>Business and Entrepreneurial Initiative</b>	4
<b>On the Job Training</b>	22
	TOTAL CRÉDITOS
	<b>120</b>
<b>DURACIÓN OFICIAL DEL TÍTULO (HORAS)</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

