

# EUROPASS DIPLOMA SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico Superior en Mantenimiento Electrónico*

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

*Higher Technician in Electronic Maintenance*

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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:**

Maintaining and repairing electronic, professional, industrial and consumption systems and equipment, as well as planning and organizing maintenance processes, applying occupational and environmental risk prevention plans, quality criteria and the applicable laws and rules.

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

### “Analogical Electronic Circuits”

The holder:

- Characterises both passive and active electronic parts, analyzing their performance and relating them to their implementation in circuits.
- Applies measuring and visualisation techniques of analogical electrical analogical signals, describing the equipment and analyzing the procedures used.
- Determines the structure of analogical circuits, identifying their application and analyzing the linkage of their parts.
- Proposes solutions with analogical circuits, producing sketches and selecting parts.
- Checks the functioning of electronic circuits, interpreting diagrams and applying techniques to visualise or to measure signals.
- Produces technical documentation related to electrical circuits, by using IT tools and standardized symbology.

### “Microporgrammable Equipment”

The holder:

- Identifies the parts of digital electronics, recognizing their technical characteristics and their function within the circuits.
- Assembles digital combinational circuits, identifying parts and blocks and verifying their functioning.
- Assembles digital combinational circuits, identifying the features of the different parts and blocks and verifying their functioning
- Sets up peripherals and auxiliary devices in micro-processing systems, verifying their functioning and their benefits.
- Sets up micro-processing digital equipment, programming functions, depending on their application
- Carries out the maintenance of micro-processing digital equipment, repairing faults and dysfunctions.

### “Radio-communication Equipment”

The holder:

- Determines the building blocks in radio-communication equipment, identifying their modules and components and measuring parameters.
- Verifies the functioning of radio-communication equipment, analyzing their internal structure and their features.
- Optimizes the functioning of equipment and systems, adjusting their elements and re-setting systems
- Prevent malfunctions in equipment and modules of radio-communication systems, measuring elements and identifying acceptance values.
- Detects faults in equipment and systems by using localization and diagnostic techniques.
- Restores the operation of radio-communication equipment, repairing faults and dysfunctions.

### “Maintenance of Voice and Data Equipment”

The holder:

- Identifies voice and data equipment, recognizing constructive building blocks, depending on their function and their technical features.

- Verifies the functioning of voice and data equipment, setting up their modules and equipment and checking parameters.
- Carries out the preventive maintenance in equipment and modules, in voice and data systems, monitoring parameters and recognising acceptance values.
- Optimises the functioning of equipment and systems, adjusting elements and reconfiguring systems.
- Restores the functioning of voice, data and transmission equipment, repairing breakdowns and malfunctions.
- Complies with the rules on labour and environmental risk prevention when repairing and maintaining voice and data equipment, identifying the associated risks and the protection measures.

#### **“Maintenance of Industrial Electronics Equipment”**

The holder:

- Identifies the functioning of industrial electronics equipment and elements, differentiating their structure and their technical features.
- Determines blocks and power control systems, analyzing the features of their components and taking measurements.
- Characterises the functional blocks in programmable logic systems, interpreting their technical features and verifying their working.
- Identifies the blocks and the elements in industrial network equipments, identifying their features and measuring basic parameters of the system.
- Distinguishes industrial embedded systems (manipulators and robots), verifying that their elements are interconnected and recognising their technical features.
- Detects breakdowns and malfunctions in industrial equipment, identifying the causes and applying procedures and troubleshooting and diagnostic techniques.
- Repairs industrial equipment, setting it up and optimizing its functioning
- Complies with the rules on labour and environmental risk prevention, for maintenance and repair of industrial electronics equipment, identifying the associated processes and the protection measures.

#### **“Maintenance of Audio Equipment”**

The holder:

- Identifies functional blocks in audio equipment, identifying the features of their parts and pieces and taking measurements.
- Verifies the functioning of preamplifier and mixing equipment, interpreting its technical features and measuring parameters.
- Checks the functioning of processing, distribution and amplifier equipment, interpreting their technical features and measuring parameters.
- Detects breakdowns and malfunctions in audio equipment and systems, applying diagnostic and troubleshooting.
- Repairs breakdowns in audio equipment and electroacoustic devices, replacing elements and identifying those that are compatible.
- Complies with the rules on labour and environmental prevention when repairing and maintaining audio equipment, identifying the associated risks and the protection measures.

#### **“Maintenance of Video Equipment”**

The holder:

- Verifies the functioning of video equipment, interpreting their technical documentation identifying their functional blocks.
- Maintains video recording equipment, taking measurements and parameter adjustments.
- Repairs breakdowns and dysfunctions in video equipment.
- Carries out the maintenance of recording and video storage equipment, checking the mechanical and electronic components
- Repairs breakdowns in video recording and storage equipment, deducing the causes of the breakdown and using troubleshooting techniques.
- Carries out the maintenance of video display equipment, applying preventive and predictive maintenance techniques.
- Repairs breakdowns in video display equipment, replacing elements and verifying the functioning.

#### **“Assembly Processes and Techniques and Maintenance of Electronic Equipment”**

The holder:

- Draws electronic circuit diagrams, interpreting the design specifications, using specific software of electronic CAD.
- Simulates the functioning of electronic systems, comparing the results obtained with the specifications and making proposals for improvement.
- Obtains printed circuit boards by means of specific software and justifying the solution according to the features of the electronic circuit.
- Builds electronic circuits, applying machining, soldering and finishing techniques.

- Sets up electronic circuits, justifying the adjustments and verifications performed on the blocks and/or elements of the circuit.
- Complies with the rules on labour and environmental risk prevention, identifying the associated risks and the protection measures.

#### **“Infrastructures and Development of Electronic Maintenance”**

The holder:

- Designs plans of maintenance of equipment and electronic systems, applying programming techniques and establishing procedures to monitor and to control the execution.
- Manages maintenance operations of equipment and systems, defining the features that guarantee an optimal performance.
- Plans the supply, establishing its conditions and those of the equipment storage, replacement parts and tools.
- Manages the human resources for maintenance, assigning tasks and coordinating work teams.
- Manages maintenance workshop, establishing protective electrical, environmental and organizational criteria.
- Applies processes and procedures of standardized management systems, by using quality standards and planning their stages.

#### **“Project of Electronic Maintenance”**

The holder:

- Identify the needs of the production sector, relating them to similar projects that may satisfy them.
- Design 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 to monitor and to control the project implementation, justifying the selection of the variables and the instrument 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 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 agents involved.
- Applies protection and prevention measures, analysing the risk situations in the labour setting of the Higher Technician in Electric Maintenance.

#### **“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 sphere of action 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 the organization of the company, relating both to the kind of service provided.
- 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.
- Maintains microprogrammable equipment, interpreting the assembly and disassembly processes and ensuring their functionality.
- Maintains voice and data equipment, recognizing a correct functioning and setting up its parameters.
- Maintains industrial electronics equipment, identifying how it has to be used and replacing its parts.

- Maintains audio and video equipment, making use of the technical documentation of the equipment and applying specific repair techniques.
- Maintains equipment and radiocommunication systems, interpreting preventive and predictive maintenance protocols and applying breakdown repair techniques.

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

The Higher Technician in Electronic Maintenance works in both public and private companies of the services sector, which are specialised in maintenance and repair of telecommunications and microprocessing systems, broadband networks, telematic and radiocommunications, as well as industrial and professional equipment of audio and video, either as self-employed or for others.

- The most relevant occupations or jobs are the following:
- Technician in supervision and verification of radio and television system equipment and audiovisual production systems
- Technician in repairing and maintenance of radio and television systems and audiovisual production systems.
- Technician in supervision and verification of broadcast system equipment
- Technician in repair and maintenance of broadcast systems
- Technician in supervision and verification of domotic and building automation and electronic security system equipment
- Technician in repair and maintenance of domotic, building automation and electronic security systems
- Technician in supervision and verification of local networks and telematic systems equipment.
- Technician in repairing and maintenance of local networks and telematic systems equipment
- Technician in supervision and verification and control of radio link systems
- Technician in repair and maintenance of professional video equipment
- Technician in repair and maintenance of professional video equipment
- Technician in repair and maintenance of industrial equipment

### **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 1578/2011, of 4 November, according to which the diploma of Higher Technician in Electronic Maintenance 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>Analogical Electronic Circuits</b>	14
<b>Microporgrammable Equipment</b>	14
<b>Maintenance of Radio-communication Equipment</b>	9
<b>Maintenance of Voice and Data Equipment</b>	9
<b>Maintenance of Industrial Electronics Equipment</b>	10
<b>Maintenance of Audio Equipment</b>	6
<b>Maintenance of Video Equipment</b>	6
<b>Techniques and assembly processes and maintenance of electronic equipment</b>	6
<b>Infrastructures and development of electronic maintenance</b>	12
<b>Project of Electronic Maintenance</b>	4
<b>Vocational Training and Guidance</b>	5
<b>Business and Entrepreneurial Initiative</b>	5
<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

