

# EUROPASS CERTIFICATE SUPPLEMENT

## TITLE OF THE DIPLOMA (ES)

*Técnico en Mantenimiento Electromecánico*

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

*Technician in Electromechanical 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:**

Assembling and maintaining machinery and industrial equipment as well as authorised production lines, according to the rules and regulations established, and following the protocols related to quality, security, occupational risk prevention and environmental protection.

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

### “Production Techniques”

The holder:

- Defines the form and the dimensions of the products to be manufactured, interpreting the symbology and relating it to the products’ representation in the fabrication plans.
- Identifies the resistance of forms, dimensions and other features of the products to be manufactured, analysing and interpreting the technical information contained in the fabrication plans.
- Carries out sketches of tools and equipment for the execution of different processes, defining the constructive solutions for each case.
- Selects the processed material, identifying the properties of the materials and relating them to the technical specifications of the pieces to be built.
- Controls the dimensions, the geometries and the surfaces of the products, comparing the measures with the product specifications.
- Applies manual machining techniques, relating the procedures to the product to be obtained.
- Works with chip tear shaving machine-tools, relating their functioning to the process conditions and the features of the final product.
- Complies with the rules on labour risk prevention and environmental protection, identifying the risks associated and the measures and equipment to prevent them.

### “Bonding and assembly techniques”

The holder:

- Defines the process to follow during the operations of assembly and bonding, analyzing the technical documentation.
- Identifies the materials used in the processes of assembly and bonding, identifying the influence of their properties.
- Shapes metal sheets, pipes and sections, analyzing the specific geometries and dimensions and applying the corresponding techniques.
- Makes non welded joints, analyzing the features of each joint and applying the adequate techniques to each type of union.
- Prepares the junction to assemble fixed elements, analyzing the type of welding and the procedures established in the processes sheet.
- Prepares soft, oxi-acetylenic and electric solder equipment in order to assembly fixed components, identifying the parameters, gases and fuels that must be regulated and their relation with the features of the joint to be obtained.
- Manually and on a semi-automatic basis works with soft, oxi-acetylenic and electric solder equipment, relating their functioning with the process conditions and the features of the product to be obtained.
- Complies with those rules on labour risk prevention and environmental protection related to the operation with machines and bounding equipment, identifying the risks associated and the measures and equipment to prevent them.

### “Electricity and electronic automatisms”

The holder:

- Measures parameters of electric magnitudes in direct current electric circuits, comparing them to the calculations made.

- Measures parameters of electric magnitudes in single-phase alternating current, comparing them to the calculations made and describing the differences with the alternating current.
- Measures parameters of electric magnitudes of a three-phase system, comparing them to the calculations made.
- Identifies the protective devices to be used, relating them to the risks and the effects of the electricity.
- Executes switchboards machining operations, interpreting technical documentation and verifying its functioning.
- Assembles section switchboards and associated electrical systems, interpreting the technical documentation and verifying their functioning.

#### **“Pneumatic and Hydraulic automatisms”**

The holder:

- Identifies the elements forming pneumatic and electro-pneumatic circuits, according to their physic and functional features.
- Identifies the elements forming hydraulic and electro-hydraulic circuits, according to their physic and functional features.
- Assembles pneumatic/electro-pneumatic and hydraulic/electro-hydraulic automatisms, interpreting the technical documentation, applying connection techniques and carrying out functional tests and adjustments.
- Diagnoses the state of the elements in pneumatic and hydraulic systems, applying measuring and analysis techniques.
- Writes simple programmes for programmable automats, identifying the
- Identifies the elements of the circuits in pneumatic/electro-pneumatic and hydraulic/electro-hydraulic technology circuits, both wiring and programmed, interpreting technical documentation and describing its features.
- Physically configures simple automatisms of pneumatic/electro-pneumatic technology, both wiring and/or programmed for automatic control, preparing sketches and diagrams in order to build them.

#### **“Mechanical Assembly and Maintenance”**

The holder:

- Defines functional blocks in machines and equipment, interpreting plans of elements and assemblies of machinery and equipment, principle diagrams and circuit diagrams.
- Carries out assembly and dismantling operations of mechanical and electromechanical elements in machines, interpreting the technical documentation provided by the equipment manufacturer.
- Carries out simple repair or modification operations in the functional status of the machine, following the instructions contained in the reference plans.
- Runs the installation and coupling of the electromechanical equipment and machinery, carrying out functional tests and, later, verifying their functioning.
- Diagnoses breakdowns or operating defects of the machinery’s electromechanical systems, interpreting their symptoms and relating them to the malfunctions.
- Diagnoses the condition of the elements and parts of the machines, using the suitable measuring instruments for each case.
- Applies maintenance techniques that do not involve the replacement of mechanical and electromechanical parts of machinery and automated production lines, selecting and applying the procedures to follow.
- Conducts maintenance operations that do not involve the replacement of mechanical and electromechanical parts of machinery and automated production lines, selecting and applying the procedures to follow.

#### **“Electric-electronic Assembly and Maintenance”**

The holder:

- Recognizes the functioning of electric machines, identifying their application and determining their features.
- Assembles and maintains electric rotating machines, assembling their elements, connecting and checking its functioning through calculations.
- Identifies the features of the transformers, connecting and checking its functioning through calculations.
- Assembles and maintains automated systems with programmable controller, interpreting the technical documentation and verifying their functioning.
- Adjusts start systems, configuring regulation and electric motor control equipment.
- Assembles and maintains electric switchboards for machinery and industrial equipment, on the basis of technical documentation, localising and repairing breakdowns.
- Diagnoses faults in electric-electronic systems, by using measuring equipment and relating the causes of the faults to the dysfunctions caused.

#### **“Assembly and Maintenance of Automated Lines”**

The holder:

- Develops written procedures of machinery preventive maintenance, defining the operations and how often they have to be carried out.
- Characterizes the auxiliary processes of production and manufacturing, identifying and describing automatic techniques and means to carry them out.

- Integrates PLC in the assembly of a machine, equipment or automate production line in order to control it, connecting, adapting and/or developing simple programmes and checking and maintaining its functioning.
- Integrates a manipulator and/or a robot in the global assembly of a machine, equipment or automated production line, controlled by PNC, installing, controlling and developing simple programmes that allow its functioning.
- Integrates industrial communications in the global assembly of a machine, equipment or automated production line, controlled by PLC, installing and connecting its physical components.
- Diagnoses and repairs breakdowns in automatic simulated production systems, identifying the nature of the breakdown and carrying out corrective interventions in order to clear the error and to restore the functioning.

#### **“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 arising from his/her activity, analysing the job conditions and the risks 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 risk situations in the labour setting of the technician in Electromechanical 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 to create 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 company's structure and organization, 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.
- Participates in the configuration and assessment of facilities and equipment, applying techniques and procedures of corrective maintenance.
- Assembles installations and equipment, applying the relevant regulations, the security standards and also those of the company.
- Collaborates in the operations and processes in order to put into service installations and equipment, following the established procedures.
- Carries out the preventive maintenance in installations and equipment that are in charge of the company, applying the corresponding maintenance plans.
- Collaborates in the diagnosis and repair of breakdowns and dysfunctions in installations and equipment, applying corrective maintenance techniques and procedures

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

The Technician in Electromechanical Maintenance works in companies of the services sector, mainly private, committed to the assembly and maintenance or installation of machinery, industrial equipment, and automated lines, either as self-employed or employee.

The most relevant occupations or jobs are the following:

- Maintenance Mechanic
- Industrial Fitter
- Electrical Equipment Fitter

- Electronic Equipment Fitter
- Automated Line Maintainer
- Capital Goods Fitter
- Hydraulic and Pneumatic Automatism Fitter
- Industrial Electrician Fitter
- Electrician of Maintenance and repair of control, media and precision 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: Post-Compulsory Secondary Education
- INTERNATIONAL:
  - Level 3 of the International Standard Classification of Education (ISCED3).
  - Level \_\_\_\_\_ of the European Qualifications Framework (EQF\_\_).

**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 1589/2011, of 4 November, according to which the diploma of Technician in Electromechanical 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. An Annex I may be added and will be filled in by the corresponding Autonomous Community.

### **INFORMATION ON THE EDUCATION SYSTEM**

