

PROJECTX Nº 022

“WIRING AND PROGRAMMING AN AUTOMATED CONTROL OF A CANAL LOCK”

PRESENTATION



Promoting school:

XABEC, Vocational Training Centre
Spain



A. GENERAL DESCRIPTION

Title of the ProjectX

WIRING AND PROGRAMMING AN AUTOMATED CONTROL OF A CANAL LOCK

Core area

GENERAL / KNOWLEDGE **AUTOMATION, ELECTRICITY AND PNEUMATIC**

PARTICULAR / ACTIVITY: **ASSEMBLY, PLC AND MAINTENANCE**

Promoting school

XABEC

Schools participants in the revision of the ProjectX

MARKIEZAAT COLLEGE

Reference to ECVET Credit System and EQF / NQF

ECVET	EQF	REFERENCE TO NATIONAL QUALIFICATIONS (NQF)						
		Spain	Finland	Romania	Portugal	UK	Turkey	France
2	4	4	4	3	4	3	4	4

Learning Outcomes achieved (to be developed in the future related with ECVET credit system)

1. ATMPL04 - Write PLC program for sequential control systems
2. PNMAS01 - Perform installation, configuration and test of a pneumatic system
3. ELYAS01 - Installation and commissioning of electrical components
4. ATMPL02 - Develop connections between the PLC and units of automated control systems, robots or SCADA systems.

Time that is necessary to do the ProjectX (in hours)

Theory: 20 hours
Practice: 36 hours

Link to real companies in your region (it is just informative)

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|-----------------------------|-----------------------|
| 1. NAME:MECANIZADOS S.A. | WORKPLACE: TECHNICIAN |
| 2. NAME: MATRICES ALCÁNTARA | WORKPLACE:TECHNICIAN |



B. THEORY

Objectives of the theoretical Knowledge

1. Pneumatic system
2. Basic Components Pneumatics
3. Elements Pneumatics and Electro-Pneumatic
4. Connection de Pneumatic and Electro-Pneumatic system
5. Electric Element in control system. Sensors and relays
6. Design and connection electric components
7. PLC, structure Hardware and software
8. Software in different languages (KOP-AWL-FUP-SCL)
9. Building SCADA Systems

List of activities

1. Assembly of Pneumatics systems and circuits
2. Assembly of a circuit in Electro-Pneumatic systems
3. Programming PLC and SCADA systems
4. Assembly of wireless elements in project
5. Make software program and simulation
6. Testing the PLC program
7. Testing the complete installation

C. PRACTICE

Brief description of the Practice

The students use a small model of a lock-gate of a canal available in the automation workshop of Xabec. Students have to wire the electricity and control components, to program the PLC and the Scada systems for the control of the canal lock-gate. The automated system controls de water level and the opening of the locks to raise a ship model

Steps or activities to be performed by the student

- First: Studying the theoretical part pneumatic, electro-pneumatic and control elements. To do an oral assessment with the trainer
- Second: Assembly of the pneumatic circuit
- Third: To wire the electro pneumatic, sensors and relay circuits
- Fourth: Studying the theoretical part of PLC and SCADA
- Fifth: To write the program with the instruction of PLC
- Sixth: Building the SCADA and simulation in PLC
- Seventh: Integration of the pneumatic and electric circuit controlled by the PLC and SCADA
- Eighth: Test the signals
- Ninth: Dry run. Check mechanical part and adjust sensors
- Tenth: Automatic mode
- Eleventh: Check the SCADA
- Twelfth: Documentation: Electrical Soft, Mechanical documents and Handbook



D. DETAILED DESCRIPTION OF LEARNING OUTCOMES.

Learning Outcome:	ATMPL04 Write PLC program for sequential control systems
Knowledge	
<ul style="list-style-type: none"> - The student knows kinds of sequential control systems. - The student knows PLC programming algorithm logic and rules 	
Skills	
<ul style="list-style-type: none"> - The student is able to create an algorithm and draw a flowchart to solve problem - The student is able to write PLC program codes correctly by following flowchart and algorithm 	
Competences	
<ul style="list-style-type: none"> - The student is responsible for applying the right strategy to program sequential control systems. - The student is responsible of planned work and good use of time - The student is responsible for sharing Knowledge, experience and insights - The student is responsible for being carefully to create qualified products 	

Learning Outcome:	PNMAS01 Perform installation, configuration and test of a pneumatic systems
Knowledge	
<ul style="list-style-type: none"> - The student knows principles related to the pneumatic systems - The student knows pneumatic circuits elements - The student knows basic installation and configuration steps of the pneumatic systems - The students knows main test procedures for pneumatic systems 	
Skills	
<ul style="list-style-type: none"> - The student is able to select proper pneumatic circuit`s elements - The student is able to read diagrams and perform installation of pneumatic circuits - The student is able to configure and monitor the pneumatic systems 	
Competences	
<ul style="list-style-type: none"> - The student is responsible for installation of pneumatic systems - The student is responsible for performing calibration and monitoring to the pneumatic systems - The student is responsible for applying general and specific branch related safety rules and procedures in his/her work - The student is responsible of planned work and good use of time 	



Learning Outcome:	ELYAS01 Installation and commissioning of electrical components
Knowledge	
<ul style="list-style-type: none"> - The student knows the necessary occupational safety regulations, accident prevention regulations and environmental protection regulations - The student can read the assembly and installation diagrams - The student knows occupational safety regulations for electrical installations - The student knows the basis of plans, the cable paths and device installation locations in buildings - The student knows the use of various mounting brackets 	
Skills	
<ul style="list-style-type: none"> - The student is able to define and carry out operations independently - The student is able to build up scaffolds and ladders correctly - The student is able to build up sub distribution boards - The student is able to produce clamp connections and screw connections - The student is able to mount distributor, switches and cable installation systems - The student is able to select and apply measurement and testing methods - The student is able to measure and evaluate electrical quantities - The student is able to test electrical installations in terms of function and safety 	
Competences	
<ul style="list-style-type: none"> - The student is responsible for setup the workstation - The student is responsible that protective measures are complied - The student is responsible to make tools and equipment ready for operation - The student is responsible to check and understand the documents of the customer order - The student is responsible for checking the existing power supplies - The student is responsible for complying the installation regulations - The student is responsible for the proper assembly and testing of assemblies - The student is responsible for the cleanliness and order in the assembly area - The student asks questions for clarification appropriate and reasonable and listens carefully to the instructor 	



Learning Outcome:	ATMPL02 Develop connections between the PLC and units of automated control systems, robots or SCADA systems
Knowledge	
<ul style="list-style-type: none"> - The student knows kinds of PLC elements, units of automated control systems, robots and SCADA systems - The student knows how to read technical drawing shows the connections between the PLC and units of automated control systems, robots or SCADA systems - The student knows types of connections between the PLC and units of automated control systems, robots or SCADA systems 	
Skills	
<ul style="list-style-type: none"> - The student is able to read technical project document - The student is able to make connections between PLC and units of automated control systems, robots or SCADA systems 	
Competences	
<ul style="list-style-type: none"> - The student is responsible for applying the right strategy to make connections between the PLC and units of automated control systems, robots or SCADA systems - The student is responsible of planned work and good use of time - The student is responsible for cooperation with colleagues - The student is responsible for sharing Knowledge, experience and insights 	

