



Erasmus+



Better Electro-World

How to Program a Traffic Light Programmable Logic Controller (PLC)



ORANGE TEAM

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THE PROJECT SUMMARY

E World (Better Electro World) is a project which is set up on the idea that VET (Vocational Education and Training) can be learned best if a student acquires vocational qualifications by the good samples of practices on peer learning and project based implementations.

The idea of this project is to learn with the good examples of project based learning comes after finding that we have a lot of common needs, problems and reasons for participating in a European partnership.

The main reason of this project was to how to Programme on the PLC Mitsubishi A12-24MR-D and create a Traffic Light Programme.

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Profiles of the Group: ... **Napaka! Zaznamek ni definiran.**

Miguel Silva..... **Napaka! Zaznamek ni definiran.**

Mustafa Koç..... **Napaka! Zaznamek ni definiran.**

Loik Fresnel..... **Napaka! Zaznamek ni definiran.**

Luka Farkas **Napaka! Zaznamek ni definiran.**

Yorbin Gutierrez **Napaka! Zaznamek ni definiran.**

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PLC Mitsubishi AI2-24MR-D

A **programmable logic controller (PLC)** is an industrial digital computer which has been ruggedized and adapted for the control of manufacturing processes, such as assembly lines, or robotic devices, or any activity that requires high reliability control and ease of programming and process fault diagnosis.

They were first developed in the automobile manufacturing industry to provide flexible, ruggedized and easily programmable controllers to replace hard-wired relays, timers and sequencers. Since then they have been widely adopted as high-reliability automation controllers suitable for harsh

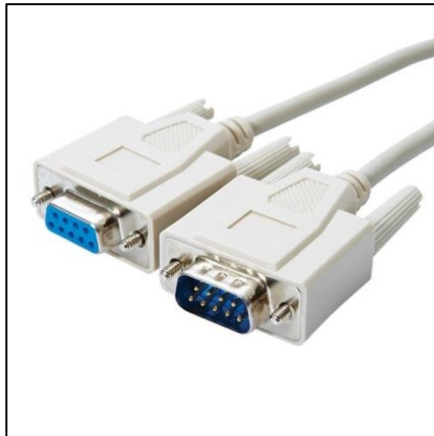
environments. A PLC is an example of a "hard" real-



time system since output results must be produced in response to input conditions within a limited time, otherwise unintended operation will result.

How to Connect the Computer to the PLC

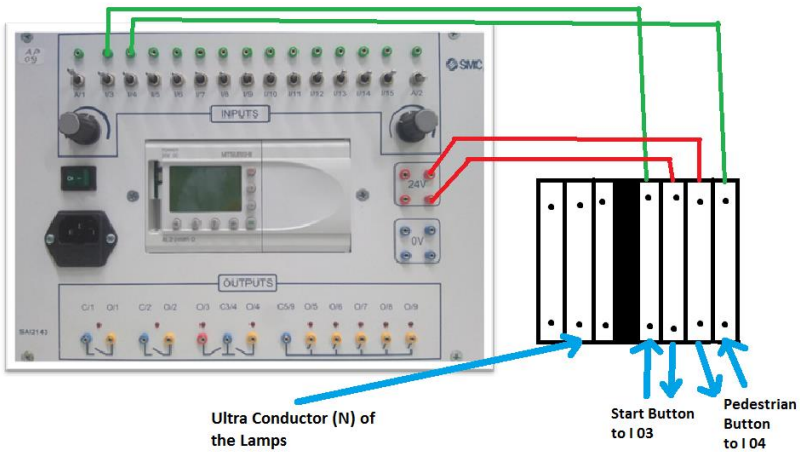
We need to connect the PLC Mitsubishi AI2-24MR-D by the 9 Pin Serial Port Cable to the Computer.



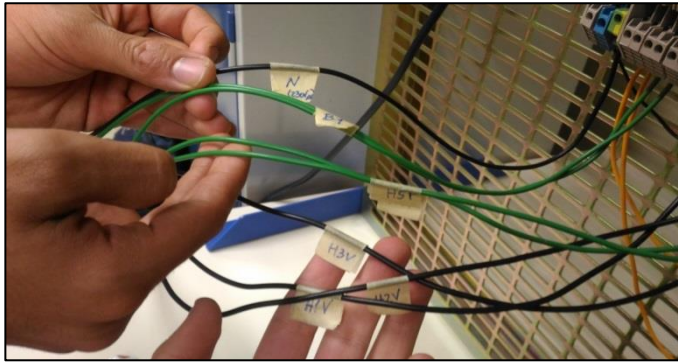
9 Pin Serial Port Cable

How to Connect the PLC to the Traffic Light

We need to connect the Traffic Light with specific wires to the PLC Mitsubishi A



Input connections, Neutral connections, 24VDC connections and the Buttons connections.



The specific wires between the traffic light and PLC connections.

	Description	Symbol	Address
INPUTS	Start Button	Start	I 03
	Pedestrian Button	B1	I 04
OUTPUTS	Red Light Vehicles	H1V	O 01
	Yellow Light Vehicles	H2V	O 02
	Green Light Vehicles	H3V	O 03
	Red Light Pedestrian	H4P	O 04
	Green Light Pedestrian	H5P	O 05

List of the specific Wires to the PLC and for the software program.

Materials

- 5 Light Bulbs

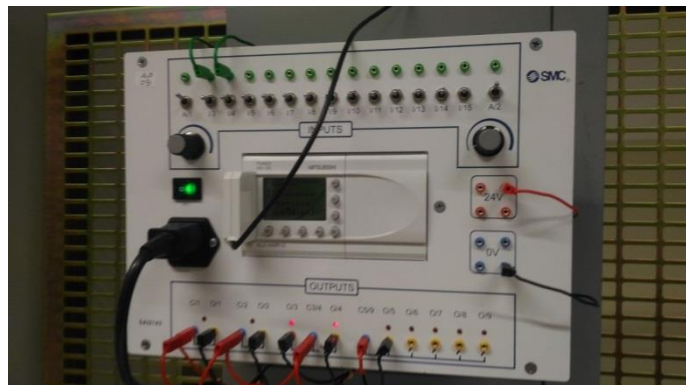
(2 reds, 1 yellow and 2 greens)

- PLC Mitsubishi AL2-24MR-D
- Wires
- Computer
- The Mitsubishi AL-PCS / WIN-E: Software
- 2 Buttons
- Relays

Step 1 – Understand the Inputs and Outputs of the PLC

The inputs to be used will be digital and all will be fed at 24VDC. As for the outputs, they will also be supplied with 24VDC and then connected to relays to supply the traffic lights.

In this image we can see that there are 2 inputs (Start Button and Pedestrian Button) and 5 outputs (3 Lamps for Vehicles and 2 lamps for pedestrians).

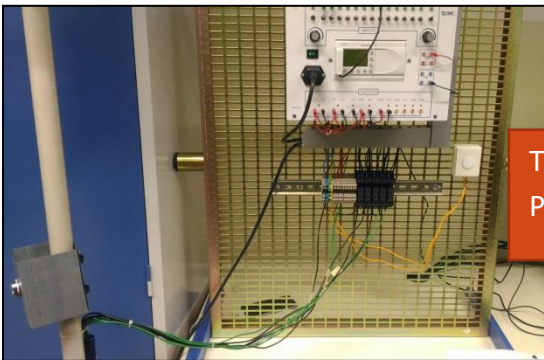


PLC with Input Connections to the Buttons and the Output Connections to the Traffic Lights.

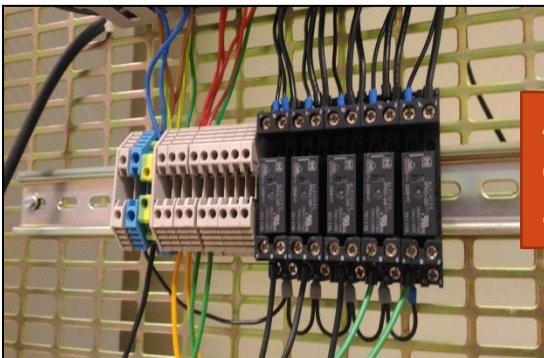
Step 2 – Connections between the PLC and Traffic Light

In the image below, the connections between the PLC and the Traffic Light have to be specific.

The conductor “N” is connected to the Neutral of the circuit, the start button and the pedestrian button is connected to the phase (directly from the PLC) and the Lamps are connected to the Relays and those Relays are connected to the conductor “N”.




The Connections between the PLC and the Traffic Light.



A very close up image from the connections between the PLC and the Traffic Light.

Step 3 – Reading the Manual

With the Manual, you can acquire knowledge at the programming level, never forgetting that the ultimate goal is to develop a programming for control of a traffic light for vehicles and pedestrians.



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WORKSHOP 3 – USE A PROGRAMMABLE LOGIC CONTROLLER (PLC)


OBJECTIVE: CONTROL A TRAFFIC LIGHT FOR PEOPLE AND CARS. THE SYSTEM PROVIDES A BUTTON TO BE OPERATED BY THE PEDESTRAIN

STEP 1. Understand the Inputs and Outputs of the PLC (Mitsubishi) AL2-24MR-D

The following image shows the PLC to be used to control the traffic light system. You can identify the inputs and outputs.

The inputs to be used will be digital and all will be fed at 24VDC. As for the outputs, they will also be supplied with 24VDC and then connected to relays to supply the traffic lights.

In the next step, the inputs and outputs to be used are defined.



The manual was given
by the teachers.

Step 4 – Create a Programme to the Traffic Light

We need to programme that we can control a traffic light for pedestrian and vehicles with a push button for pedestrian.

The system has 3 lamps for vehicles, 2 lamps for pedestrians, a call button for pedestrians and a button to start the system.

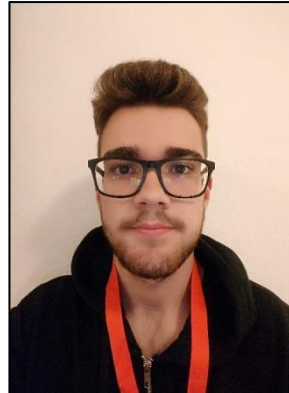
In the computer we can program the PLC in the Software “The Mitsubishi AL-PCS / WIN-E”.

Profile

Name: Miguel Silva

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My name is Miguel Silva, I am 17 years old.

I live in Portugal. I'm studying at Emidio Navarro Secondary School in Almada. I am in the 12th grade and I am attending in the area of Electronics, Automation and Computers.

I usually like to play video games, watching anime and write some poetry.

Projects like this are really great for me because I can communicate with people from other countries and that can really improve my English.

Name: Mustafa Koç

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Department, 12th grade student. I live in Instabul, Turkey. My interests are sports, repair electronics board, books, reading magazines and learning different things. This is my first Erasmus+experience.

I am very excited and happy because of it. I am also excited to see a different culture. The reason for joining this project is: To teach something, to learn better while teaching to see different cultures, to overcome self-confidence and to direct other people to such projects, such opportunities.

Profile

Name: Loïk Fresnel

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My name is loïk. I'm 16 years old. I live in France, I'm learning in Clement Ader High Vocational School in Normandy Bernay. I'm studying the digital system.

My hobbies are to watch manga, play football and my wish is to be a computer scientist in the army.

Profile

Name: Luka Farkas

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Hi!

I am Luka. I attend vocational school for chemistry, electrical engineering and computer engineering in Slovenia.

I am really interested in technology, besides that I really like sports, reading and doing something new.

Projects like this really excite me. I get to know different people and different culture. I hope I will learn a lot of new things and become more fluent in English.

Profile

Name: Yorbin Gutierrez

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I live in Spain (Gran Canaria), I'm studying in the I.E.S. Santa Lucia (Vocational Training for Medium Grade of telecommunications) and my favorite sport is basketball.

I'm excited about this project because I can learn from different people with a different culture.

Working Process

