Teaching materials
Guide notes 1. Introduction to the Test-Bed

MISCE project

Mechatronics for Improving and Standardizing Competences in Engineering

Competence: Automation Technology

Workgroup: University of Cagliari

University of Cassino and Southern Lazio

This document corresponds to the introduction lecture, presenting the experimental platform, for the competence ‘Automation Technology’ using the ‘Test-Bed_n.1’

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Visit https://misceproject.eu/ for more information.

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1 Platform overview

The final aspect of the experimental platform is shown in Figure 1.

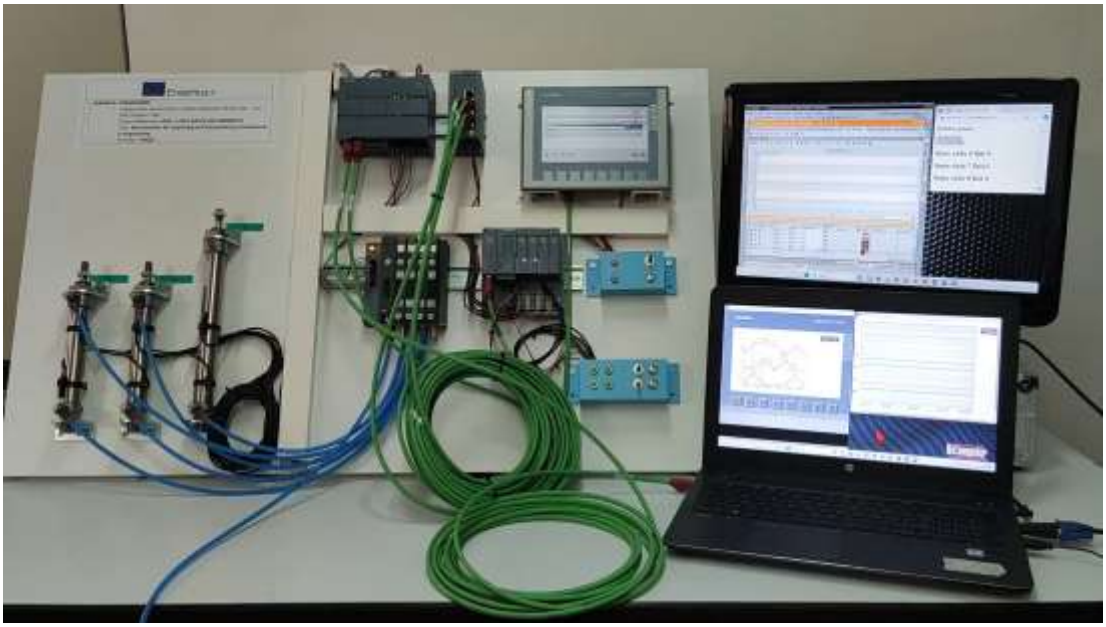

Figure 1. Experimental platform overview

The main functional elements to understand the basic operation mode of the experimental platform are the following ones:

a)

b)

Figure 2. Mounting phase: a) Step 1; b) Step 2

The Test Bed can be operated in a different way.

2 Software description

When launching the software for operating with the platform the image will appear (see Figure 3).

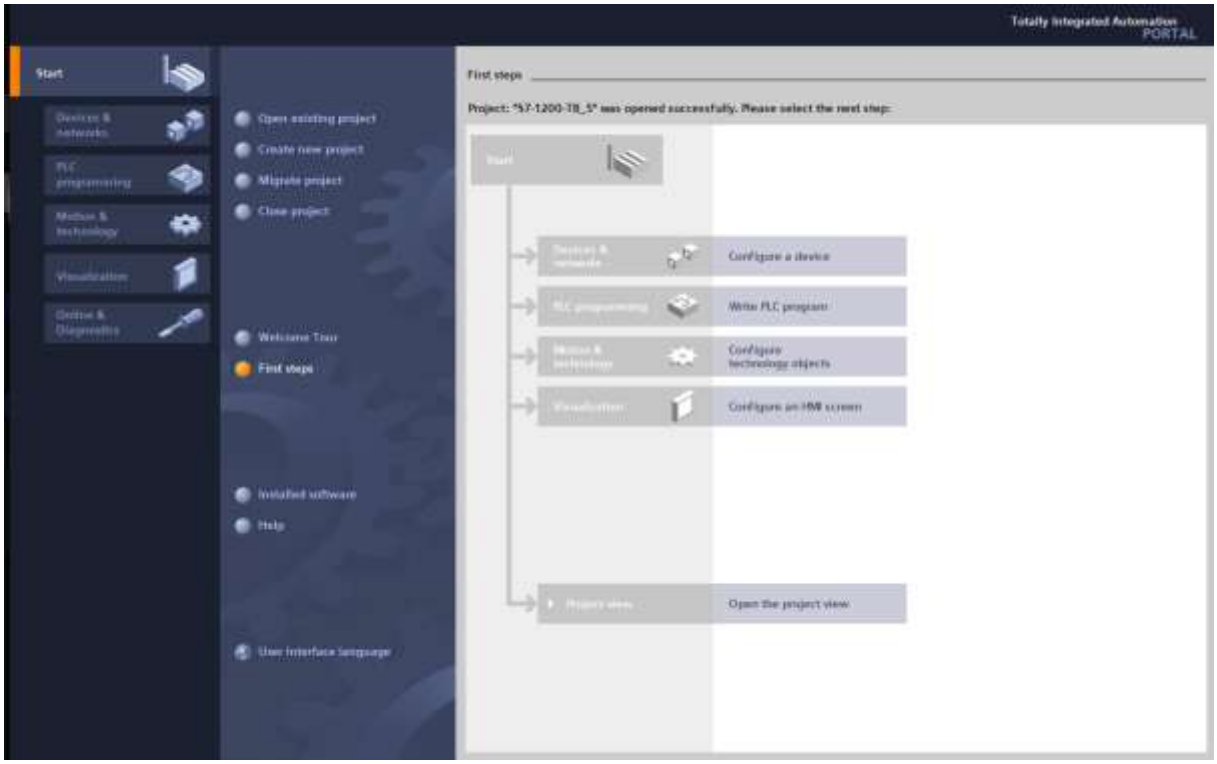

Figure 3. First step view of the Test-Bed_n.1

At this point, click on “open existing project”, and after, click on “Project View”.

When launching the “project View” for operating with the platform the image will appear (see Figure 4).

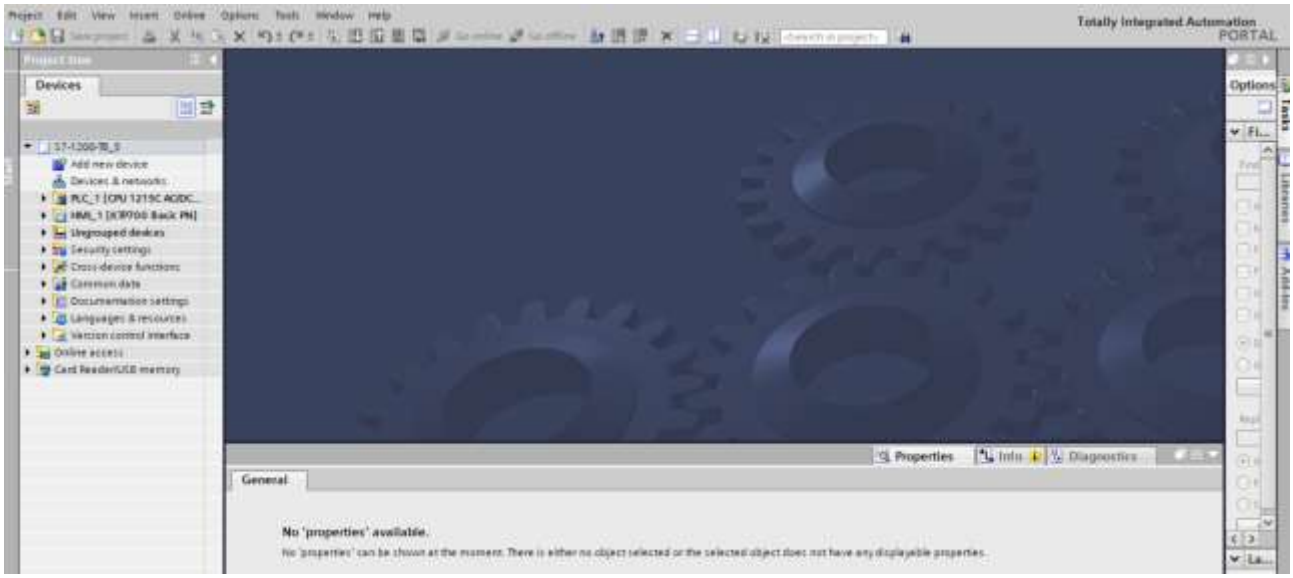

Figure 4. Second step view of the Test-Bed_n.1

At this point, click on “PLC_1”, click on “Program blocks” and after, click on “Main”. This image will appear:

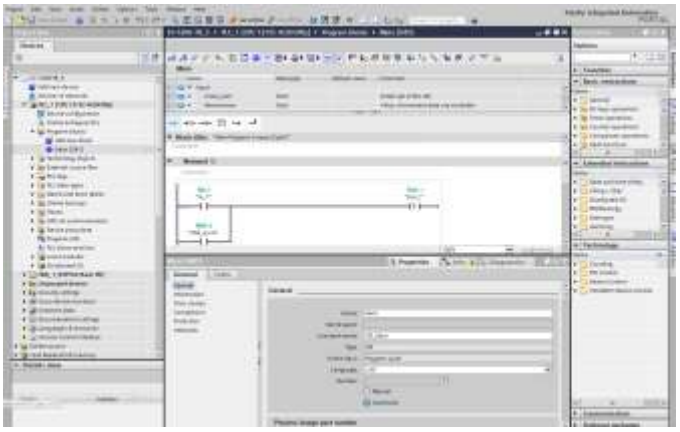

Figure 5. Third step view of the Test-Bed_n.1

At this point, click on “Accessible devices”, to connect the PC with the PLC, the following image will appear:

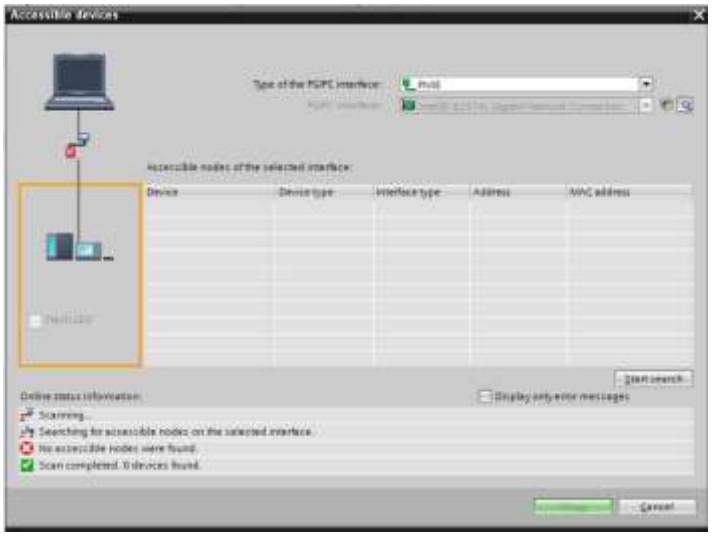

Figure 6. Fourth step view of the Test-Bed_n.1

Now click on “Start Search” and after, click on “Connect”. This image will appear:

At this point, click on “Download to Device  ” in order to download the software on the PLC.

When the connection to the test-bed is established the connection state will change to “Connected”.

At any time, if the user want to exit to the connection, the “GO off-line” 

button must be pushed.

Before to start the application is important to start the PLC, the button “Start CPU”  must be pushed. 

Referring to the image in figure 6, in first row (in the top) the input "%I0.7", is used for indicate the physical Start, *pushbutton*, of the test Bed.

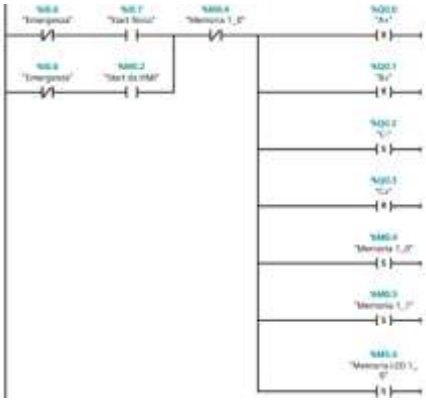

Figure 7. Zoom-in of figure 1 of the Test-Bed_n.1 of the Ladder software.

Additionally, the test Bed can be operated by:

- Physical button
- Physical HMI
- Virtual HMI
- Web-Server
- SCADA

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2.1 Operation mode 1: Push Button 1

Some parameters of a can be selected by using the HMI (reported in figure.8-3).

In order to start the test-bed the button indicated with “X” in figure 8, must be pushed.

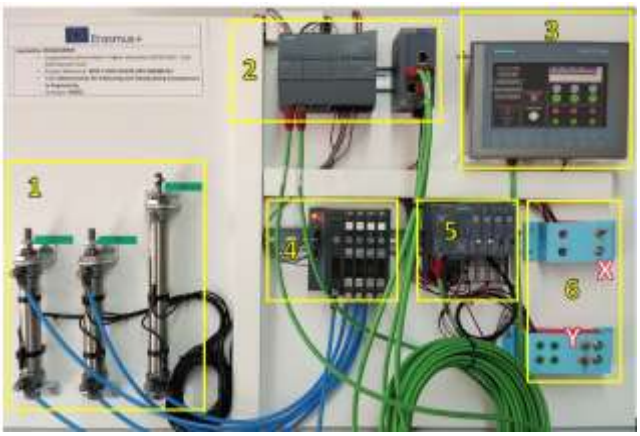

Figure 8. Subsystem of Test-Bed_n.1.

Procedure:

1. Click on “X” button.

Result:

The pneumatic cylinder will start the movement at the maximum velocity

2.2 Operation mode 2: Soft button on HMI

In order to start the test-bed the button named “START from HMI” in figure 9, must be pushed.

Figure 9. Subsystem of Test-Bed_n.1.

Procedure:

2. Click on “START from HMI” button.

Result:

The pneumatic cylinder will start the movement at the maximum velocity

2.3 Operation mode 3: Button on VIRTUAL HMI

In order to start the test-bed the button named “START from HMI” in figure 10, must be pushed.

Figure 10. Zoom -in of the of Test-Bed_n.1 reported in fugure.1.

Procedure:

3. Click on “START from HMI” button.

Result:

The pneumatic cylinder will start the movement at the maximum velocity

2.4 Operation mode 4: Button on WEB Server

In order to start the test-bed the button named “START from HMI” in figure 11, must be pushed.

Figure 11. Test-Bed_n.1 and zoom -in of the of WEB Server (n.5) of figure.1.

Procedure:

4. Click on “Set START from HMI” button.

Result:

The pneumatic cylinder will start the movement at the maximum velocity

2.5 Operation mode 5: Changing the parameters

To modify the automatic cycle, is important to follow this sequence.

The screenshot of this operation mode is shown in Figure 5.

Procedure:

1. Click on ‘F2’ button.
2. Select the appropriate “Recipe”, in order to define the sequence of the movement ot the pneumatic cylinder.
3. Click “upload to PLC.
4. Click on “Start from HMI”.

Result:

The pneumatic cylinder will start the movement at the maximum velocity, but with a different scheme/sequence.

Figure 12. Recipe page and an example of “Operation mode with six phases”