

Project 4: Maintenance in a production line including Handling station and Sorting station

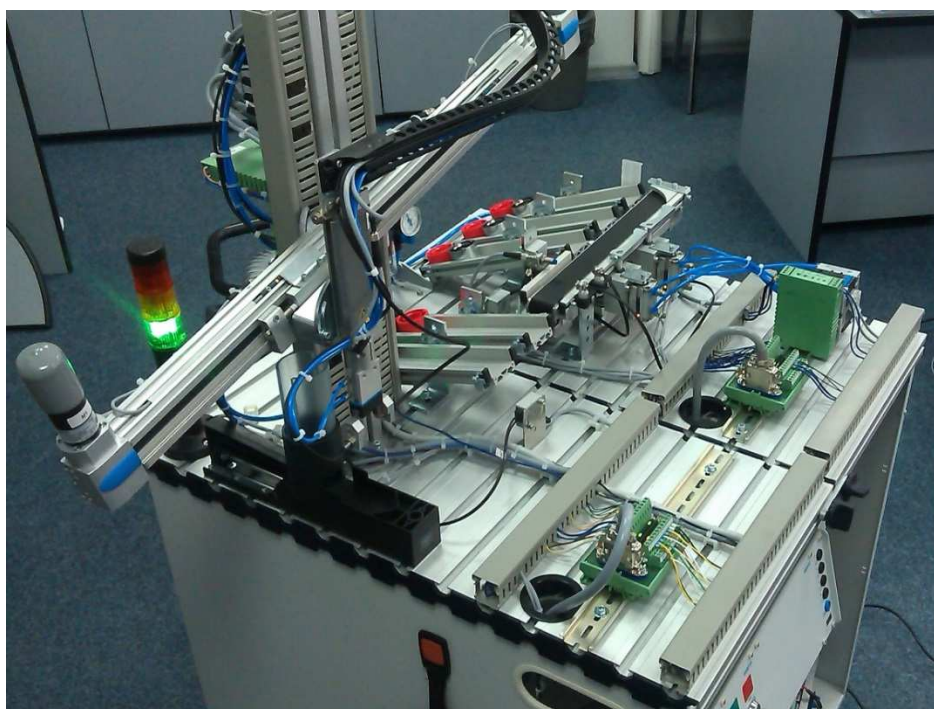
Weighting (points out of total) 14/100

t max 60 min

All big pictures are also on USB-Stick

■ Scenario

You are responsible for the delivery of a production line purchased by a customer in the world to be used in the partial automation of its production process.



■ Task

Assemble, wire and tube the production line according to the following guidelines and the technical information.

Develop a program and commission the system.

Your task is complete when:

1. The production line has been mechanically assembled, correctly wired, connected and its correct operation is guaranteed (based on evaluation using the simulation box).
2. Correct execution of the program with PLC activation (based on evaluation with PLC) is guaranteed.
3. The system meets the specifications (in accordance with the 'Agreement on Professional Practice' which has been handed out separately).


The system will be sent to the customer as soon as you are finished. You will have no opportunity to make improvements later.


Evaluation sheet Project 4: Maintenance in a production line including Handling station and Sorting station

Team: _____ Time _____

Verification of acceptance by experts (names, signatures): _____

Maximum time: 60 min. / Maximum points: 14

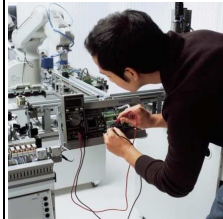
Description		Evaluation	
Function to be checked using simulation box and wiring of the I/O Terminal for the station			
Preparation: Connect the simulation box to the I/O terminal (Output 0 – 7: signal 1 or 0); (Input 0 – 7: signal 1 or 0)			
Connector I/O Terminal (IN)	Comment signal 1 indicates	Done	Max points
DI 0	Sorting gate to slide 1(SO) retracted		0,1
DI 1	Sorting gate to slide 1(SO) extended		0,1
DI 2	Sorting gate to slide 2(SO) retracted		0,1
DI 3	Sorting gate to slide 2(SO) extended		0,1
DI 4	Workpiece available on the beginning of conveyor		0,1
DI 5	Workpiece is silver		0,1
DI 6	Workpiece is red or black		0,1
DI 7	Slide x(SO) is full		0,1
Connector I/O Terminal (OUT)	Comment signal 1 set	Done	Max points
DO 0	Conveyor forwards		0,1
DO 1	Conveyor backwards		0,1
DO 2	Extend sorting gate to slide 1(SO)		0,1
DO 3	Extend sorting gate to slide 2(SO)		0,1
DO 4 - 7	Not used	-	-
SimuBox Total			1,2

Description / checked using PLC	Evaluation	
1. Function Quality of production and signals 2. Function Errors and Lamps 	Done	Max points
Preparation: Connect the PLC board with the I/O terminal and the control panel, switch key to the position AUTO, start the PLC, no programming cable and no communication between PC and PLC, valve for air opened. Put 5 workpieces into the magazine (to be announced) Start from the initial position (competitors allowed to reach it manually or via control panel) Key is in position AUTO (HS). Attention: When the function stops with one of the workpieces then the evaluation is finished. (no manual help allowed)		
1. Function Quality of production and signals	-	-
GREEN signal lamp ON **, Start lamp flashing 1 Hz (1/2 marks for each aspect)		0,1
A: Press Start button, then Start lamp OFF		0,1
Distribute workpiece out of the magazine, workpiece placed on the conveyor (1/10 marks for each aspect) (2 aspects for each workpiece)		1
If workpiece is Black and slide №1(SO) is empty:	-	-
Lamp Q1 ON, workpiece placed to slide №1(SO) (1/2 marks for each aspect) If not last one ==> B:, else ==> C:		0,1
If workpiece is Black and slide №1(SO) is not empty:	-	-
Lamps Q1 and Q2 ON, workpiece placed to slide №3(SO) (1/3 marks for each aspect) If not last one ==> B:, else ==> C:		0,3
If workpiece is Red and slide №2(SO) is empty:	-	-
Lamp Q2 ON, workpiece placed to slide №2(SO) (1/2 marks for each aspect) If not last one ==> B:, else ==> C:		0,1
If workpiece is Red and slide №2(SO) is not empty:	-	-
Lamps Q1 and Q2 ON, workpiece placed to slide №1(HS)) (1/3 marks for each aspect) If not last one ==> B:, else ==> C:		0,3
If workpiece is Silver:	-	-
Lamps Q1 and Q2 ON, workpiece placed to slide №2(HS) (1/3 marks for each aspect) If not last one ==> B:, else ==> C:		0,3
B: after each cycle system returns to initial position (1/5 marks for each workpiece)		0,5
If system is in initial position, then lamps Q1 and Q2 OFF, Start lamp flashing 1Hz (complex condition) (1/5 marks for each workpiece)		0,5
Continue with A: (1/5 marks for each workpiece)		0,5
If the last workpiece is placed on the conveyor:	-	-
C: Press Stop button (HS) then Start lamp and GREEN signal lamp** flashing 2 Hz, system finish the process and moves to initial position (1/4 marks for each aspect)		0,4
GREEN signal lamp ON** and Start lamp flashong 1 Hz (1/2 marks for each aspect)		0,2
Mechanical stopper wasn't used and evaluation reaches label C:		1
At any time only one lamp of the signal column is on		0,1
PLC board Function Quality of production and signals total		5,5

2. Function Errors and Lamps	-	-
Magazine is empty Start from the initial position (competitors allowed to reach it manually or via control panel)	-	-
GREEN signal lamp ON** and Start lamp flashing 1 Hz (1/2 marks for each aspect)		0,2
Press Start button (HS), then Start lamp OFF		0,1
Identification that magazine is empty	-	-
If magazine empty then Start lamp ON <u>and</u> both Q1 <u>and</u> Q2 lamps <u>and</u> YELLOW signal lamp** flashing together 2 Hz. (1/4 marks for each aspect)		0,8
Put a workpiece into magazine (to be announced)	-	-
Press Start button (HS), then distribute workpiece out of the magazine, place it on slide 3(SO), after workpiece placed on the slide, lamps Q1 and Q2 OFF, GREEN signal lamp ON ** (1/5 marks for each aspect)		1,5
Syster moves in initial position, Start lamp flashing 1 Hz (1/2 marks for each aspect)		0,1
At any time only one lamp of the signal column is on		0,1
PLC board Function Errors and Lamps total		2,8

PLC board total		8,3
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There is no control panel on the Sorting station

Description		Evaluation	Max points
Professional Practice 		List of Professional Practice will be checked in samples	
PP item No	Description	-	-
*			0,4
*			0,4
*			0,4
*			0,4
*			0,4
Professional Practice total			2

* Each deviation will result in 0,4 points being deducted

Description	Evaluation	Max points
Component(s) was changed		0,5
Time evaluation (only if the maximum number of points is achieved for PLC and simulation box function and at least 1,2 points for professional practice and the component(s) was changed)	-	-
Points for time = (max. time – actual time) x max. points / (max. time – min. time) = (60.0 -) x 2,0 Points / (60.0 -)	_____	2
Time points with Maintenance total		2,5

Total evaluation Project 4:

Description / points for	Evaluation	Max points
Operation based on simulation box	_____	1,2
Operation based on PLC board: Function Quality of production and signals	_____	5,5
Operation based on PLC board: Function Errors and Lamps	_____	2,8
Professional Practice	_____	2
Points for time evaluation	_____	2,5
Total points Project 4	_____	14