




Description		Evaluation	
Function to be checked using simulation box and wiring of the I/O Terminal for the station		Done	Max. Points
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	Comment			
<b>T1 (IN)</b>	<b>1 signal indicates</b>			
DI 0	DI 0: Conveyor: Workpiece at conveyor end position	YES		
DI 1	DI 1: Conveyor: Workpiece at module Pick and Place assembly position	YES		
DI 2	DI 2: Conveyor: Workpiece at module Lift/Turn place/pick up position	YES		
DI 3	DI 3: Conveyor: Digital measuring result okay (no function test, only wiring)	YES		
DI 4	DI 4: Identification: Inductive Sensor	YES		
DI 5	DI 5: Identification: Optical sensor: Light barrier	YES		
DI 6	DI 6: Identification: Optical sensor: Reflex light	YES		
DI 7	DI 7: not used			

Connector I/O	Comment			
<b>T1 (OUT)</b>	<b>1 signal set</b>			
DO 0	DO 0: Conveyor: Conveyor belt moves to Pick and Place Module	YES		
DO 1	DO 1: Conveyor: Conveyor belt moves to output slide	YES		
DO 2	DO 2: Conveyor: Retract stopper (place/pick up position)	YES		
DO 3	DO 3: Conveyor: Switch separator (input slide tall cap)	YES		
DO 4 - 7	DO 4-7: not used			

<b>SimuBox total T1</b>			<b>1,3</b>
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Connector I/O	Comment			
<b>T2 (IN)</b>	<b>1 signal indicates</b>			
DI 0	DI 0: Pick and Place: Horizontal slide retracted	YES		
DI 1	DI 1: Pick and Place: Horizontal slide extended	YES		
DI 2	DI 2: Pick and Place: Vertical slide is at upper position	YES		
DI 3	DI 3: Pick and Place: Vacuum is available	YES		
DI 4	DI 4: Module Lift/Turn: Gripper is open	YES		
DI 5	DI 5: Module Lift/Turn: Gripper is up	YES		
DI 6	DI 6: Module Lift/Turn: Gripper is at conveyor-belt position	YES		
DI 7	DI 7: Module Lift/Turn: Gripper is at workpiece in/out position	YES		

Connector I/O	Comment			
<b>T2 (OUT)</b>	<b>1 signal set</b>			
DO 0	DO 0: Pick and Place: Retract horizontal slide	YES		
DO 1	DO 1: Pick and Place: Extend horizontal slide	YES		
DO 2	DO 2: Pick and Place: Move vertical slide down	YES		
DO 3	DO 3: Pick and Place: Switch vacuum on	YES		
DO 4	DO 4: Module Lift/Turn: Open Gripper	YES		
DO 5	DO 5: Module Lift/Turn: Move Gripper down	YES		



DO 6	DO 6: Module Lift/Turn: Move Gripper to workpiece in/out position	YES		
DO 7	DO 7: not used			


<b>SimuBox total T2</b>			<b>1,9</b>
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Connector I/O Analog (IN)	Comment		
AI 0	AI 0: Conveyor: value of the workpiece height	YES	

<b>SimuBox analog</b>			<b>0,1</b>
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<b>SimuBox total</b>			<b>3,3</b>
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Description / checked using PLC		Evaluation	
<div><div><div>1.</div><div>Function Operation mode and signals</div></div><div><div>2.</div><div>Function of the production in general</div></div><div><div>3.</div><div>Function Quality of production and signals</div></div><div><div>4.</div><div>Function errors messages and signals</div></div></div> <div></div>	Done	Max. Points	
<p>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, Handling gripper unit between Magazine and slide 1 position, Module Lift /Turn in pickup position on the conveyor belt. Magazine/slides are empty.</p> <p>You will get time to check that before the evaluation!</p>			

1. Function Operation mode and signals		Done	Max. Points
RED signal lamp ON ** and RESET lamp ON (HS)	1/2 mfe aspect	no eval. In T4	
Switch key to the position MAN (HS) and back to AUTO then YELLOW signal lamp ON**	YES	no eval. In T4	
Press RESET button (HS) then the stations (HS and AS) move to initial position	YES	no eval. In T4	
If the stations are in the initial position then RESET lamp OFF	YES	no eval. In T4	
Switch key to the position MAN (HS) and back to AUTO then GREEN signal lamp ON** and START lamp ON	1/2 mfe aspect	no eval. In T4	
**At any time only one lamp of the signal column is on	YES	no eval. In T4	
PLC board Operation mode total			

2. Function of the production in general (Evaluation only if PLC module 3 hasn't 100%)		Done	Max. Points
Competitor selects one workpiece (red, black or silver) for the evaluation and put it hole up into the magazine. HS and AS in initial position (no manual help in the station allowed)			
GREEN signal lamp ON ** and START lamp ON (HS and AS)	1/2 mfe aspect	no eval. In T4	
Press the START button (HS) then distribute workpiece out of the magazine and transport workpiece to the pickup position in Assembly Station (AS) and workpiece placed on the table (AS)	1/3 mfe aspect	no eval. In T4	
The AS transport the workpiece to the conveyor pickup position and assemble a cap	1/2 mfe aspect	no eval. In T4	
The AS transport the workpiece with the cap to the output slide or the HS pickup position	YES	no eval. In T4	
After the workpiece has left the station, the station moves to initial position (HS and AS)	½ mfe aspect	no eval. In T4	
PLC board production in general total			



3. Function Quality of production and signals		Done	Max. Points
Put 3 workpieces into the magazine of the Handling Station*, 3 small caps on slide P&P, 2 tall caps on slide with the separator. HS and AS in initial position.			
<b>Attention:</b> When the function stops with one of the workpieces in the stations then the evaluation is finished. (no manual help allowed)			
GREEN signal lamp ON ** and START lamp ON (HS)	1/2 mfe aspect		
<b>A:</b> Press the START button (HS) then START lamp OFF (HS) and distribute workpiece out of the magazine and transport workpiece to the table (AS) and workpiece placed on the table (AS) (!marks only with the first workpiece)		1/4 mfe aspect	
With pressing the START button (HS) also reset Q1 and Q2 (AS) (!checked with workpiece 2 and 3)	1/2 mfe colour		
Move workpiece to the conveyor pickup position and GREEN signal lamp flashes with 2 Hz ** (!marks only with the first workpiece)	1/2 mfe aspect		
Show the dynamic analogue value on the screen of the touch panel (can be visible all the time) (as beam and as number) (will be evaluated only with the first workpiece)	1/2 mfe aspect	no eval. In T4	
<b>If the workpiece is upside down: (test with one workpiece)</b>			
Lamp Q1 ON (AS) and YELLOW Signal lamp flashes with 2 Hz ** and move the workpiece on to the slide	1/3 mfe aspect		
As soon as the workpiece is on slide, lamp Q1 (AS) flashes with 2 Hz ==> <b>B:</b>	YES		
<b>If the workpiece was correct (hole up):</b>			
Lamp Q2 ON (AS)	1/2 mfe colour		
<b>If the workpiece is red or silver (will be evaluate only with one of them)</b>			
Mount the small cap	YES		
Move the workpiece to the pickup position on the conveyor and to the station in/out table and place it on the table	1/3 mfe aspect		
Pickup the Workpiece with the HS and place the workpiece on slide 1 (red) or slide 2 (silver) ==> <b>B:</b>	1/2 mfe aspect		
<b>If the workpiece is black:</b>			
Separate the tall cap	YES		
Mount the tall cap***	YES		
Move the workpiece onto the slide (AS) ==> <b>B:</b>	YES		
<b>If the workpiece is silver ==&gt; see workpiece is red</b>			
Mount the small cap			
Move the workpiece to the pickup position on the conveyor and to the station in/out table and place it on the table			
Pickup the Workpiece with the HS and place the workpiece on slide 2 ==> <b>B:</b>			
<b>B:</b> After the workpiece has left the station, the station moves to initial position (HS and AS)		1/6 mfe colour	
If the system is in initial position after the process then START lamp ON (HS) and GREEN Signal lamp ON ** (!Here end of eval. after the 3 <sup>rd</sup> workpiece)	1/6 mfe aspect and colour		
Continue with <b>A:</b>	1/2 mfe colour		
**At any time only one lamp of the signal column is on		YES	
<b>PLC board Function Quality of production and signals total</b>			<b>5</b>

\* Red, black or silver work piece will be chosen by the evaluation team, also the orientation

\*\*\* the collision of Part 1 and Part 2 in the front of the Pick and Place module is no collision!

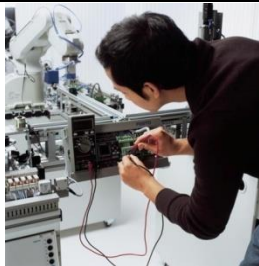


4. Function error message and signals		Done	Max. Points
Slide at Module P&P empty; Start from initial position			
GREEN signal lamp ON ** and START lamp ON (HS)	1/2 mfe aspect		
Press the START button (HS) then distribute workpiece out of the magazine, workpiece placed on the table (AS), move workpiece to the conveyor pickup position, identify the colour type	1/4 mfe aspect		
<b>If the workpiece is red or silver (will be evaluate only with one of them)</b>			
Identification that the cap slide is empty then:			
If slide empty then START lamp ON (HS) and YELLOW signal lamp and Q1 and Q2 lamp (HS) flash with 2 Hz	1/4 mfe aspect		
Put a cap on the slide			
Press the START button (HS) then START lamp OFF and GREEN signal lamp ON and Q1 and Q2 OFF	1/4 mfe aspect		
Mount the small cap	YES		
Move the workpiece to the pickup position on the conveyor and to the station in/out table and place it on the table (evaluation of the Error - Function finishes here)	1/3 mfe aspect		
<b>PLC board production in general total</b>			<b>1,2</b>



1. Touch panel design		Done	Max. Points
Field 2: Function: Word fix: mm	YES		
Field 3: Function: Word fix: Q1	YES	no eval. In T4	
Field 4: Function: Word fix: Q2	YES	no eval. In T4	
Field 6/10: Form: Rectangle and Color: Green bargraph if value > 1 else white and function: Dynamic beam 0-30 mm (cross the line between F9 and F10 is not a fault)	1/3 marks/aspect		
Field 7: Form: Circle with X and Color: Yellow if ON else white and function: Lamp (Q1 lamp)	1/3 marks/aspect	no eval. In T4	
Field 8: Form: Circle with X and Color: Yellow if ON else white and function: Lamp (Q2 lamp)	1/3 marks/aspect	no eval. In T4	
Field 14: Form: Rectangle and Color: Grey and Function: dynamic value 0,00 - 30,00 [mm]	1/3 marks/aspect		
Objects inside the field limit lines (no touch of the lines)	1/3 marks/aspect		
<b>Touch panel design</b>			<b>0,5</b>



Description		Evaluation	Maximum evaluation
Professional practice / Judgment			
			
Judgment topic			
*	1. Cleanliness of the workplace and the station while approval		
	Excellent: 3P; Professional: 2P; Optimization / rework necessary: 1P; not acceptable; 0P		
*	2. Routing of tubes and cables on profiles and on the profile plate		
	Excellent: 3P; Professional: 2P; Optimization / rework necessary: 1P; not acceptable; 0P		
*	3. Mechanical and pneumatical implementation		
	Excellent: 3P; Professional: 2P; Optimization / rework necessary: 1P; not acceptable; 0P		
*	4. Electrical installation and wiring of the components		
	Excellent: 3P; Professional: 2P; Optimization / rework necessary: 1P; not acceptable; 0P		
*	5. Special cases announced by experts and the overall impression		
*	Excellent: 3P; Professional: 2P; Optimization / rework necessary: 1P; not acceptable; 0P		
<b>Professional Practice total</b>			<b>2</b>

Description	Evaluation	Maximum evaluation
Component(s) was/were changed		
<b>Time evaluation (only if the maximum number of points is achieved for PLC and simulation box function and at least 1,3 points for professional practice and the component(s) was/were changed)</b>		
Points for time = (max. time – actual time) x max. points / (max. time – min. time) = (60.0 - ..... ) x 1,5 Points / (60.0 - ..... )		
<b>Time points with Maintenance total</b>		<b>2</b>

Description / Total evaluation Project 3:	Evaluation	Maximum evaluation
Operation based on simulation box		3,3
Operation based on PLC board: Function Operation mode and signals	not in Task 4	
Operation based on PLC board: Function of the production in general	not in Task 4	
Operation based on PLC board: Function Quality of production and signals		5
Operation based on PLC board: Function Error message and signals	not in Task 3	1,2
Touch panel design		0,5
Professional practice		2
Points for time evaluation / Maintenance		2
<b>Total points</b>		<b>14</b>