Future Skills

TEST PROJECT

Industry 4.0

Task A

CONTENTS

INTRODUCTION TO TEST PROJECT

This Test Project proposal consists of the following documentation/files:

1. CP-L-WSK_iDrill_20190718_V15.1_Day1_Task1_2.zap15_1   (TIA Portal project for the CP-Lab iDrilling Station, prepared for the Task A and Task B)

2. CP-AM-iDrill_Siemens_v1.03_20180702.projectarchive   (Original CODESYS project for the iDrilling Station)

3. CP Factory - CP Lab iDrilling Electrical Schematic.pdf   (Electrical Schematics of the CP-Lab iDrilling Station)

4. CP Factory - CP Lab iDrilling Manual A003.pdf   (User Manual of the CP-Lab iDrilling Station)

5. WSK2019_Task_A_Documentation.docx   The template file for documenting Task specific requirements

INTRODUCTION

The Test Project Task A represents following scenario:

- Two "I4.0" technicians (you, competitors) have got a job in the Maintenance/Technical Support department of a cell phone housing manufacturing company;

- Among the other machines, the manufacturer does have a drilling machine, being set-up to produce one single product;

- Two VIP customers place two separate, different orders for differently drilled housings, at the same time. The order is urgent! The customers are ready to pay the triple price of the regular one, but the parts have to be produced until August 25th, 2019, 3:30PM;

- It is summer time: All engineers are on vacation. It is more than obvious the situation will lead to the stop of the production, re-programming of the main PLC and other required actions to retrofit of the machine from "Industry 3.0" to "Industry 4.0";

- The General Manager of the company is on vacation, too. During the phone call with them, he remembered his two employees on their job interviews when they declared that they could fix any technical problem, if it appears. He trusts on them and needs all steps taken documented in written form.

DESCRIPTION OF PROJECT AND TASKS

Task A: Retrofit of a machine from Industry 3 to Industry 4

The Task is based on the inspection of the existing production system and the necessary steps to prepare it for further development.

The 1st part of the Task A: Analyzing of the existing I3.0 production system and its set-up

The maintenance team has to inspect the existing production system (drilling machine) and to ensure the system is supplied with the appropriate power to be ready for production. In order to ensure the modifications will lead to more efficient production, to document it to the owner of the company, the production system has to be monitored. The consumption monitoring has to ensure the data comparison at any time.

The data exchange between the production system, monitoring unit and the maintenance PC has to be ensured by connecting to a network. IP address assignment of the controlling PC(s) has to be based on the predefined (already assigned) IP addresses of the production and monitoring systems. To ensure the data exchange between the components in the LAN the communication to be proven. The IP address assignment and the corresponding MAC-Address have to be documented.

The 2nd part of the Task A: PLC Programming and Control

When the communication between the components is ensured, the working project of the main PLC on the USB stick has to be downloaded to the PLC and HMI. Online/Offline variable comparison of the "Main" could help with the identification.

To analyze possibilities for the upgrading the production system/ machine, analysis of the existing "TIA Portal" project in complete (PLC and HMI part) is essential. The technicians have to identify the way of actuating the Stopper and the Conveyor in both directions, how to manage the states of the embedded drilling module bringing them to the Reset, Setup and Cycle End mode, to get feedback from the Carrier Start/Stop sensors on the Conveyor, and to get feedback from the Ready, Busy and Initial Position states of the drilling production module.

The existing HMI Graphic User Interface (GUI) solution represents the way to control the machine as it is. It has to be figured out the way of control the functions of the production system and analyse solutions for the further developments.

The monitoring function i.e. logging to the EMB DB, has to be activated to provide the customers needed consumption statistics and optimisation.

INSTRUCTIONS TO THE COMPETITOR

Each Task the Competition Teams will get a USB stick with two folders:
- **Competition documents**, containing all software files, Test Project Task descriptions, explanations and other important documents
- **Competition results**, containing the Documenting template to document Task specific requirements

The Competitors will use their own PCs to handle the above-mentioned files.

The Competitors should work in team. By the specific tasks they should Split themselves to the "Task worker" and the „Documentary worker": One works on a task, the other make snapshots, creates the documentation.

EQUIPMENT, MACHINERY, INSTALLATIONS, AND MATERIALS REQUIRED

There is no any equipment or material is required that is not listed in the Infrastructure List

ITEM	QUANTITY	MATERIAL	DESCRIPTION	NOTES

MARKING SCHEME

TASK	CRITERIA	ASSESSMENTS		
		BY JUDGEMENT	BY MEASUREMENT	TOTAL
A	Analysing of the existing hardware, Hardware Set-up, PLC/HMI Programming	2	13	15
B	Retrofit from I3.0 to I4.0	1	14	15
C	Data Security 1	0	13	13
D	Data Security 2	0	7	7
E	Smart Maintenance	2	27	29
F	Production, Optimization, Evaluation, Reporting	6	14	20
Total =		13	87	100