“Kazakh-British Technical University” JSC
School of Information Technology and Engineering

REPORT

Company: "Hyundai Trans Kazakhstan"

Prepared By: Zeinulla Rassul

Practice supervisor from the enterprice:

_____

Signature _____

«____» _____2025

Almaty, 2025

CONTENT

Introduction

In this industrial internship which was held in **Hyundai Trans Kazakhstan** from 23 June to 23 July 2025 I was working with electrical assembly PLC Siemens S7 300 programming in TIA Portal and creating HMI screens in LS Electronics XP Builder I also connected inductive sensors with timers made control logic for start stop and emergency stop assembled and wired a control panel and practiced motor reversing on contactors I designed a 3D bracket in CAD and mounted it on the conveyor and in the final stage I tested integration of PLC and HMI and made robot simulation in HR Space.

The goals of the internship were to get familiar with modern automation systems used in car production and transport to apply my knowledge in practice and to learn how automation devices are used in the industry.

The main tasks of the practice were to expand my technical skills to study industrial devices now in use to follow safety instructions and to gain real hands on experience with programming wiring and testing automation systems.

Hyundai Trans Kazakhstan

About the Company

Hyundai Trans Kazakhstan is part of Astana Motors and is one of the main car production plants in Kazakhstan the factory produces Hyundai vehicles for the local market and also for export to CIS countries the project was developed with the support of the Ministry of Industry and Infrastructure Development of the Republic of Kazakhstan.

The plant is located in the Industrial Zone of Almaty it has an area of 34000 square meters and a territory of 25 hectares the production capacity at the first stage is 30000 vehicles per year and at the second stage up to 45000 vehicles per year.

The company plays an important role in the economic development of the country it

introduces modern technologies develops engineering skills and increases the position of Kazakhstan in the regional automotive market.

The plant is equipped with modern Korean technology there are workshops for welding painting final assembly and plastic painting as well as a warehouse for components all production is organized according to Hyundai global quality standards under the guidance of experienced specialists.

Hyundai Trans Kazakhstan provides stable work conditions social benefits and opportunities for professional growth for young specialists and students the company supports motivated people who want to develop in the automotive industry and grow together with the enterprise.

Main Activities at Hyundai

Car Painting Process

In the paint shop the car body first goes through preparation it is cleaned from dust oil and other dirt then the surface is sanded smooth and any dents or scratches are repaired an anti corrosion coating is applied to protect the metal from rust and to make sure that the paint will stick firmly after that several layers of paint are sprayed primer for adhesion the main color coat and finally a clear coat which protects from sunlight and gives the body a glossy look once painted the body is moved into a curing oven at a set temperature and after drying it is polished to a smooth finish.

Figure 1 Painting Process

Car Assembly Process

Before assembly all important parts like the engine transmission suspension and electronics are inspected and prepared during body assembly panels doors trunk and hood are attached using welding bolts and fasteners after this the powertrain is installed including the engine transmission suspension and brakes the next stage is interior installation where seats dashboard climate systems and all electronics such as lighting multimedia and safety features are fitted and tested the last stage is a complete inspection and test drive to make sure the car meets quality and safety requirements

Figure 2 Assembly Process

Plant Tour and Control Panels Introduction

During this part of the internship we walked through the plant and looked closely at the main control panels distribution boards and automation cabinets this gave me a clear view of how electrical systems in the factory are organized and how the equipment is managed I studied the layout and the function of these parts and understood why regular inspection and maintenance are needed for safe and reliable work.

I also learned about different types of cables used in automation including power cables for supplying machines and control cables for signals between devices we practiced how to choose the right cable for each task how to install them correctly and what to do to keep them in good condition in the workshop I worked with cable clamps and fixings to hold wires in place and to protect them from damage I carried out simple operations like cutting stripping and crimping cable ends then tested the connections to make sure they were strong and ready for use in real circuits.

Technical Assignment: Soldering a 5-Channel Intermediate Cable

One of the important technical tasks during the internship was soldering a five channel intermediate cable using a welding tool with a nozzle this work required accuracy and steady hands because any mistake could damage the cable or cause weak contact I practiced the correct way to heat the joint control the temperature and keep the right amount of time on each connection we repeated the process until the soldering was clean and strong after finishing we checked the joints for strength and continuity to make sure they met the required technical standards and could be used safely in industrial equipment.

Building and Testing Schemes with Contactors and Start Buttons

In addition to other tasks I worked on building circuits with contactors and start stop buttons this helped me understand how basic automation schemes are created and how they function I assembled the circuits step by step connected the wires and checked that the control logic worked correctly if there was a mistake I learned how to trace the problem and fix it this practice gave me useful experience in troubleshooting and in making sure that the system runs safely and reliably.

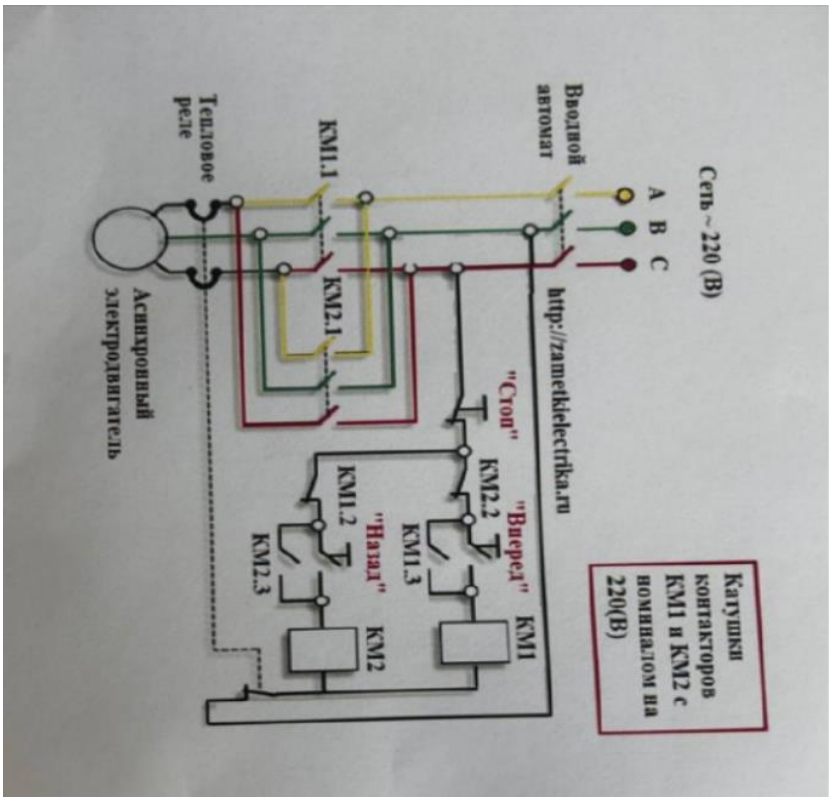

Figure 2 Testing Schemes

Designing and Implementing Control Schemes

During the internship I also designed and assembled control circuits that used contactors and push buttons such as forward backward and stop the contactors acted as electromagnetic switches and were able to control higher current and voltage while the buttons gave the commands to start change direction or stop the motor by building these schemes I learned how each element works together and why interlocks are important for safety the circuits were first created on prototypes then tested in practice to check that they functioned correctly and reliably this exercise gave me real understanding of how industrial machines are controlled with simple but effective electrical logic.

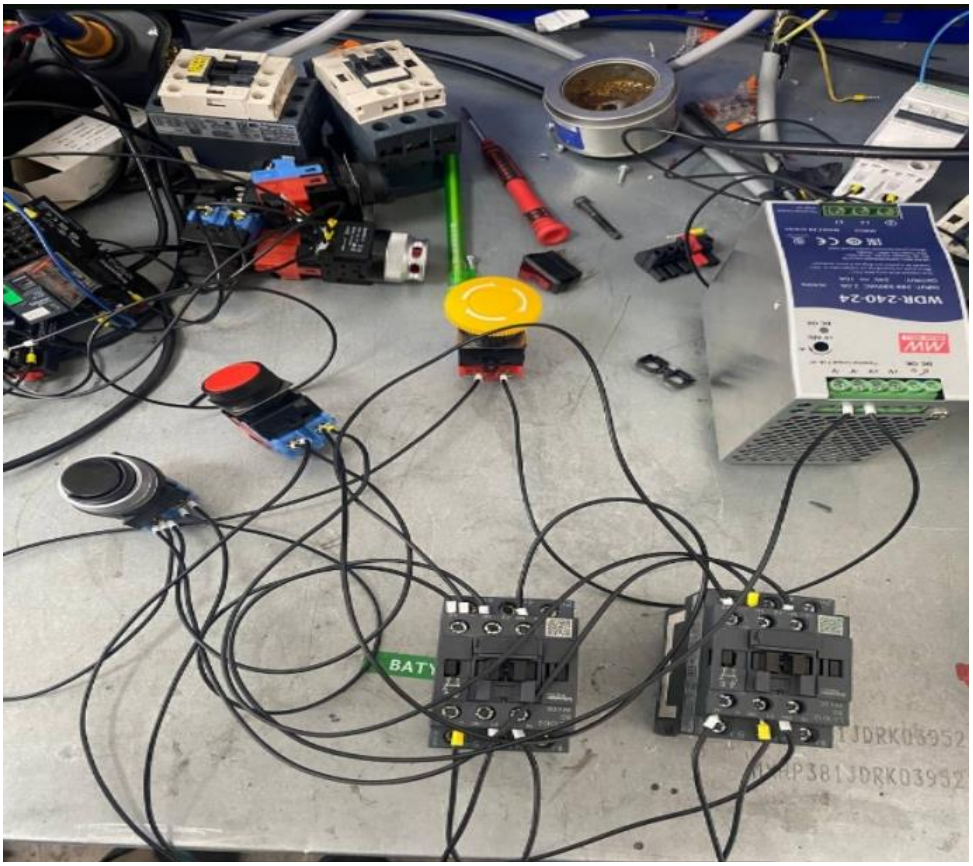

Figure 3 fail-safe system

Problem Solving with Relays

Figure 4 Complete Scheme in hardware

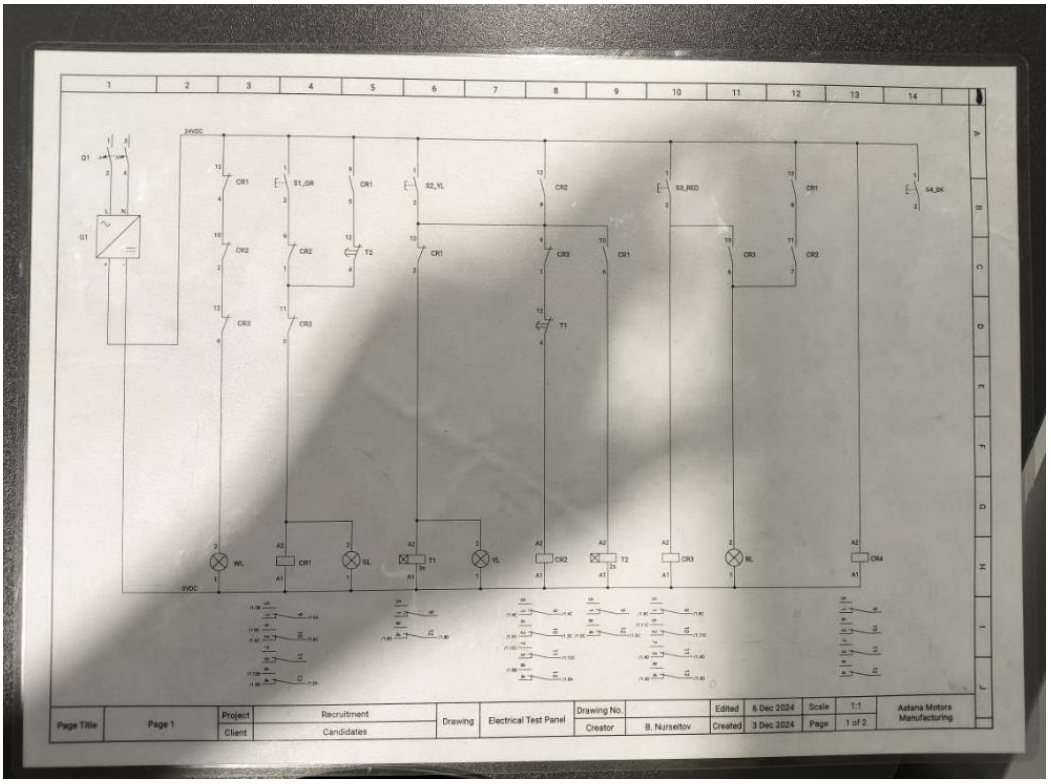

Figure 5 Scheme AUTOCAD

As part of the practice I worked with low voltage control systems for asynchronous motors based on real industrial schemes I built and tested circuits for forward and reverse motor operation using magnetic starters and added interlocked contactor logic so that both directions could not be activated at the same time this was important for safe operation I also designed latching circuits for self hold functions and foolproof protections against wrong switching in addition overload protection was included by installing miniature circuit breakers and motor speed control was practiced with variable frequency drives that had 220 volt AC input and 24 volt DC control.

During the exercises I used timing relays from Schneider Electric as well as intermediate relays and 24 volt pilot lights which allowed me to build logic sequences and to show the status of the system I also applied photoelectric sensors from Omron for non contact detection of objects and connected them into the relay control circuits this gave me practical knowledge of how sensors can be integrated with classic relay logic to create more advanced automation tasks.

Introduction to Siemens PLCs and TIA Portal

During the internship I studied Siemens PLC models S7 300 and S7 1200 and practiced programming them in TIA Portal version 18 I learned how to connect the PLCs to the computer through Ethernet how to set up digital input and output modules and how to create and upload programs to the controller for testing we used simple devices like push buttons and indicator lamps this allowed me to follow the program step by step see the reactions of the outputs in real time and find mistakes in the logic when something was not working correctly this practice gave me clear understanding of how PLCs are

connected configured and used in industrial automation.

Project: Conveyor Belt Control

Figure 6 HMI and Conveyor full process

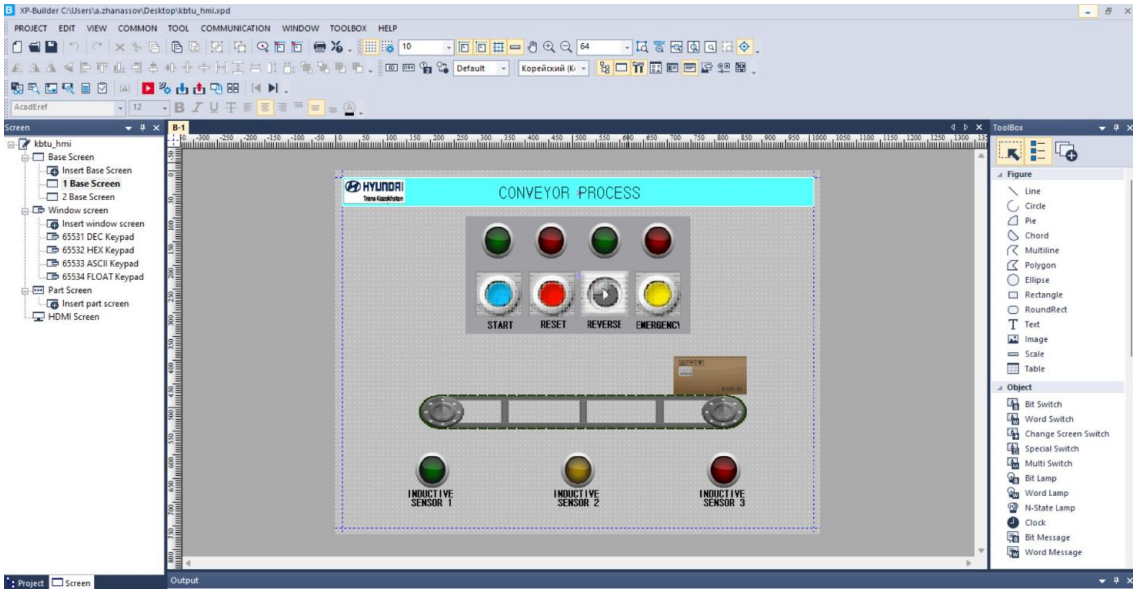

Figure 7 HMI XP electronics

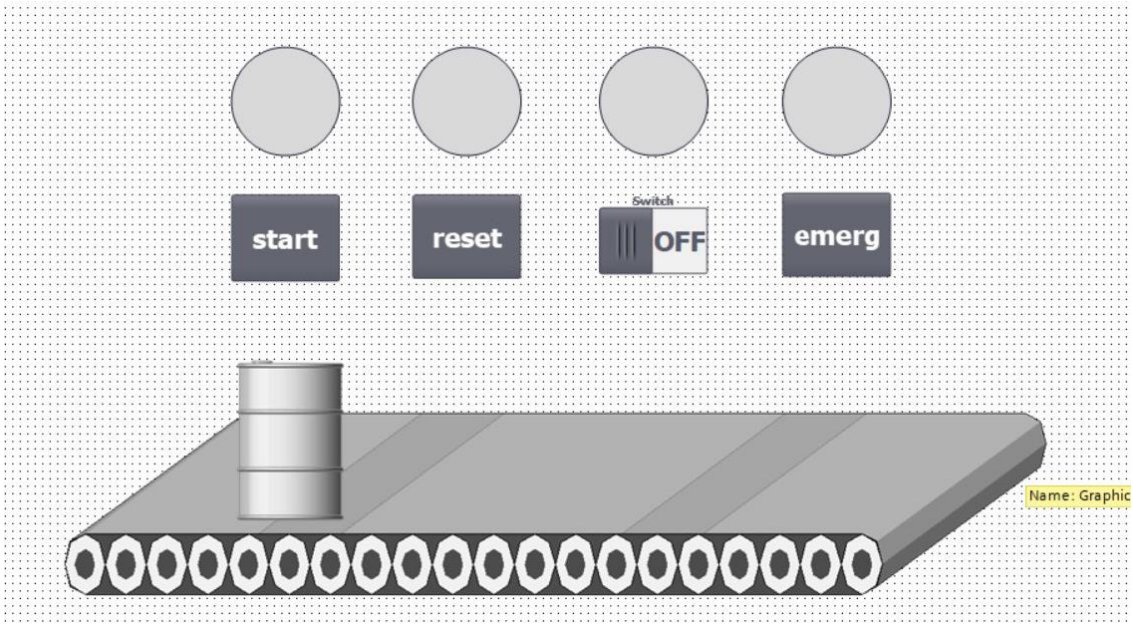

Figure 8 HMI SIMIT siemens

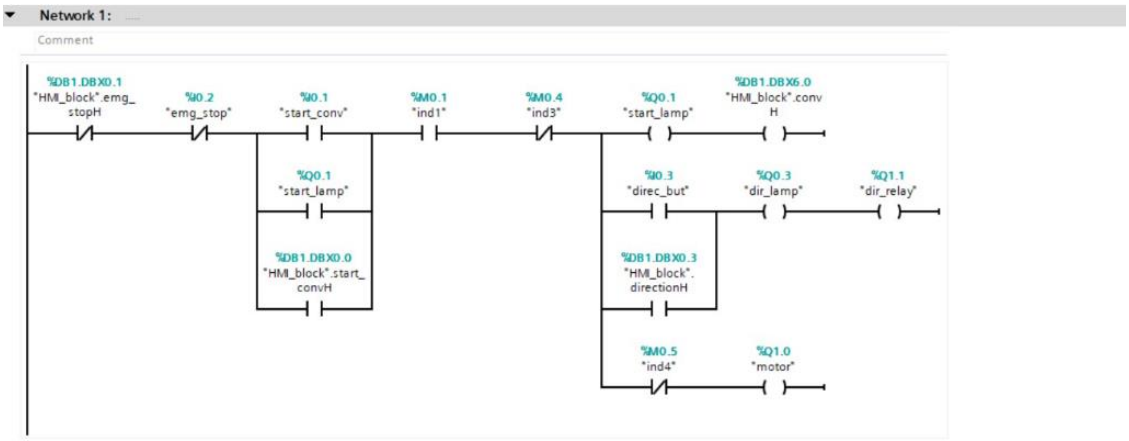

Figure 9 Partial LD code

As a final project in the internship I worked on building a small conveyor system controlled by a Siemens S7 300 PLC with ET 200S modules and programmed in TIA Portal the conveyor used a 24 volt geared motor with 180 rpm and a PNP inductive sensor that was able to detect and count metal pieces I set up the hardware connected the modules

and established PROFINET communication then I created the control logic in ladder diagram this included starting and stopping the conveyor and processing the signals from the sensor the project gave me real practice in combining mechanics electronics and programming and showed me how industrial automation works in a complete system from motor drive to sensor input and PLC logic.

Completion of Internship and General Meeting of Interns

At the end of the internship I took part in a final meeting with all interns where we looked back at the results of our practice each student shared what tasks they had completed and what new skills they had gained we also exchanged ideas about the difficulties we faced and how we solved them this meeting gave me a chance to reflect on my own progress during the internship to listen to feedback from supervisors and to think about what steps I should take next for my professional growth in the field of industrial automation.

Figure 10 Supervisors: Lead Engineer of Instrumentation, Control and Automation; Lead Robotics Engineer

Results

I gained practical experience in designing and commissioning low voltage motor control systems I learned how to implement forward and reverse control using magnetic starters how to build latching circuits and how to add interlock protections so that the system runs safely and without mistakes.

I improved my skills in industrial automation by working with variable frequency drives

timing relays and sensors I connected photoelectric and inductive sensors into control schemes and tested how they can provide reliable motor speed control and non contact detection of objects.

I also designed and programmed a mini conveyor system with Siemens S7 300 PLC using TIA Portal with PROFINET communication and sensor based counting I created ladder logic for start stop and counting tasks and checked the accuracy of the program in real time this gave me strong practice in PLC programming and in integrating hardware and software into one system.

The internship at Hyundai Trans Kazakhstan provided a transformative platform for bridging theoretical foundations with applied industrial practice. Beyond conventional training tasks, I engaged in the end-to-end engineering of an automated conveyor module, incorporating Siemens PLC architecture, PROFINET communication, and inductive sensor integration. This project not only advanced my technical proficiency in PLC programming and system diagnostics but also cultivated a systems-thinking approach to automation design. By experiencing the workflow from electrical wiring and circuit protection to HMI configuration and logic testing, I developed a holistic understanding of how discrete components evolve into a fully operational industrial process. Such exposure underscored the critical role of precision, reliability, and safety in modern manufacturing, while simultaneously shaping my professional identity as an emerging engineer in industrial automation.

Conclusion

My internship at Hyundai Trans Kazakhstan became an important stage in my professional formation, giving me real exposure to industrial automation and control with a focus on Siemens technologies. I gained a clear view of how automation is applied in automotive manufacturing and how these systems ensure stable production, efficiency, and safety on the shop floor.

The program gave me the chance to be involved in different areas of plant activity, from observing technological steps in the paint shop to assembling and programming modern control systems. I improved my skills in cable work, soldering, building and testing electrical circuits, as well as developing PLC programs. Projects such as creating a functional conveyor model and assisting with automation tasks in the paint section allowed me to apply theoretical concepts directly in practice and better understand the real demands of production.

Support from the Hyundai engineering staff played a key role in my progress. Their mentoring helped me not only solve technical problems but also learn how automation engineers think and work in real conditions.

This internship gave me both practical knowledge and professional confidence. It broadened my technical outlook, strengthened my interest in industrial automation, and built a strong base for my future career in engineering.