T Level Technical Qualification in Engineering and Manufacturing – Maintenance, Installation and Repair

8712-312 Mechatronic

Grade standard exemplification material

Distinction - summer 2024

Version 1-0

Version and date	Change detail	Section	Question
v1-0 Oct 2024			

Contents

Introduction

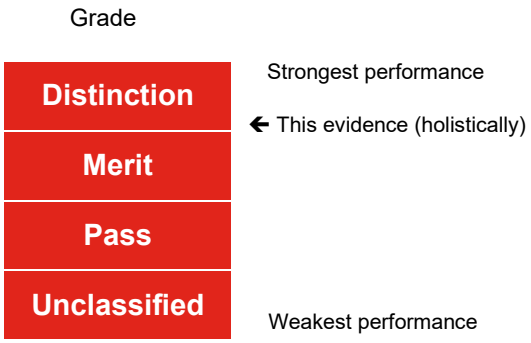
Summer 2024 Results

This document is aimed at providers and learners to help understand the standard that was required in the summer 2024 assessment series to achieve a distinction grade for the 8712-312 Maintenance, Installation and Repair in Mechatronic engineering Occupational Specialism (OS).

The grade standard exemplification evidence (Grade SEM) provided for the distinction grade displays the holistic standard required across the tasks to achieve the distinction grade boundary in the summer 2024 series.

The aim of these materials is to provide examples of knowledge, skills and understanding that attested to **two marks above** distinction competence in summer 2024. It is important to note that in live assessments a candidate's performance is very likely to exhibit a spikey profile and standard of performance will vary across tasks.

The Occupational Specialism is graded Distinction, Merit, Pass or Unclassified.



The distinction grade boundary is based on a synoptic mark across all tasks. The materials in this Grade SEM are separated into two sections as described below. Materials are presented against a number of tasks from the assignment.

Tasks

This section details the tasks that the candidate has been asked to carry out. What needs to be submitted for marking and any additional evidence required including any photograph/video evidence. Also referenced in this section are the assessment themes the candidates were marked against when completing the tasks within it. In addition, candidate evidence that has been included or not been included in this Grade SEM has been identified within this section.

In this Grade SEM there is candidate evidence from:

Task 1 Plan and prepare the maintenance activities
Task 2 Perform and record the maintenance activities
Task 3A Review and report the maintenance activities
Task 3B Peer review
Task 4 Complete Handover

Candidate evidence

This section includes exemplars of candidate work, photographs of the work in production (or completed) and practical observation records of the assessment completed by centre assessors. This was evidence that was captured as part of the assessment and then internally marked by the centre assessor.

The Occupational Specialism brief and tasks can be downloaded from here.

Important things to note:

- We discussed the approach to standard setting/maintaining with Ofqual and the other awarding organisations before awarding this year. We have agreed to take account of the newness of qualifications in how we award this year to recognise that students and teachers are less familiar with the assessments (grading-arrangements-for-vtqsand-technical-qualifications-within-t-levels-in-the-academic-year-2023-to-2024), whilst also recognising the standards required for these qualifications.

- The evidence presented, as a whole, was **two marks** above the distinction grade. However, performance across the tasks may vary (i.e. some tasks completed to a higher/lower standard than distinction grade).

Grade descriptors

To achieve a distinction, a candidate will be able to:

Competently and thoroughly interpret technical information, applying technical skills to plan, assess risk and follow safe working methods to practical tasks and procedures to an exemplary standard in response to the requirements of the brief, working systematically, logically and efficiently producing an excellent quality of work that meets regulations and standards.

Thoroughly prepare working area, mitigating potential risks prior to commencing tasks and consistently apply exemplary housekeeping techniques during tasks that allow safe and efficient working.

Demonstrate comprehensive technical skills for maintaining, installing, repairing and diagnosing components, assemblies and sub-assemblies in line with the requirements of the brief working systematically, logically and efficiently.

Demonstrate exemplary technical skills using tools and equipment for mechatronic maintenance, installation and repair, ensuring safe isolation, removal and replacement of components, working systematically, logically and efficiently.

Demonstrate comprehensive knowledge and understanding of the principles and processes required for disassembly, repair, configuration and reassembly of mechatronic systems, ensuring that all tolerances and tightening torques are in-line with specification.

Work safely and make well founded and informed decisions on the selection and appropriate use of tools, materials and equipment within the working environments for maintenance, installation and repair activities.

Consistently and accurately use industry and technical terminology across different communication methods with full consideration of technical and non-technical audiences.

Task 1 Plan and prepare

Assessment number (eg 1234-033)	8712-312
Assessment title	Mechatronic Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	1
Evidence title / description	Method Statement List of requirements and resources, including justifications for the selections Risk Assessment
Date submitted by candidate	DD/MM/YY

Task 1

Assessment themes:

- Health and safety
- Planning and preparation
- Systems and components

You must analyse the brief and technical information about the system provided and then:

- create a list of the requirements and resources for the maintenance activities, justifying your selections. This should include:
    - all necessary technical information to confirm the type, scope and requirements of the activity
    - tools and equipment
    - materials, components and consumables
    - wastage and disposal requirements
    - time needed to carry out the activity
    - fault diagnosis/detection methods to be used
    - any access requirements
- produce and complete a risk assessment
- produce a method statement.

Additional evidence of your performance that must be captured for marking:
none

Candidate evidence

Task 1 – Method Statement

Maintenance plan

Premaintenance checks

first Step

I shall carry out is obtaining the required PPE (gloves, safety, glasses, steel toe cap boots and overalls) Then I will continue to check over PPE ensuring the quality of the garments and that they are up to standard of completing this task, if any damages to the PPE are found this would be noted down and then reported to the appropriate people and new PPE to be inspected and put on. Once checked and the PPE is on, we can safely enter the workspace. once I am in the working area, I will head to the work bench where the conveyor belt system is. I will check the area by doing a visual inspection of the area to make sure it is clean and safe for work to start. If necessary I will collect the right cleaning stuff, and make sure to put things such as electrical components in the WEEE bin, COSHH (control of substances hazardous to health) products such as cleaning products back in a COSHH cupboard, I shall also make sure there are not any tools lying around to prevent accidents such as slip, trips and falls. And of course, I will follow all the PPE in HASAWA regulations and make sure any necessary work permits are good to go, if needed and ask for promotion to work.

Undertaking the maintenance activity

Second step

To start the maintenance work, I will carefully look over the conveyor belt system, checking its overall condition and looking for any hazards I may encounter and ensure if it is safe to work on. I will then plug in the power cord and connect the pneumatic air supply to the pressure regulator then run a program on the laptop or computer and connect it to the PLC using an ethernet cable to see how exactly it is currently running on the program and check the control console, computer and plc for any signs of faults while also listing to see if I can hear any weird noises and vibrations. If there is and a known intermittent issue with the motor and sensor, I will use different fault-finding methods such as: normal, reverse, strike-slip, and oblique. to find and diagnose the problem successfully also using the muti-meter if needed to further find the issue.

Third step

once I have figured out the issue on the control console or computer, I will unplug the power supply and lock it off, if possible, disconnect the pneumatic air supply and turn the system off using the of button in the right side, and the off button to the left of the PLC, also to put sighs up and to let people know not to touch the power while I work on it, to avoid the possibility of being electrocuted, following the LOTO procedures. start by giving the system a good clean using clean rags and cloths as part of the maintenance routine. This helps prevent any dust or debris from causing problems when I take out the sub-assemblies and clean those key parts using compressed air to ensure no further damage to the parts while cleaning as cleaning chemicals could damage the system. After removing the sub-assembly components with a flat head screwdriver and Philips screwdriver making sure it is an electrical one with a rubber handle, I will visually check the conveyor belt components and wiring to make sure everything is connected properly to the PLC and there is no damage or signs of wear and tear. If I spot any issues with the wiring, I will make a note and order replacement wiring of the same wires used as in the specs of the manual. I shall also inspect all the joints for wear and tear, apply the right grease as in the specs of the manual, and follow the IET guidance this procedure should only take 25 minutes.

Fourth step

I would begin by inspecting the belt to make ensure there is just the right amount of tension on it. If the tension is off - either too little or too much - it can lead to belt slippage, improper tension, and not enough traction and vibration. This imbalance can also put strain on the belts, resulting in noisy squealing and grating sounds. To fix this, I'll follow the manual's instructions and remove the belt using a 4mm hex key to correctly disassemble it by taking the two motors off either side, once off give it a wipe down with a disinfectant wipe then proceed to reassemble and tighten the belt to the manuals specification to ensure it done correctly and to make sure it is running smoothly and quietly this should only take 10 minutes to do so.

Fifth step

After I will go over the entire system, including the assemblies and sub-assemblies, to check for tightness and security. If any fastenings or fixings show signs of wear and tear, I will swap them out as needed. Once I am satisfied, I will put the conveyor belt back together in the right sequence as per specs of the manual, following the specified torque requirements using

a torque wrench, The sub-assemblies mostly consist of fixings, so I will make sure to tighten them to the required specifications. I will also clean off and reapply grease to all greased components, as well as clean and reapply oil to oiled surfaces. It is crucial to do this maintenance because the grease and oil contain debris and carbon deposits from regular machine use. Over time, high-temperature grease can harden and become waxy, potentially causing important components to seize if not refreshed it also protects the components from rust. This could take anywhere between 10minutes and 20minutes depending on the amount needing to be replaced and regreased.

Sixth step

Once I have done all the necessary maintenance on the conveyor belt system I will reconnect the power supply and connect the pneumatic air supply and turn on the system on both switches and check that the system is running how it should if not using the fault finding techniques and repeat the same step above if all is okay and the system functions as it should, I will set up a regular maintenance plan to prevent any future issues. This will help optimise the system's performance, boosting the company's profitability, and saving them an increase of money over time.

Task 1 – Requirements and resources

Requirements and resources needed for maintains on the Conver belt system.

Tool/equipment and consumables	Quantity	Why they are needed
Rags and clean cloths	N/A depends on how much is used	Will be used to clean tools the workspace the system itself.
Computer/laptop	1	Will be used to monitor and help diagnose the system.
Ethernet cable	1	Will be used to connect to the PLC using the laptop.
Pliers	3 one of each kind	To help remove items and to hold them or cut.
Power supply	1	To power the system out of a 230v Uk plug socket.
Belt tensioner	1	if the belt being loose or too tight could cause, The motor to overheat or the belt to slip off or vibrate, this should fix that issue.
Torque wrench	1	To ensure the correct torque within the manual.

Tool/equipment and consumables	Quantity	Why they are needed
Multi-meter	1	To help with fault finding with electrical currents.
Replacement parts for a speed sensor / Berrings /pneumatic actuators.	N/A depends on what needs replacing.	To fix the system and bring it to working order.
Scraw drivers set that includes electrical with rubber insulated handles on the Philips head and flat head.	1	To help remove and replace parts of the system such as sensor adjustment and removal and help remove wiring or put wiring on a terminal rail.
Pneumatic air supply	1	To pressurise the system to check the system is running and if the Pneumatics actuators are working correctly.
Hex key 4mm	1	To take off the motor and Berrings.

Tool/equipment and consumables	Quantity	Why they are needed
A WEEE bin for electrical components, a recycling bin and a waste bin	3 one of each	To dispose of the correct materials that are no longer needed or broken or dirty.
Magnetic tray	1	To hold any bolts, components or screws that have been taken off and need to go back on.
Tub of Grease	1	Just for the Berrings to keep them lubricated.
PPE such as: overalls, googles, safety glasses and steel toe cap boots	1 set of each	To protect the user while working on the system.
Compressor with the Nosal	1	To help clean the system as part of the maintenance, as using any cleaning chemicals could damage the system.
Cleaning chemicals	1	To clean any mess made round the workshop area this will help remove grease of the work bench if any does on it.

Task 1 – Risk Assessment

Hazard	Risk	control	Likely hood	severity
Working area when preparing for pre – preparation checks.	Slips, trips and falls on the hard floor or on to a sharp object causing personal injuries.	Ensure work area and floor is clear and tidy and there is nothing to trip on or have any object fall onto the floor as you are working and clean workspace as the work is being done.	1	4
Manual handling when carrying equipment.	Dropping the item on your foot or damaging your back.	If the item you are carrying is too heavy, ask for a hand and proceed with a two-man lift.	3	3

Hazard	Risk	control	Likely hood	severity
When working on the system.	Getting electrocuted while working on the PLC,s or wiring something up or even having exposed wires.	Switch the kill switch off, disconnect the power supply from the system, and turn the system off using the of button in the right side, and the off button to the left of the PLC, also to put sighs up to let people know not to touch the power as you are working and to use the electrical rubber insulated screwdrivers.	2	4

When working on the belt.	Hand and Fingers being crushed or cut while working.	Wearing gloves to try protect against sharp edges and to be careful when working and to use plies to prevent hands from becoming too close to the system and to keep hands and fingers away from dangerous spaces in the system.	2	3

Hazard	Risk	control	Likely hood	severity
Working with the compressor	Compressed air could get into the blood stream and overall cause harm to the body if used incorrectly	wear gloves while using the compressor And use it with caution.	2	3
Using grease and oil	Cause damage to the skin if left on which could lead to a rash or worse such as cancer and is cariogenic.	Wear rubber gloves while using and wash hands after use	1	4

Pneumatic air supply	If pumped up passed its limit could lead to it exploding and harm you and others around.	It has a pressure relace valve on top in red if pulled will release air never leave it pumped up and only pump it to what is needed never exceed the limit.	1	4

Hazard	Risk	control	Likely hood	severity
Cleaning chemicals used to clear the workspace around.	Could get into your eyes and blind you depending chemical you are using and if on skin could lead to burning or a rash.	Using it correctly and on the correct surface along with wearing PPE and gloves and washing hands after.	2	3

Task 2 Perform and record the maintenance activities

Assessment number (eg 1234-033)	8712-312
Assessment title	Mechatronic Occupational Specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	2
Evidence title / description	Completed test record sheets Updated maintenance record and control documents Annotated method statement Assessor observation (Practical Observation Form) Photographic evidence
Date submitted by candidate	DD/MM/YY

Task 2

Assessment themes:

- Health and safety
- Planning and preparation
- Systems and components
- Working with faults
- Reviewing and reporting

You must:

- prepare the work area for the maintenance activities
- perform the maintenance activities in accordance with the method statement and planning documents produced in Task 1. This should include:
    - decommissioning and inspection of the system
    - disassembly and reassembly of the system
    - diagnosing, and recording faults within the system, including carrying out appropriate tests
    - repairing the faults and replacing components as required
    - safely using the appropriate tools and equipment
    - recommissioning of the system
    - re-instating the work area
- record the maintenance activities, to include:
    - producing and completing test record sheets
    - updated maintenance records and control documents
    - annotating the method statement, including any recommendations for further investigation if required.

Additional evidence of your performance that must be captured for marking:
none

Candidate evidence

Task 2 – Test record sheet

What needs to be tested	What needs to be checked	What's the last problem it had.	How it was fixed
Conver belt	Whether the belt has slipped off or it slipping when running.	Belt slipped into sensor.	4mm hex key was used to undo the barring and then put the belt in the correct position and use two flat head steel screw drivers to put it back in place.
Wires	That they are all in the correct passion and checked with a multi-meter.	Output 3 blue wire was disconnected.	Checked the manual to see where it should be connected, and output 3 blue wire should connect to (E) and was done by using an elections flat head screwdriver.
Pnuematic actuators	That they are correctly on time and that if they are touching the Conver belt need adjusting at all.	Touching the Conver belt and slightly out of time so sometimes would miss contact with the small parts.	By adjusting the hight and moved slightly to the left using a flat head screwdriver.
S1 and S2 sensors.	That it is functioning and working as it should.	S1 was picking up the small and tall parts instead of just the tall.	S1 height was slightly adjusted using a flat head screwdriver on both sides.

What needs to be tested.	What needs to be checked.	What's the last problem it had.	How it was fixed.
PLC	The code on the PLC	None no problem was with the code	N/A nothing needed fixing.

Task 2 – Updated maintenance record and control documents

Candidate name	**xxx**
Candidate number	xxx
Date	02/05/24
Provider name	xxx
Provider number	xxx
Assessment Number	8712-312
Assessment Title	MIR Mechatronic Occupational Specialism
Task	Task 2

Maintenance Schedule and Records

Equipment/System type	**Identification No.**
Conveyor belt system	8712-312
Brand/Model	**Location**
City & Guilds	Workshop

Equipment/System specification
When in normal operation, the conveyor belt system assembly shown in Figure 1 should function as follows: • The conveyor belt is driven by a motor, at the front, controlled by a PLC (figure 3). • A mechanical tensioning idler device is positioned within the belt loop to maintain operational tension. • Sensors are located and monitored by the PLC programme for the alignment of the belt. • 4mm Hex bolts are located at the back of the system on either side which realign belt and adds tension. • Control Panel houses the buttons to operate; ○ the stop and forward belt operation. ○ Green button – when pressed the belt will start rotating anti-clockwise and the belt will move in the forward direction via a pre-programmed PLC ○ Red button – when pressed the motor will stop and the belt will become stationary ○ LEDs red and green indicate, which sensor has been activated and faults within the system will either make them flash or stay on. • Sensor S1 and S2– detect tall and short parts moving along the belt.

- MS Sensor 1 and 2 - monitors the belt alignment and go off when in direct contact with the belt.
- RED LED will illuminate if a tall part is detected on the belt.
- Once the part has moved in line with cylinder 1 and parts bin 1, the part will be pushed into the bin via a pre-programmed PLC.
- GREEN LED will illuminate if a short part is detected on the belt.
- Once the part has moved in line with cylinder 2 and parts bin 2, the part will be pushed into the bin via a pre-programmed PLC.
- Both LEDs will flash if misalignment is detected by the MS Sensors.

Maintenance records

Service No	Maintenance date	Maintenance type (scheduled/routine, fault/repair,)	Checked by	Repair details (where relevant)	Maintenance Engineer - signature
01	20/4/2022	Routine	JS	no faults or repairs required. System functionality as per specification.	J Smith
02	28/5/2023	Scheduled/routine + Fault/repair	AB	Replaced belt as broken Replace jack screw	A Bloggs
03	25/4/2024	Scheduled/routine + Fault/repair	AM	S1 Sensor altered, belt realigned, and a blue output 3 wire put in the correct connection. Along with C1 raised in height and moved slightly.	
04					
05					
06					

Maintenance Schedule – annual unless specified otherwise

Service No	Year	Detail inspection	Recommended planned maintenance	Maintenance Head Engineer signature	Maintenance Engineer signature
01	2022	Annual	Annual - routine/scheduled	D Jones	J Smith
02	2023	Annual	Annual - routine/scheduled	D Jones	A Bloggs
03	2024	Annual	Annual - routine/scheduled	D Jones	
04					

05					
06					

Commentary	
Service No	Recommendations for future maintenance activity
	To clean the system with an air gun, including clean rags after Maintenace is complete to keep the system from collecting dust this could eventually lead to the PLC or other components breaking down over time if not.
	Not to take out the hex bolts all the way just till you are able to move the belt back in position if you need to realign the belt.

Task 2 – Annotated method statement

Maintenance plan

Premaintenance checks

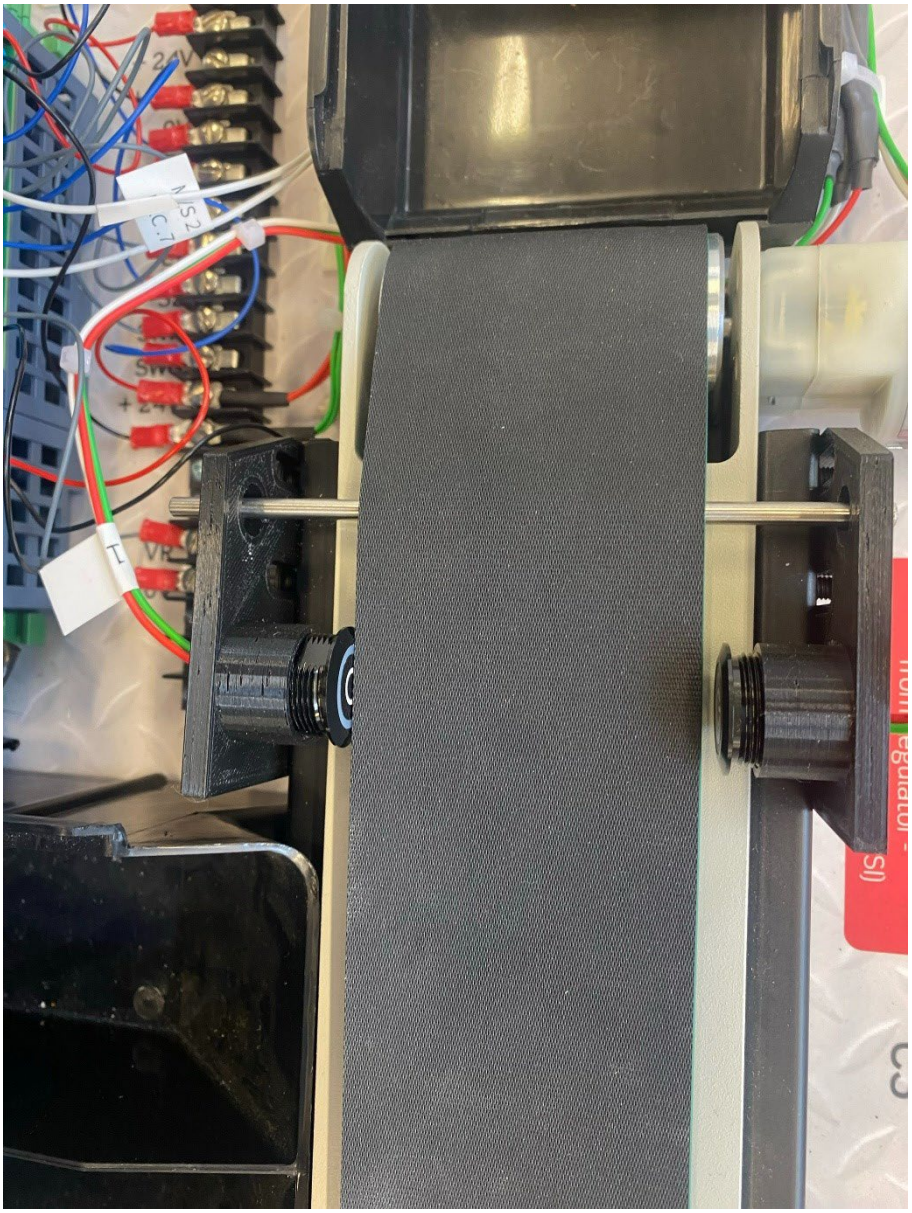
first Step

I shall carry out is obtaining the required PPE (gloves, safety, glasses, steel toe cap boots and overalls) Then I will continue to check over PPE ensuring the quality of the garments and that they are up to standard of completing this task, if any damages to the PPE are found this would be noted down and then reported to the appropriate people and new PPE to be inspected and put on. Once checked and the PPE is on, we can safely enter the workspace. Once Permision was granted I then did enter the working area, I headed to the work bench where the conveyor belt system is. I will check the area by doing a visual inspection of the area to make sure it is clear and safe for work to start. If necessary I will collect the right cleaning stuff, and make sure to put things such as electrical components in the WEEE bin, COSHH (control of substances hazardous to health) products such as cleaning products back in a COSHH cupboard, I shall also make sure there are not any tools lying around to prevent accidents such as slip, trips and falls. And of course, I will follow all the PPE in HASAWA regulations and make sure any necessary work permits are good to go, if needed and ask for permission to work.

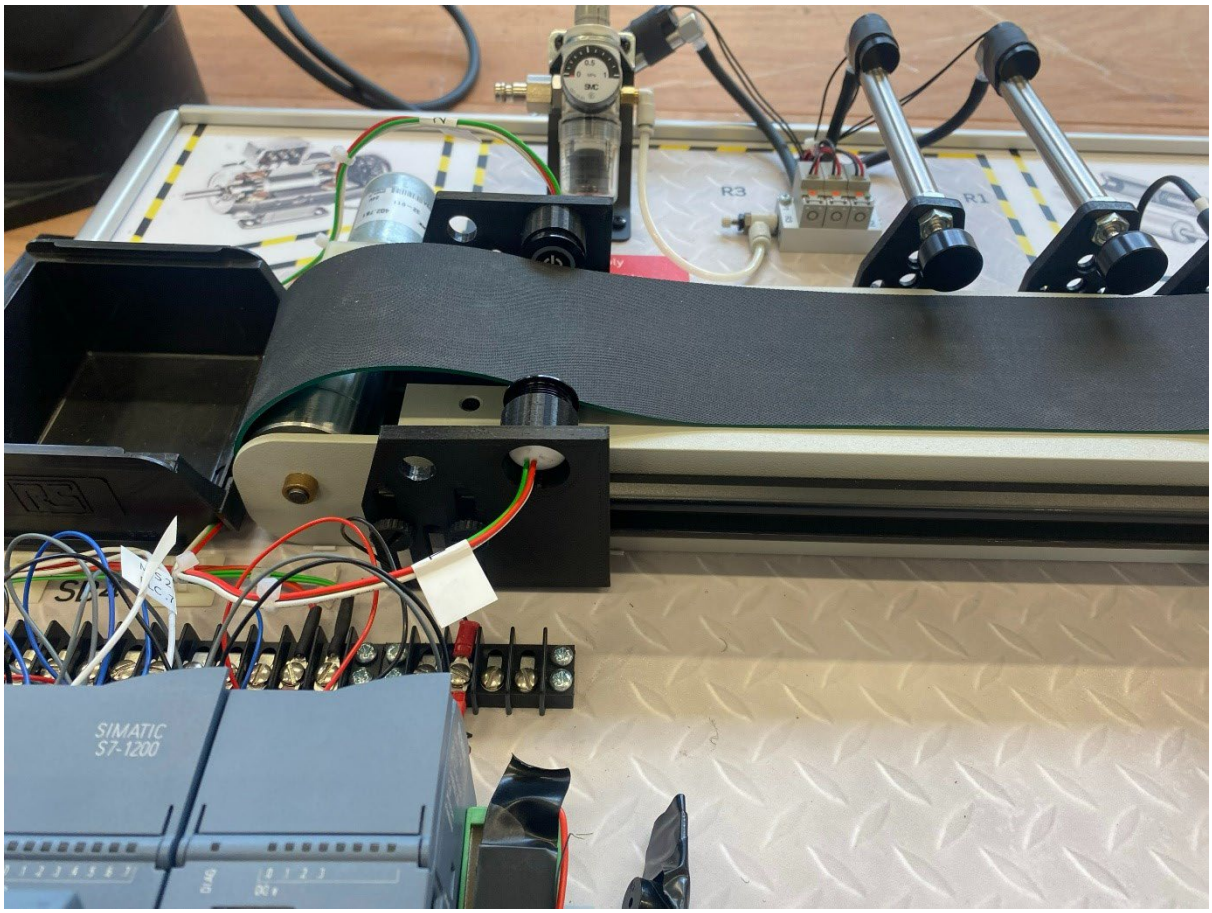
Undertaking the maintenance activity

Second step

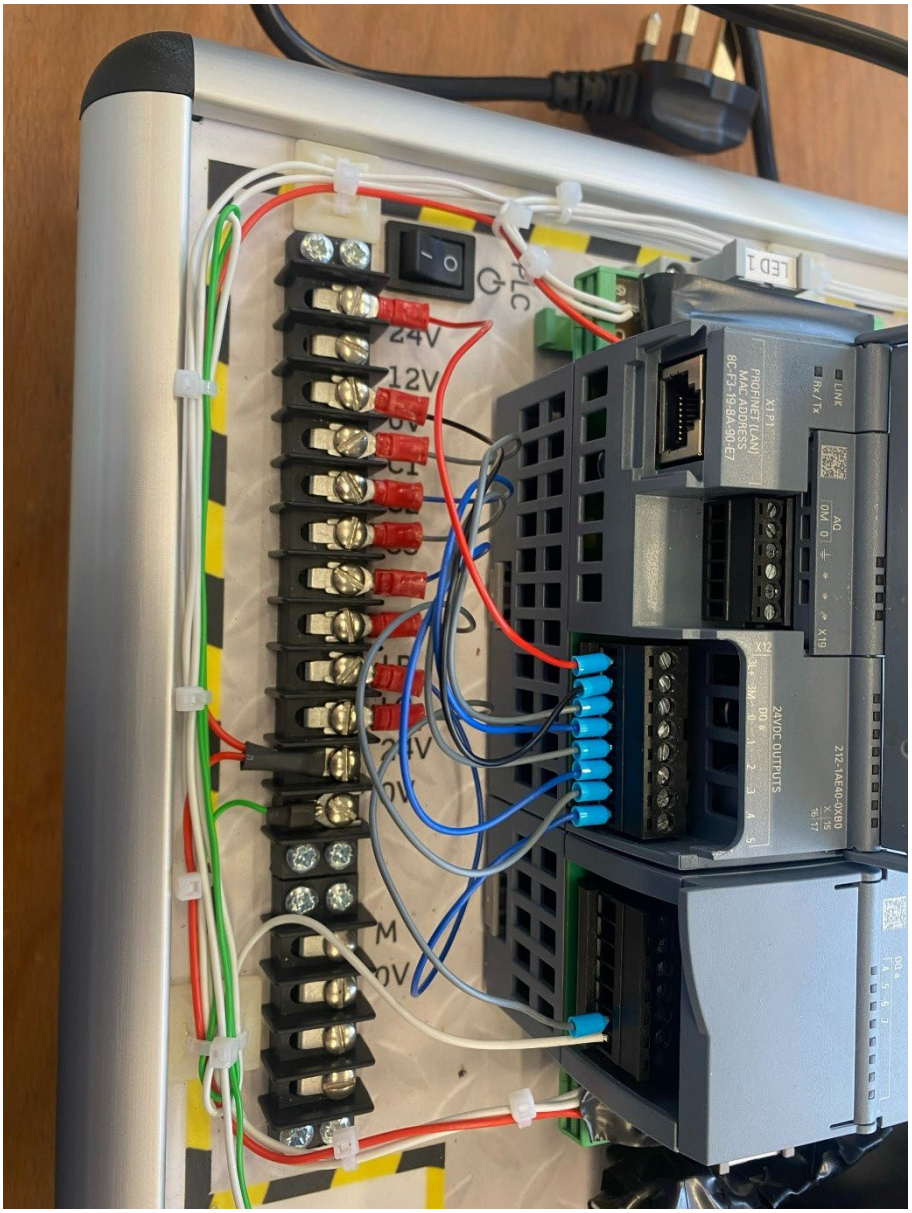
To start the maintenance work, the system was already on, and the alarm was going on loudly so to avoid not hearing anything else which could have been a hazard so I unplug the power supply and lock it off, if possible, then disconnect the pneumatic air supply and turn the system off using the of button in the right side, and the off button to the left of the PLC as the system would not run as it was. Also to stop the alarm going off, then checked the system with a Muli-meter to see if the system was dead to then be able to safely work. After I looked over the system checking the condition it was in and, for hazards that I could avoid and to see what was out of place, such as the wire from output 3 that was not connected to anything which I found out was why the system would not run along with the Conver belt that has slipped into the belt sensor.



I then fixed these issues first with the Conver belt by undoing the hex 4mm bolts on each side



and then relining the belt and putting the Berring with the belt in the correct position back on using two flat head steel screwdriver and putting the roller back in then the 4mm hex key to screw it back on in place. Then I fix the wiring by looking in the manual and seeing that output 3 blue wire connects to (E) on the board.



Then I was able to carefully look over the conveyor belt system, checking its overall condition now and looking for any more things I may have missed I then plugged in the power cord and connect the pneumatic air supply to the pressure regulator then run a program on the laptop and connect it to the PLC using an ethernet cable to see how exactly it is currently running on the program and check the control console, computer and plc for any signs of faults while also listing to see if I can hear any weird noises and vibrations. And there was no issue with the motor or Conyer belt and then use different fault-finding methods such as: normal, reverse, strike-slip, and oblique. to find and diagnose any problem with the system also using the muti-meter if needed to further find the issue. And found that the S1 (sensor) was picking up small and tall parts instead of just tall parts. And found that C2 (pneumatic

actuator two) was touching the Conver belt and that C1 and C2 was firring a bit late causing them to sometimes miss the tall and small parts. This step took around 80 minutes which was unexpected but necessary.

Third step

Once I founded out about the issues using the laptop and testing the system, I unplugged the power supply and lock it off, if possible, disconnect the pneumatic air supply and turn the system off using the button on the right side, and the off button to the left of the PLC, also to put sighs up and to let people know not to touch the power while I work on it, to avoid the possibility of being electrocuted, following the LOTO procedures. start by giving the system a good clean using clean rags as part of the maintenance routine. This helps prevent any dust or debris from causing problems when I perform the Maintenace to C1 and C2 and the S1 sensor with that. And clean those key parts using compressed air to ensure no further damage to the parts while cleaning as cleaning chemicals could damage the system. After I will visually check the conveyor belt components and wiring to make sure everything is connected properly to the PLC and there is no damage or signs of wear and tear. I did not spot anymore issues with the wiring or the system, If I did, I would have made a note and order replacement wiring of the same wires used as in the specs of the manual. Grease was no longer needed as the system did not use any as in the specs of the manual it did not say whether it did or did not. and follow the IET guidance this procedure took 68mins to complete.

Fourth step

I began by inspecting the belt to make ensure there is just the right amount of tension on it. If the tension is off - either too little or too much - it can lead to belt slippage, improper tension, and not enough traction and could lead to vibrations. This imbalance can also put strain on the belts, resulting in noisy squealing and grating sounds. To fix this, I followed the manual's instructions and adjusted the belt using a 4mm hex key to correctly move it to have more tension. Then I fixed the S1 issue by using a flat head screwdriver and adjusting the height of both sensors. After I fixed the issues with C1 and C2 by using a flat head and adjusting them slightly to the left more on both and just for C2 the height, so it no longer torched the Conver belt. This task took 70 minutes

Fifth step

After I retested the system to check it all runs okay and it did, then went over the entire system and, including the assemblies and sub-assemblies, to check for tightness and security. And to see if I missed anything which I did not. And this took 13 minutes.

Task 2 – Assessor Observation – Practical Observation Form

8712-312 Maintenance Engineering Technologies: Mechatronic - summer 2024

Candidate Name	**Candidate number**
xxx	xxx
Provider name	**Date**
xxx	25/04/24

Complete the table below referring to the relevant marking grid, found in the assessment pack.
Do not allocate marks at this stage.

This observation must cover	Assessor observation should include:	Assessment Themes
Work area preparation	• The work area preparation.	• Health and Safety • Planning and Preparation • Systems and Components
Service and maintenance activities	• decommissioning and inspection of the system • disassembly and reassembly of the system • diagnosis and recording of faults within the system, including carrying out appropriate tests • repairing the faults and replacing components • use of tools and equipment • recommissioning of the system • re-instating the work area.	• Health and Safety • Planning and Preparation • Systems and Components

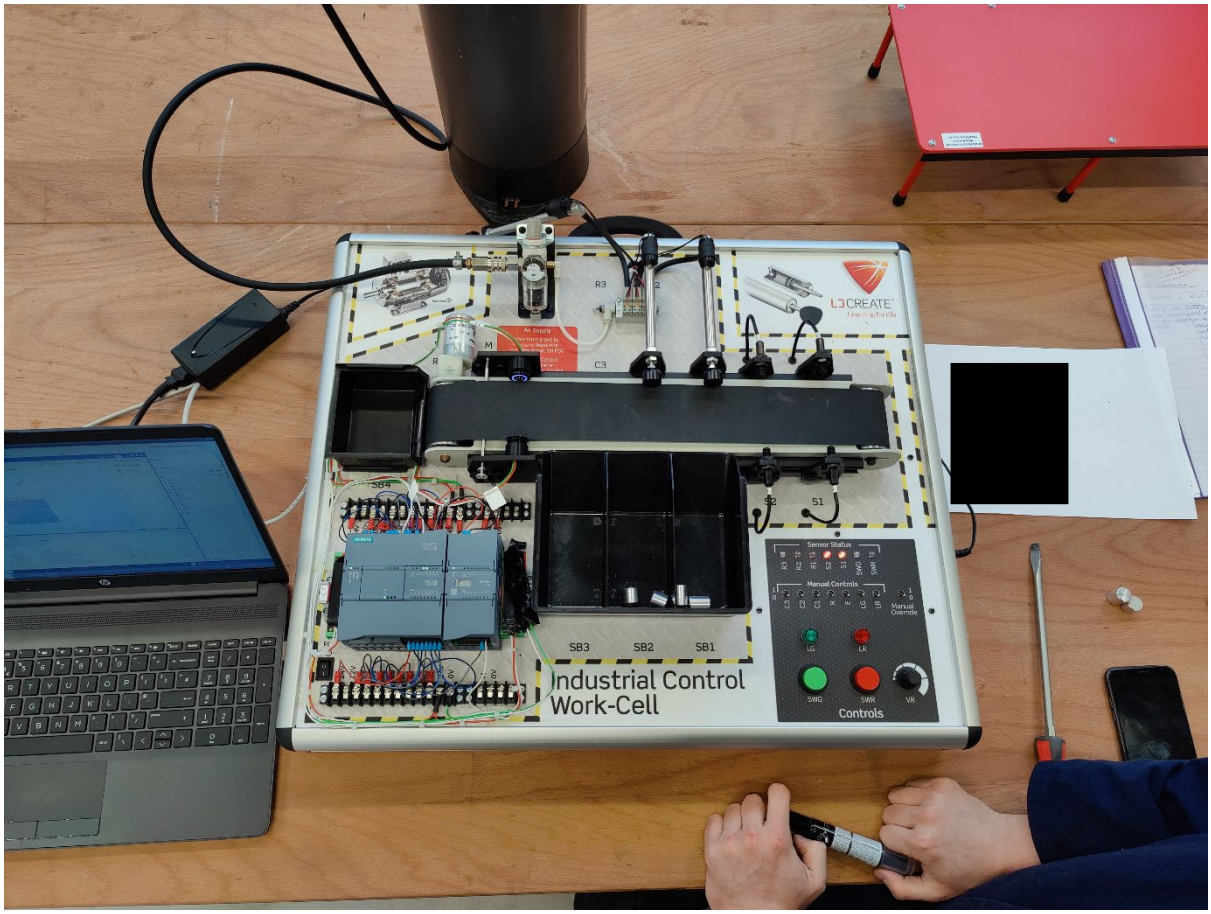
Notes – *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Work area preparation: -Ensured area is free from debris and isolated the system which reset the alarm/ buzzer. **Maintenance activities:** • Decommissioning and inspection of the system

- Disassembly and reassembly of the system
- Diagnosis and recording of faults within the system, including carrying out appropriate tests
- Repairing the faults and replacing components
- Use of tools and equipment
- Recommissioning of the system
- Re-instating the work area.

-making use of the manual to double check all of the connections on the PLC
-identified motor fault being a lose connection from the PLC
-making good use of the whiteboard to make notes
-good use of the pictures to identify current state of the rig
-dismantling belt idler using correct tools in a safe manner with system isolated
-continuing with activities currently struggling to get idler back into place
-small parts set out in an organised manner
-belt idler reinstalled thus rectifying belt idler misalignment
-jotting down notes on how each fault has be solved on the whiteboard
-using the laptop to connect to the PLC to check the programme is running correctly
-thus far activities have been performed at a high standard he has been methodical in the way in which each step has been undertaken
-system functions correctly after testing

Internal assessor signature	**Date**
xxx	xxx

Task 2 – Photographic Evidence

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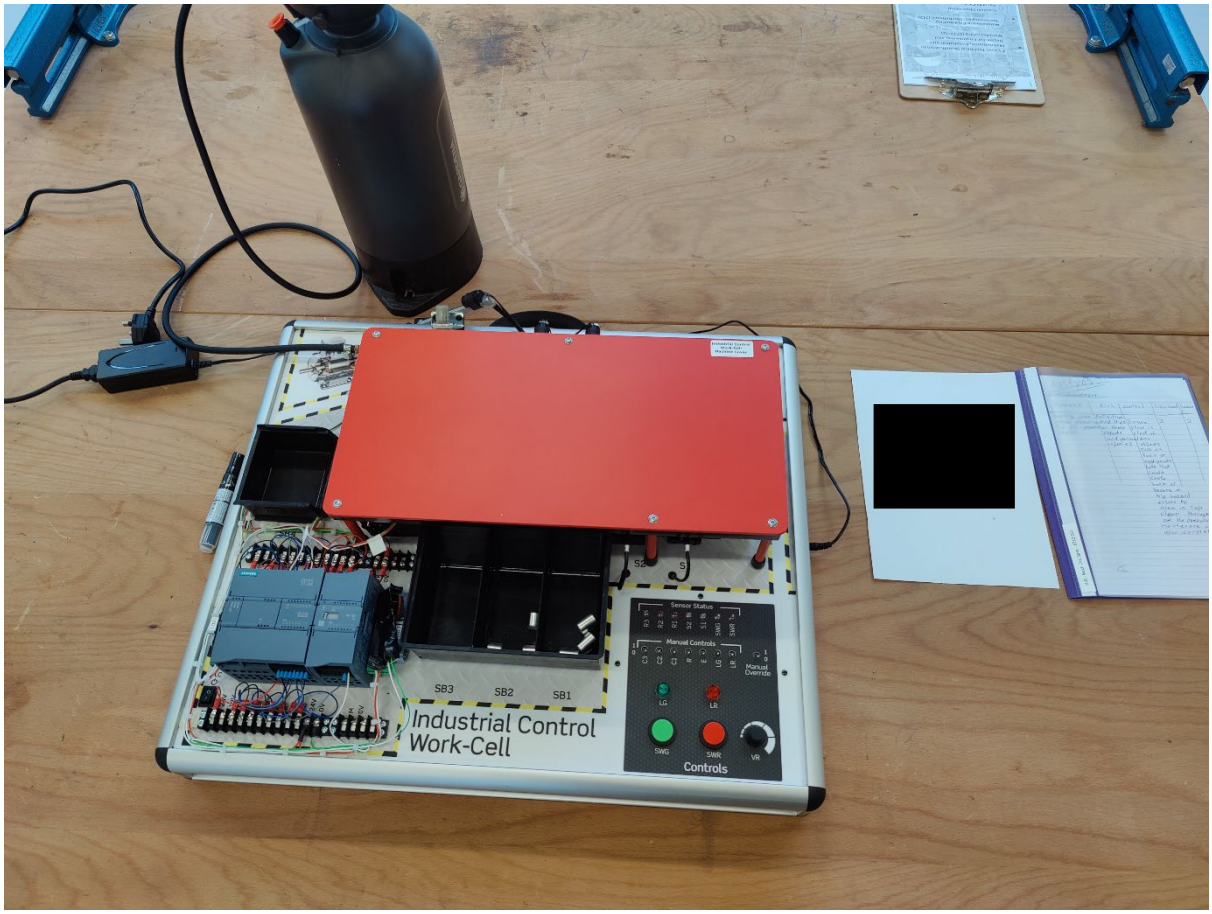
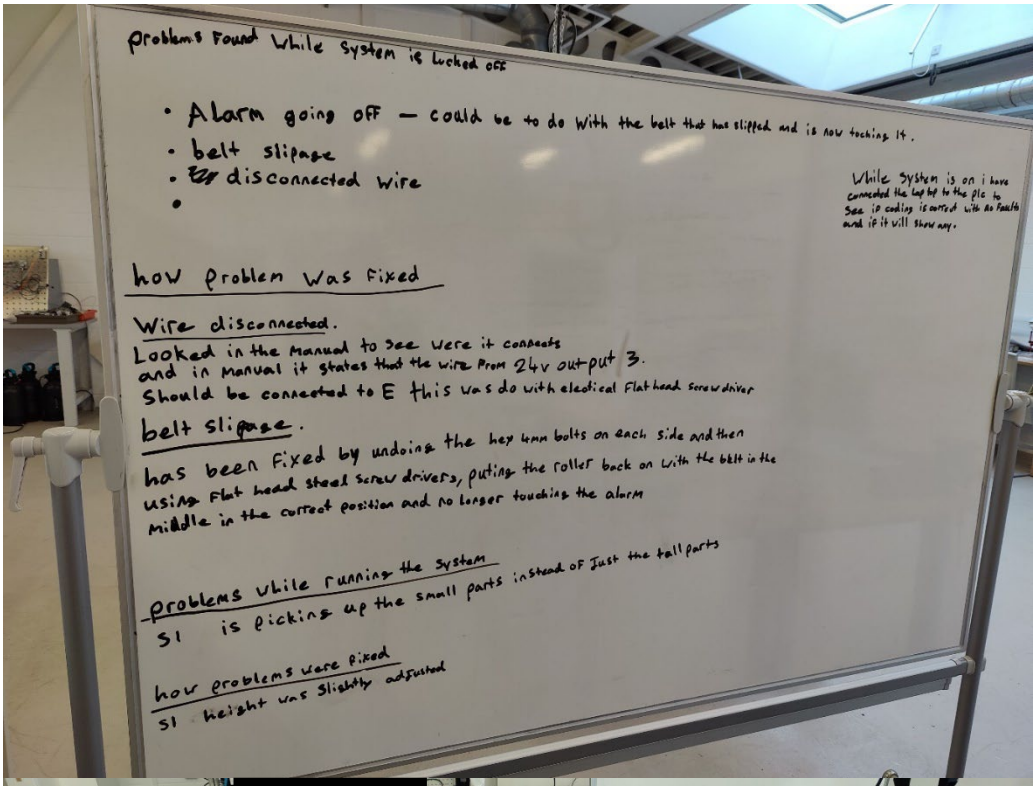
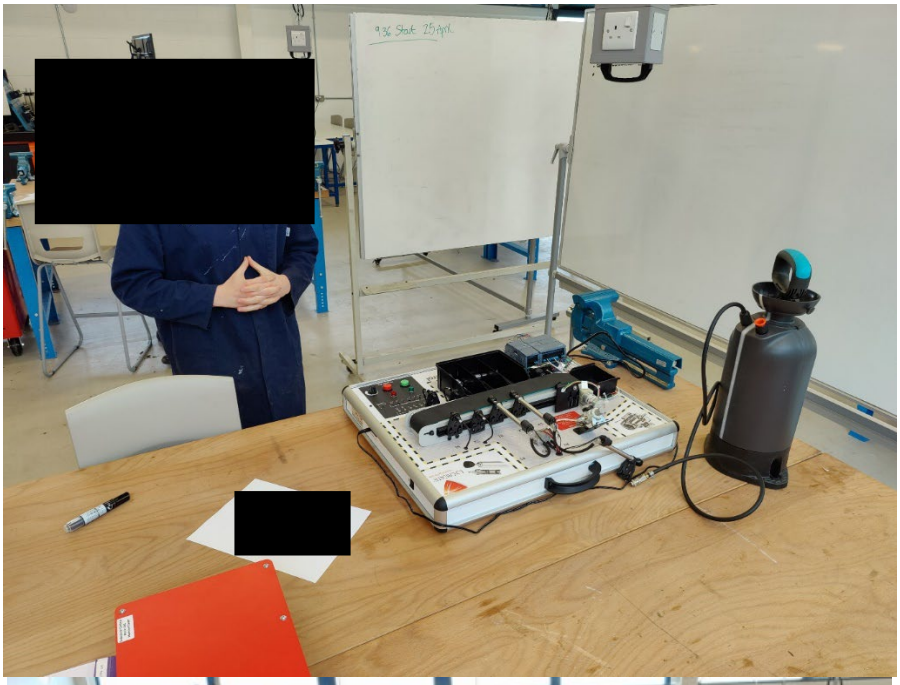
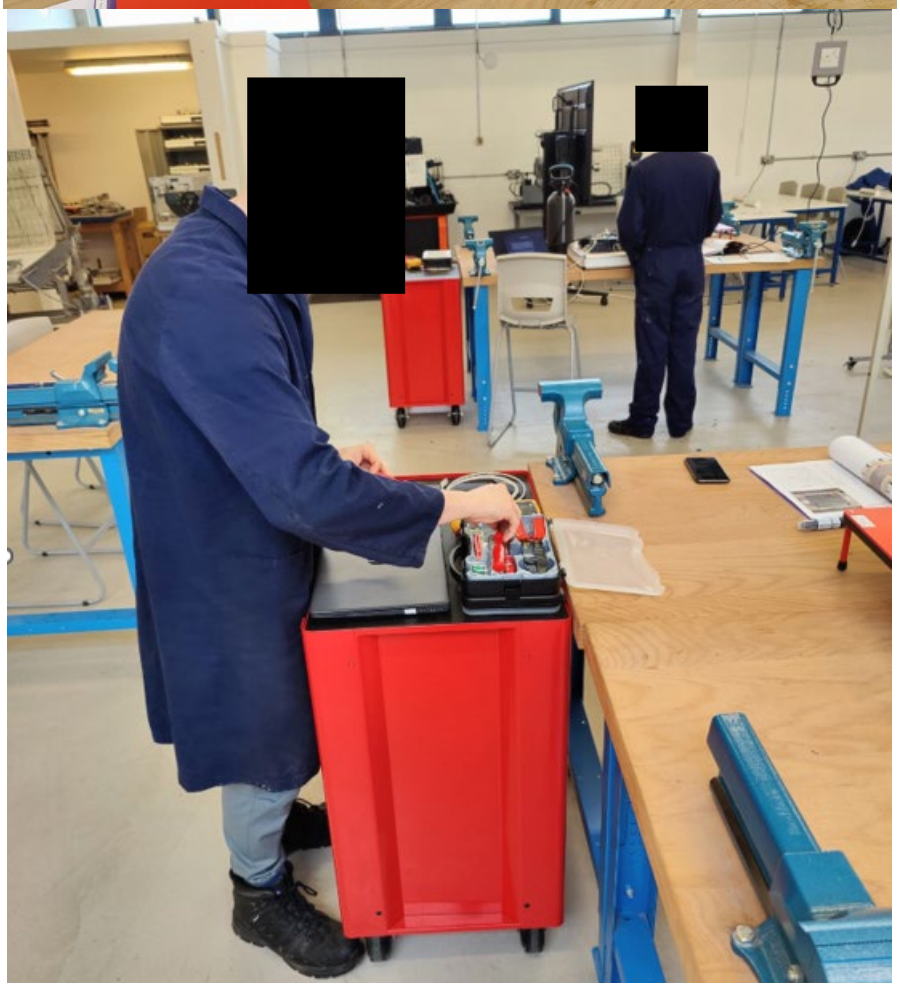
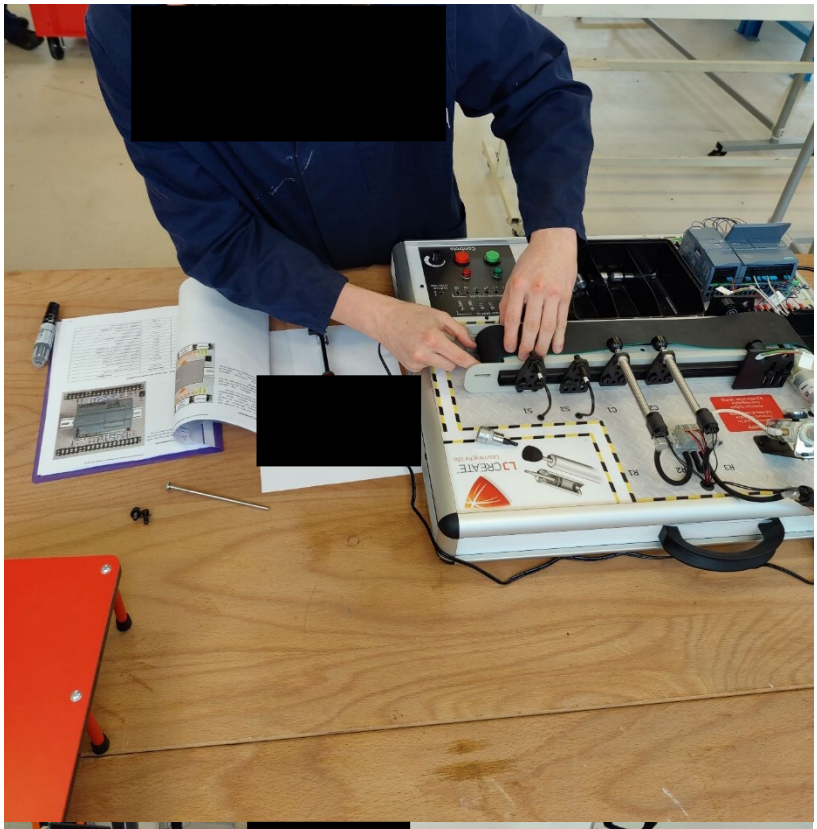
PROFESSIONAL

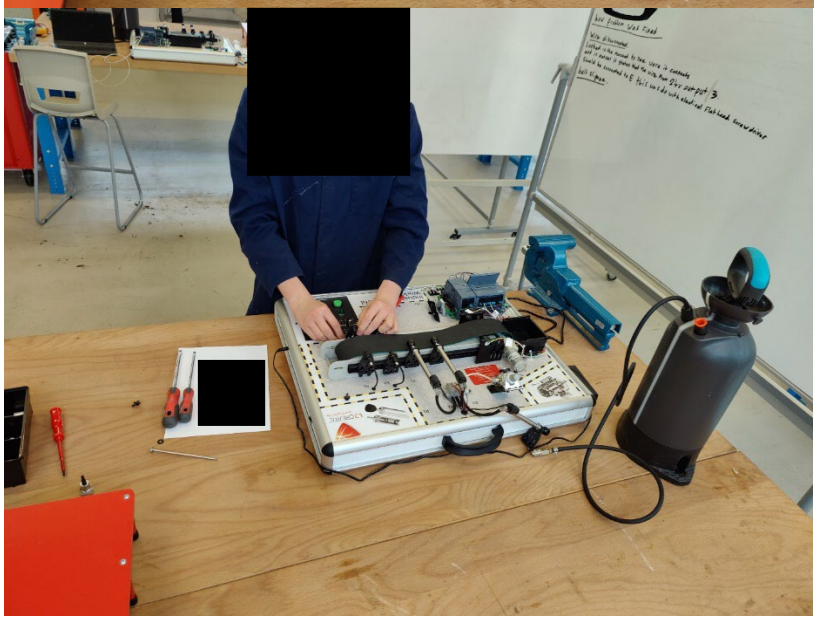

SB3
SB2
SB1
Industrial Control
Work-Cell
Sensor Status
Manual Controls
Manual Override
LG
LR
SWG
SWR
VR
Controls

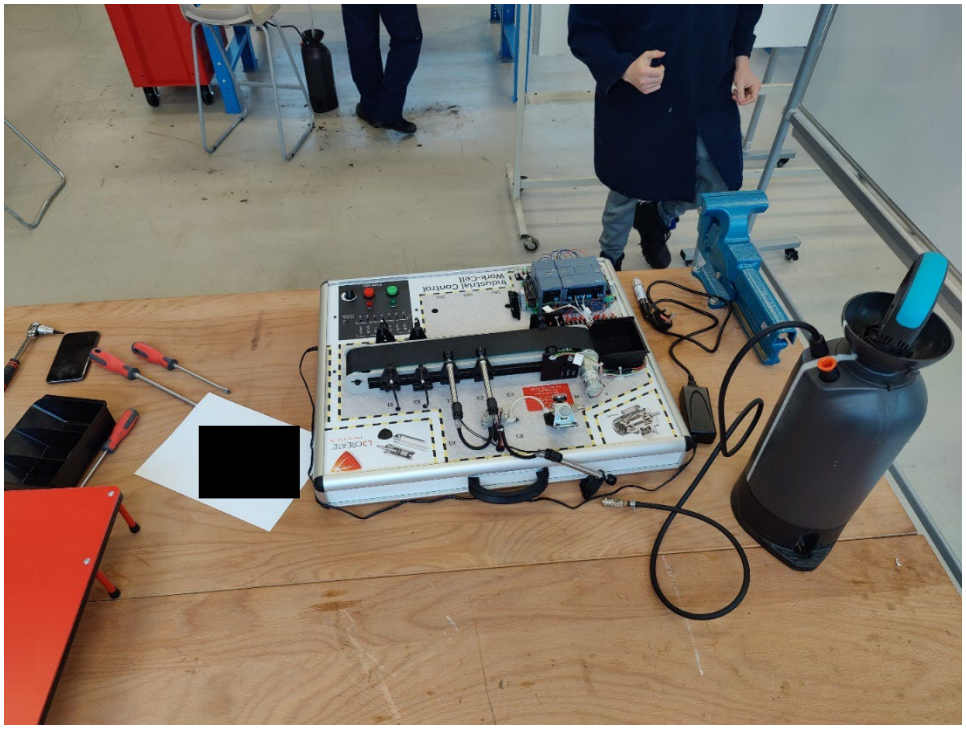

Problems Found While System is Locked off
• Alarm going off — could be to do With the belt that has slipped and is now touching it.
• belt slipage
• disconnected wire
•
While System is on i have connected the laptop to the plc to See if coding is correct with no faults and if it will show any.
how problem Was Fixed
Wire disconnected.
Looked in the Manual to See were it connects and in manual it states that the wire from 24v output 3.
Should be connected to E this was do with electrical Flat head screwdriver
belt slipage.
has been Fixed by undoing the hex 4mm bolts on each side and then using Flat head steel screw drivers, puting the roller back on with the belt in the middle in the correct position and no longer touching the alarm
problems while running the system
S1 is picking up the small parts instead of just the tall parts
how problems were fixed
S1 height was slightly adjusted

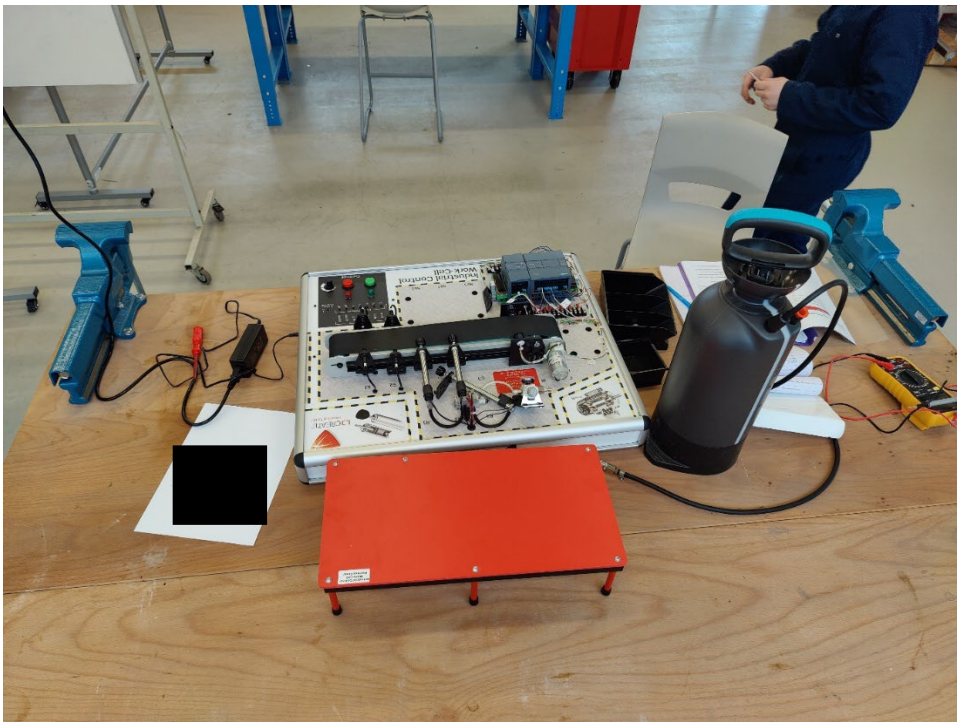



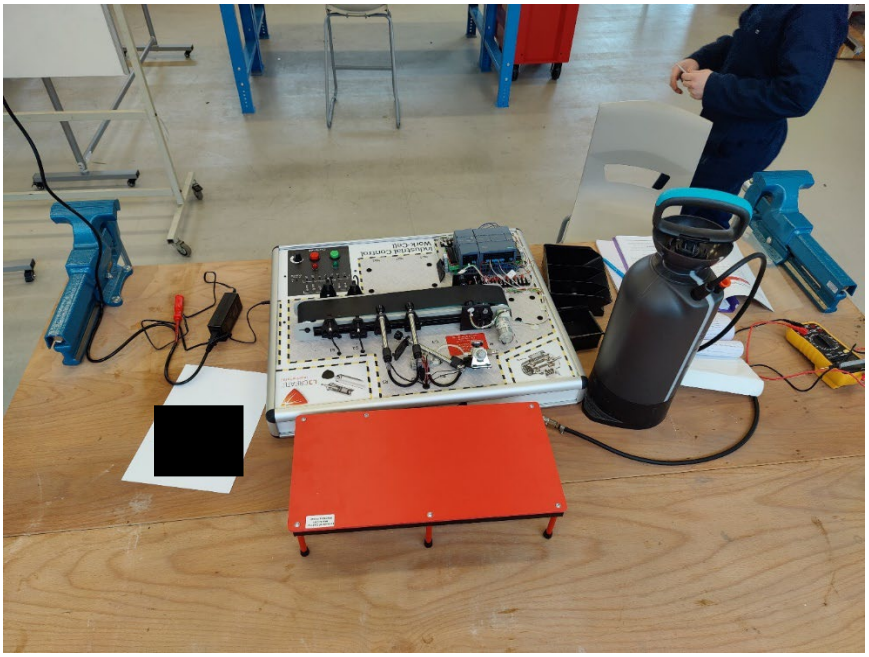


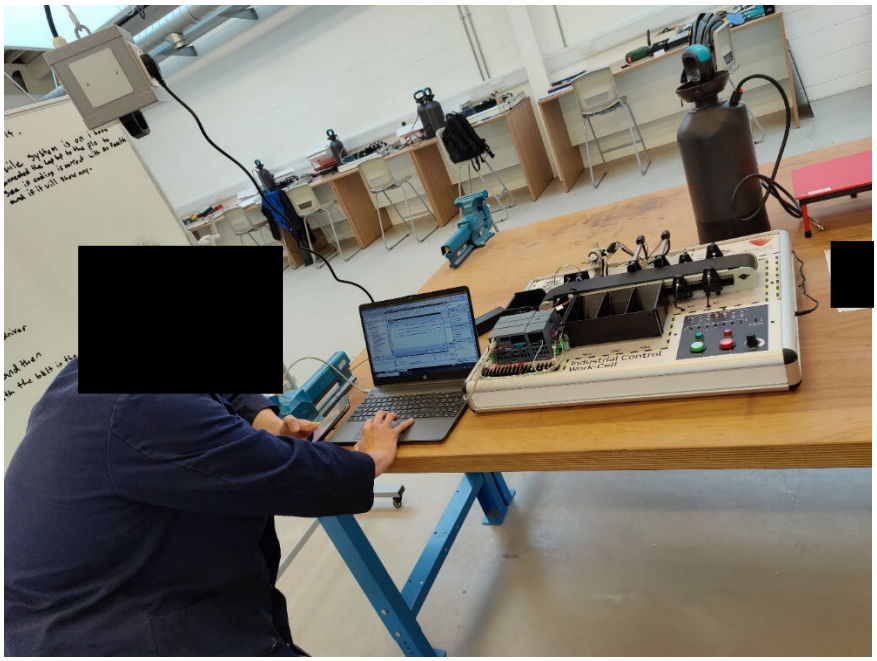


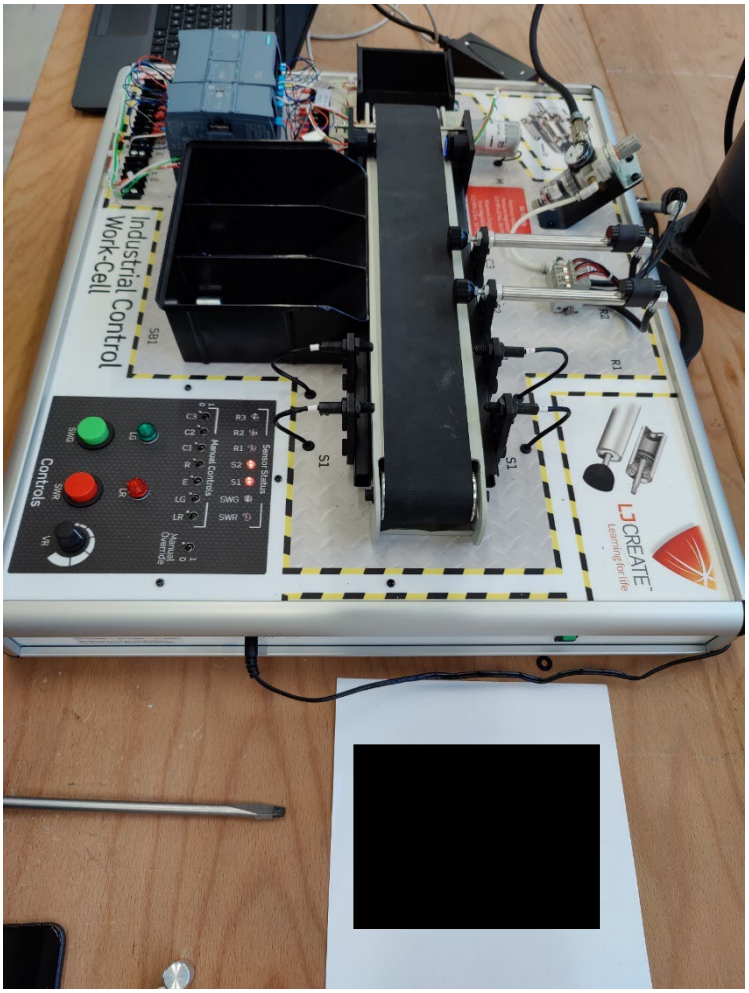


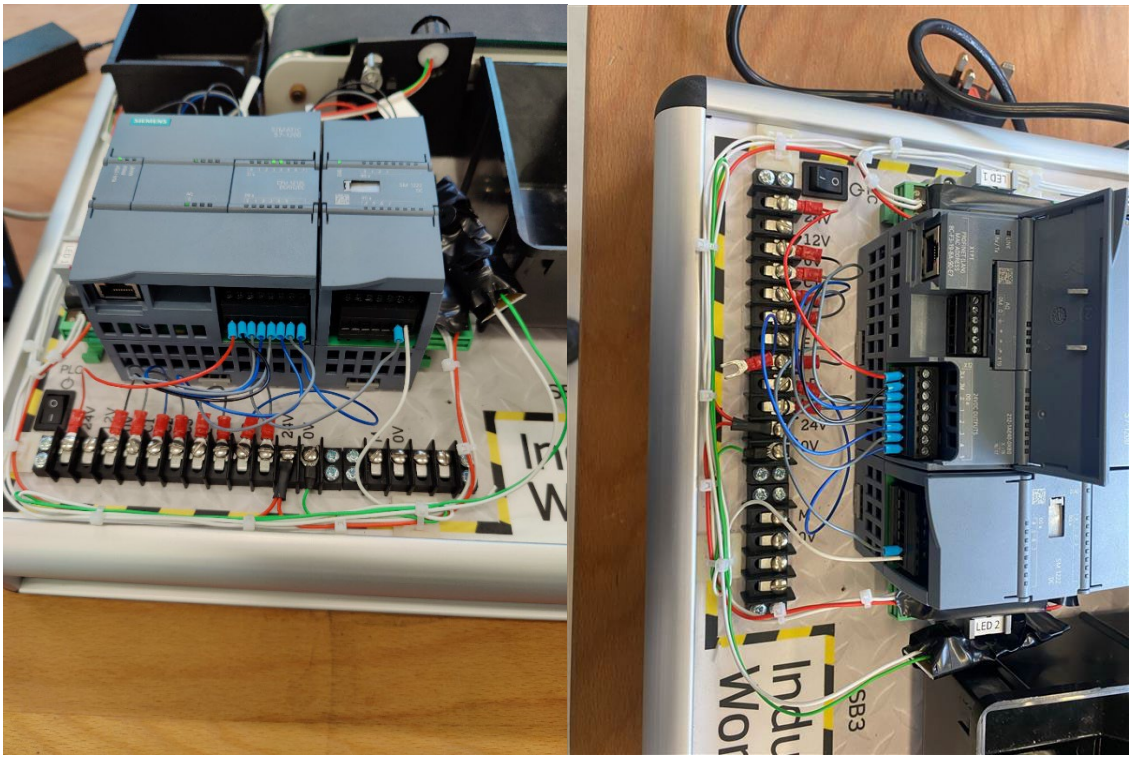






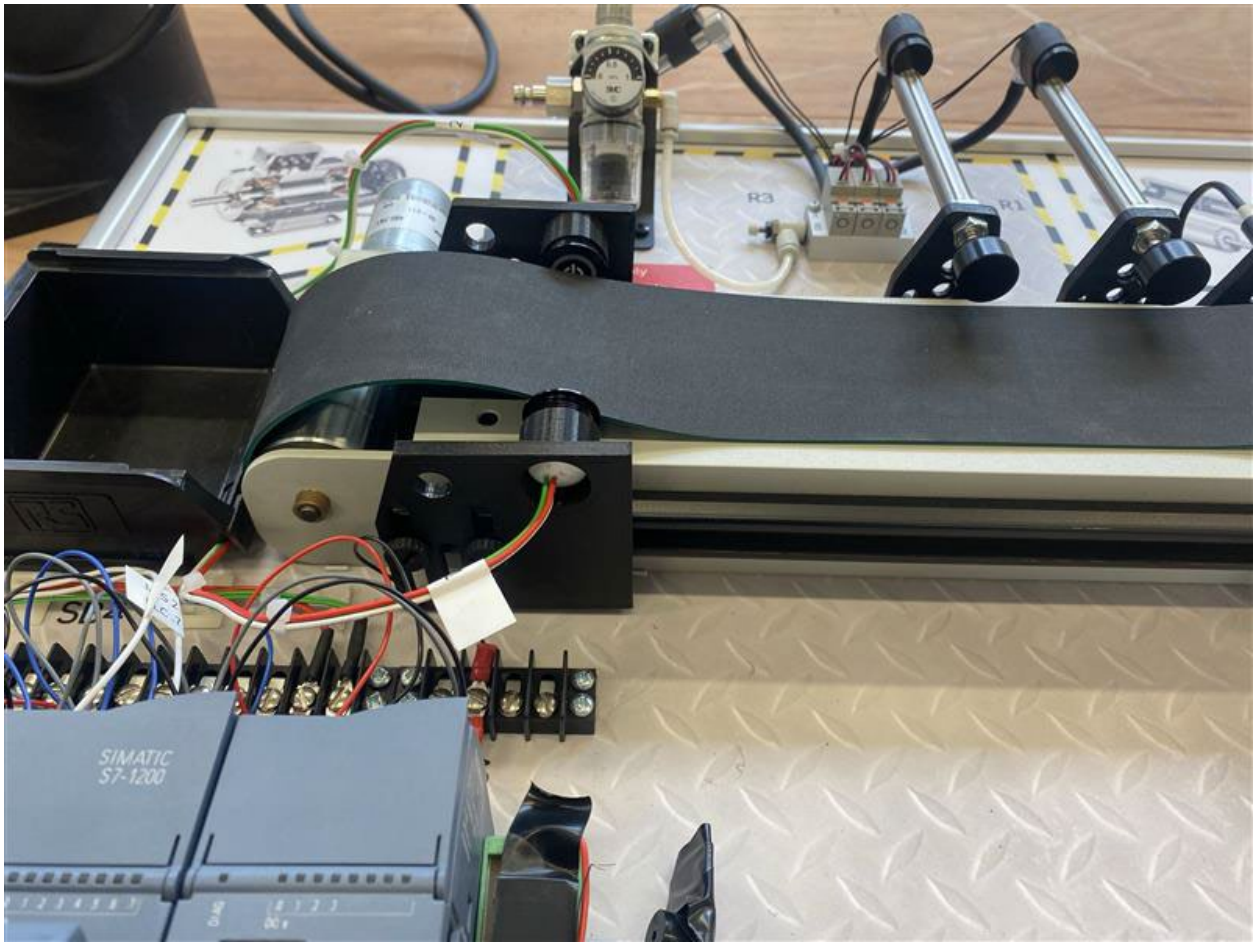



Industrial Control
Work-Cell
Controls
SWR
LR
VR
LG
Manual Controls
Manual Override
Sensor Status
SWG
SWR
S1
S1
R1
LJCREATE
Learning for life

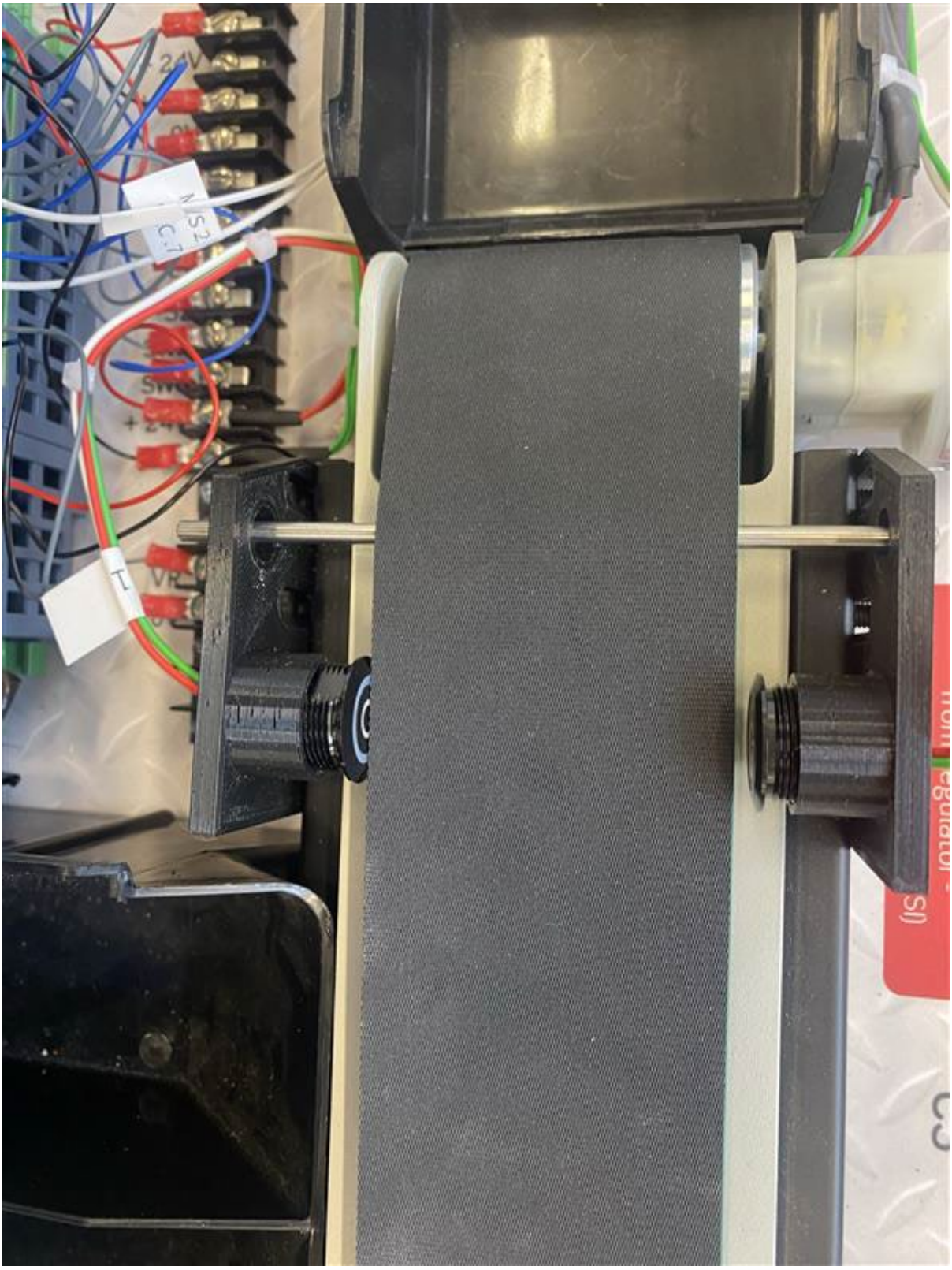

SIEMENS
24V
0V
12V
LED1
LED2
SB3


S2
S1
0
1
C3
C2
C1
R
L
LG
LR
R3
R2
R1
S2
S1
SWG
SWR
Manual Controls
Sensor Status
LR
Manual Override
1
0


Siemens
Air Supply
Maximum Input to
Pressure Regulator -
0.6 MPa (6 bar, 90 PSI)
Maximum Output
from Regulator -
0.2 MPa (2 bar, 30 PSI)
M
C3
C2
P1
R3
SMC

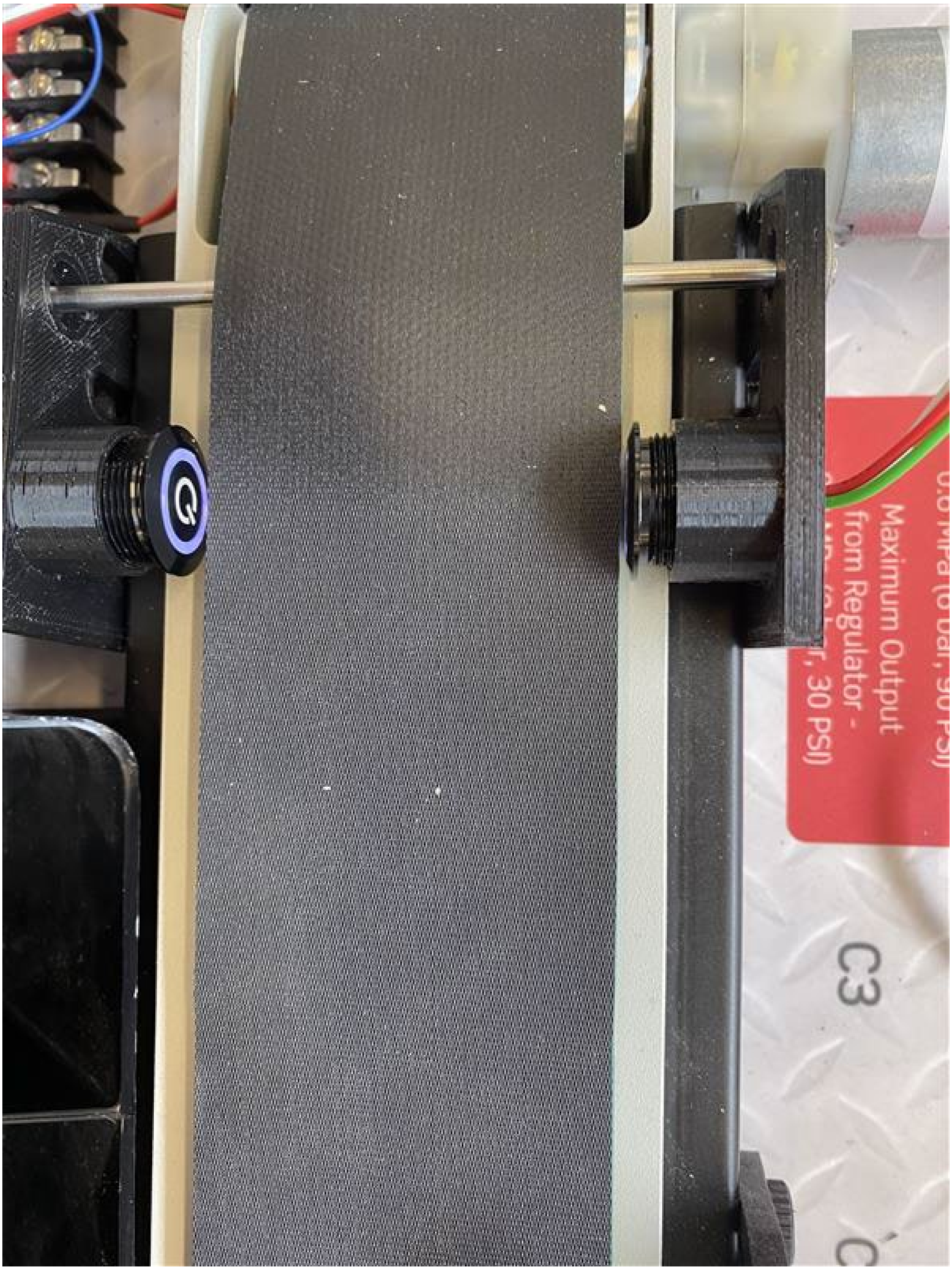

SIMATIC
S7-1200


S2
S1
R1
CREATE
Learning for life

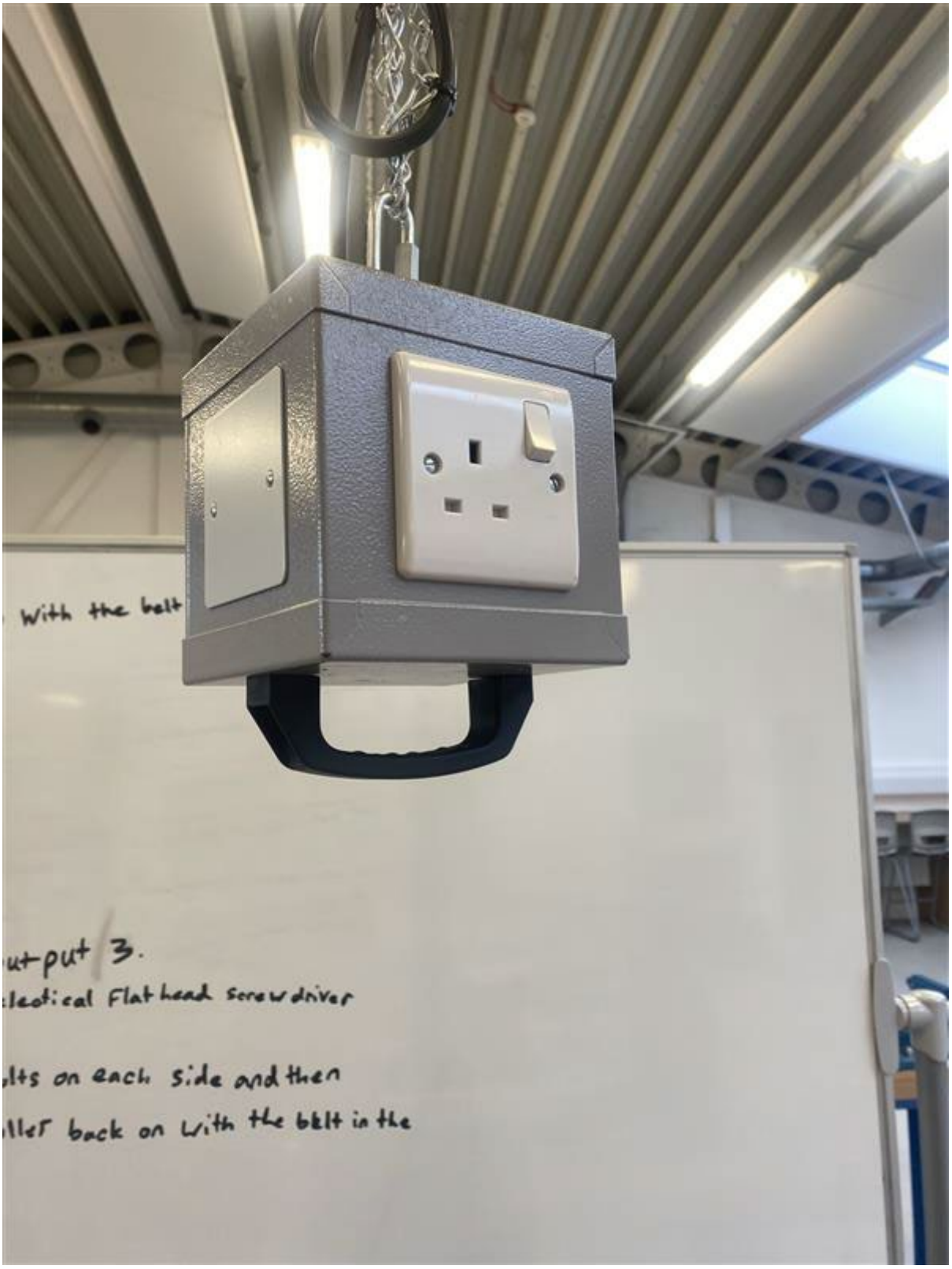



24V
0V
M
0V
R3
R2
S1
LG
LR
C3
C2
C1
R
E
LG
LR
Manual Controls
R3
R2
R1
S2
S1
SWG
SWR
Sensor Status
Manual Override
LJ CREATE
Learning for life

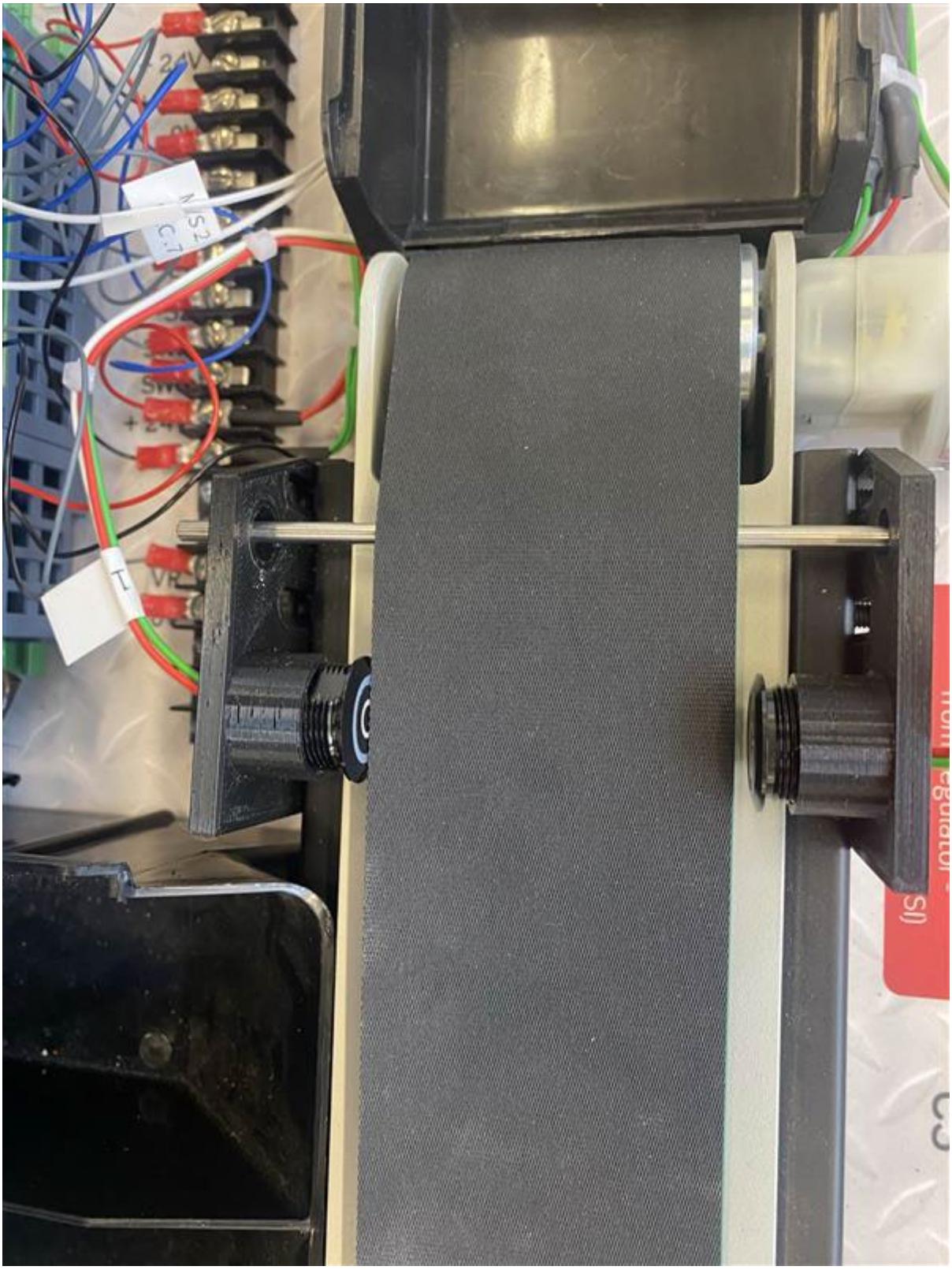

HEUER
FRONT

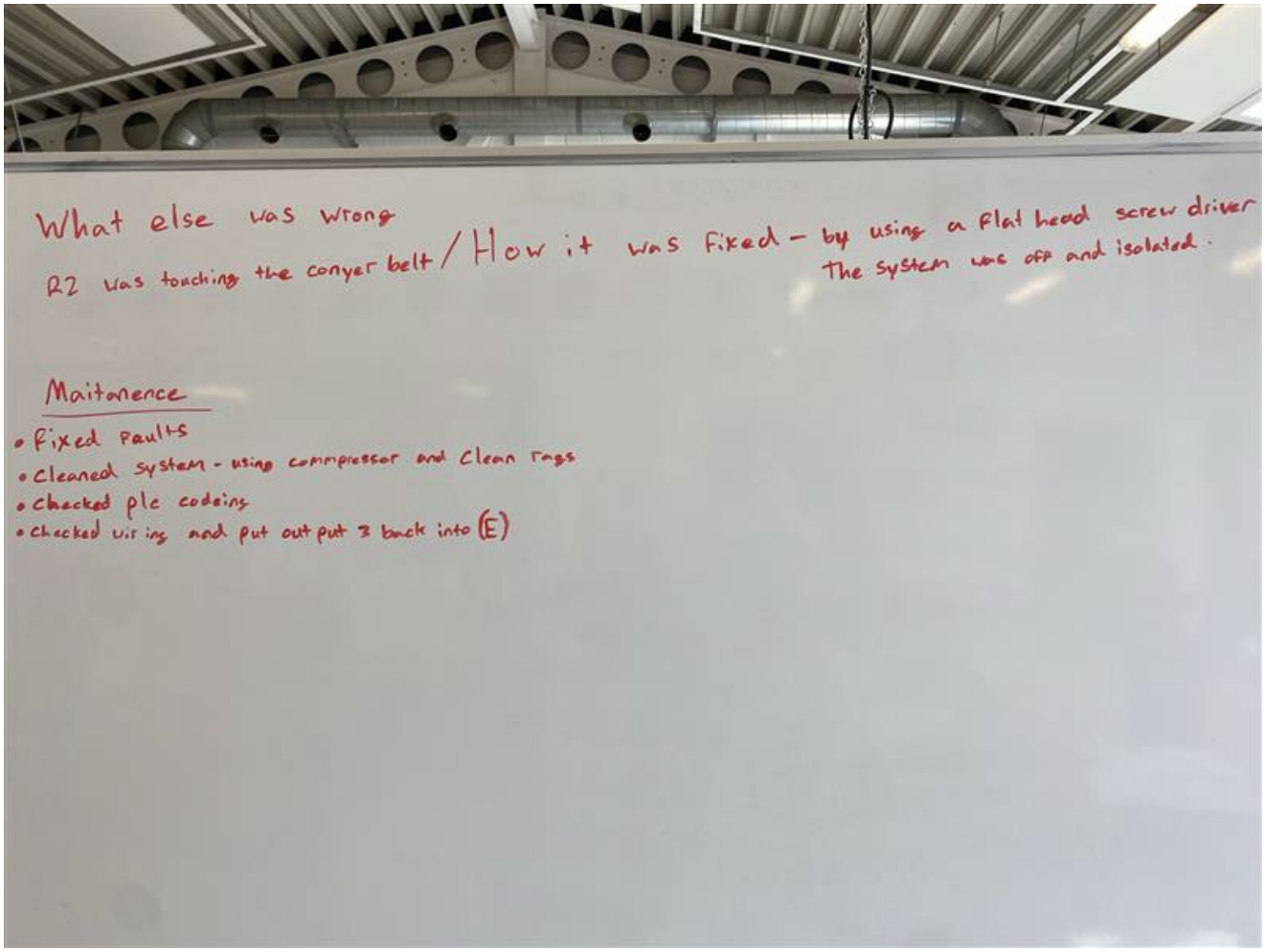

Maximum Output
from Regulator -
C3

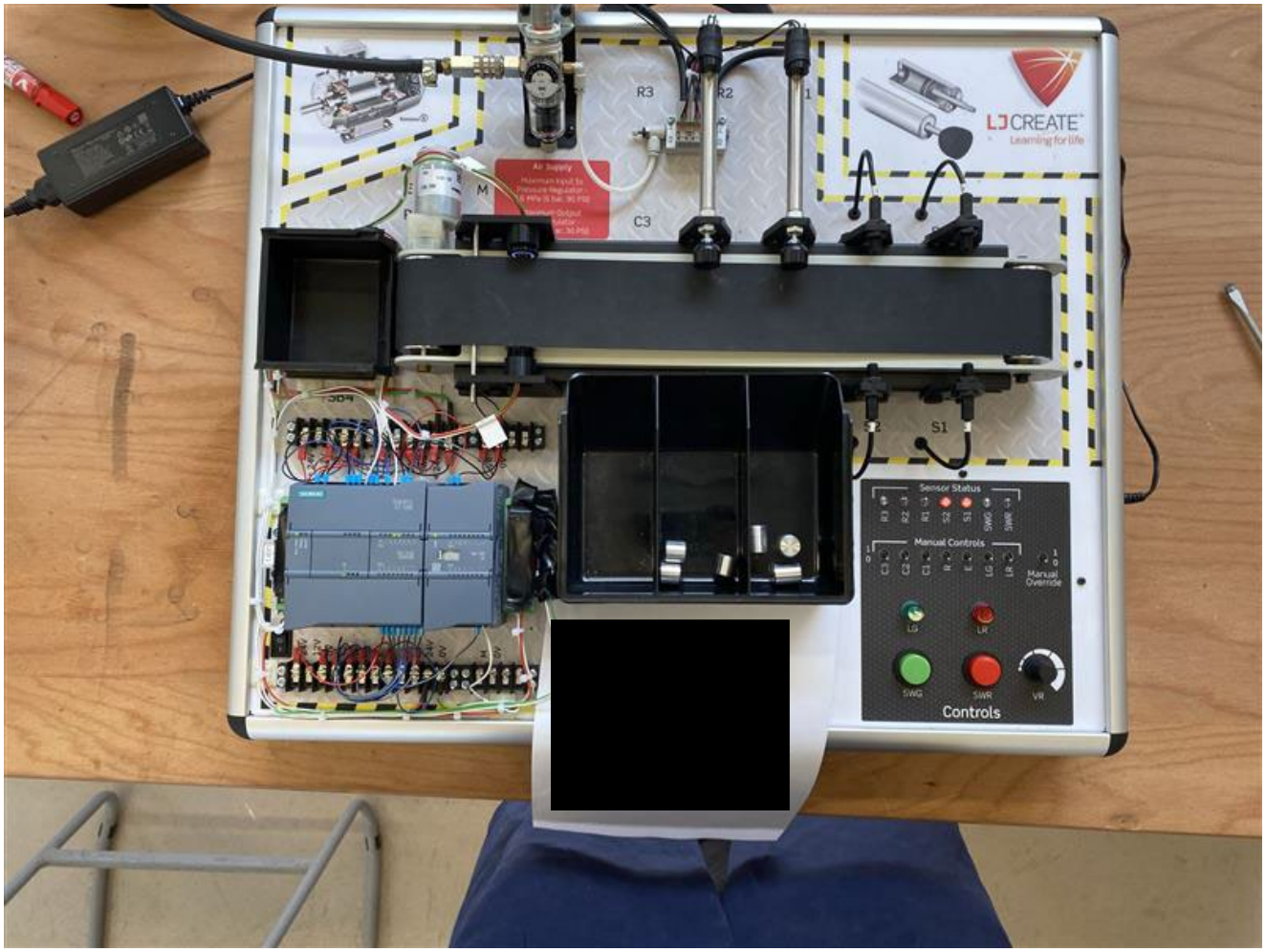

HEUER
FRONT

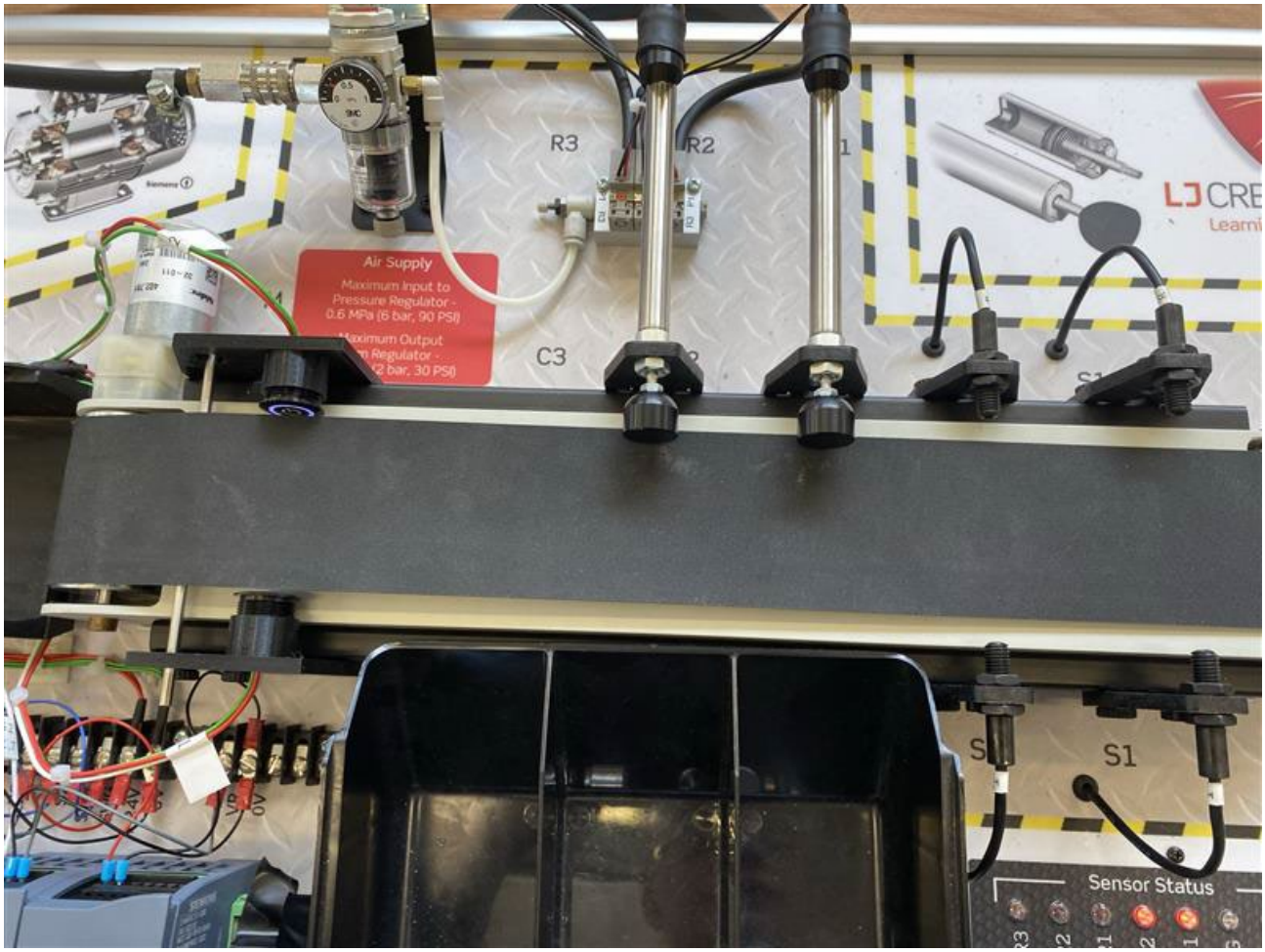

With the belt
ut put 3.
lectical Flat head screwdriver
lts on each side and then
ller back on with the belt in the

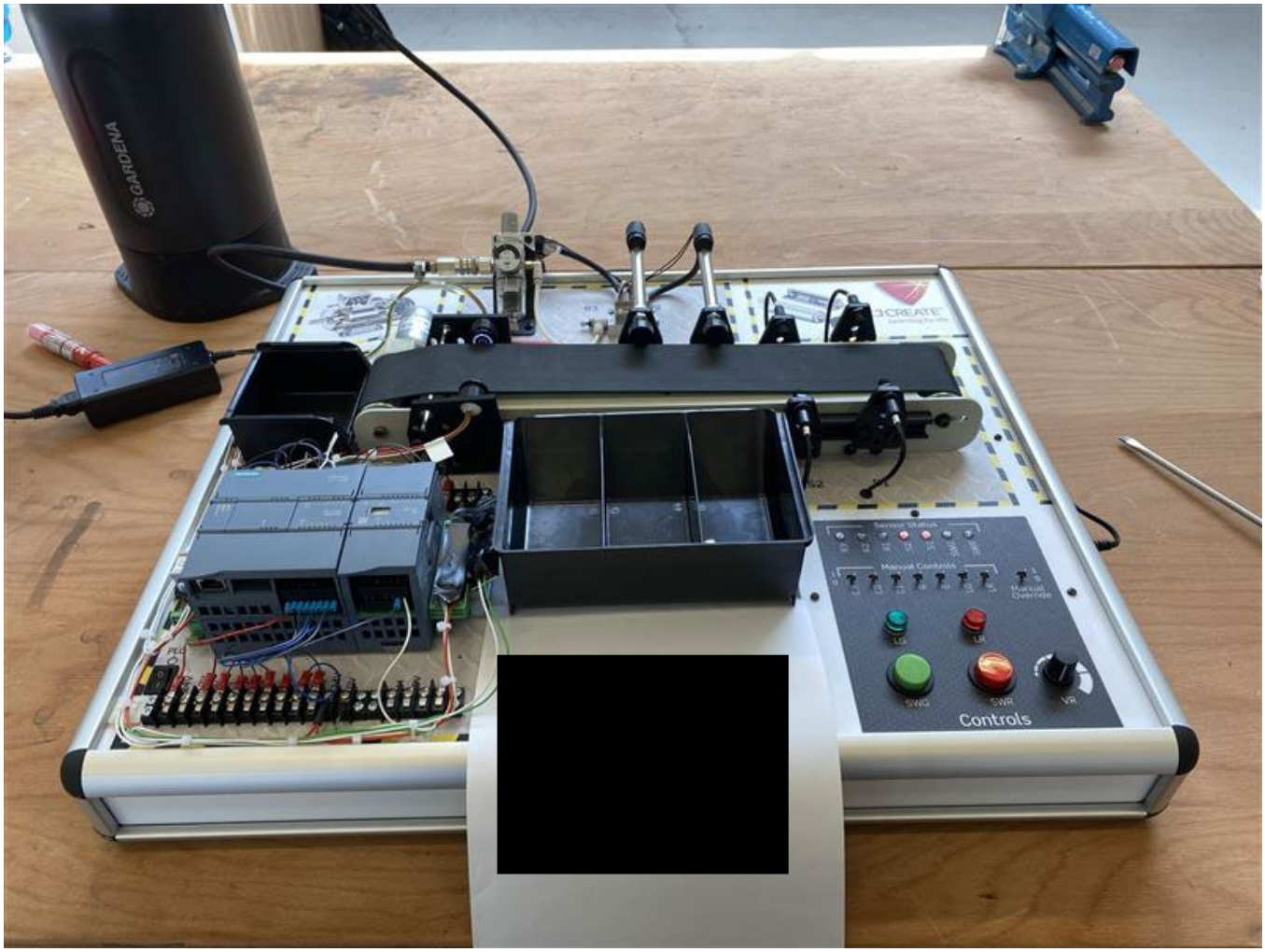

LED 1
SIEMENS
SIMATIC
S7-1200
+ 24V
+ 12V
0V
JD4
R3
LED 2
R
M
C3
Supply

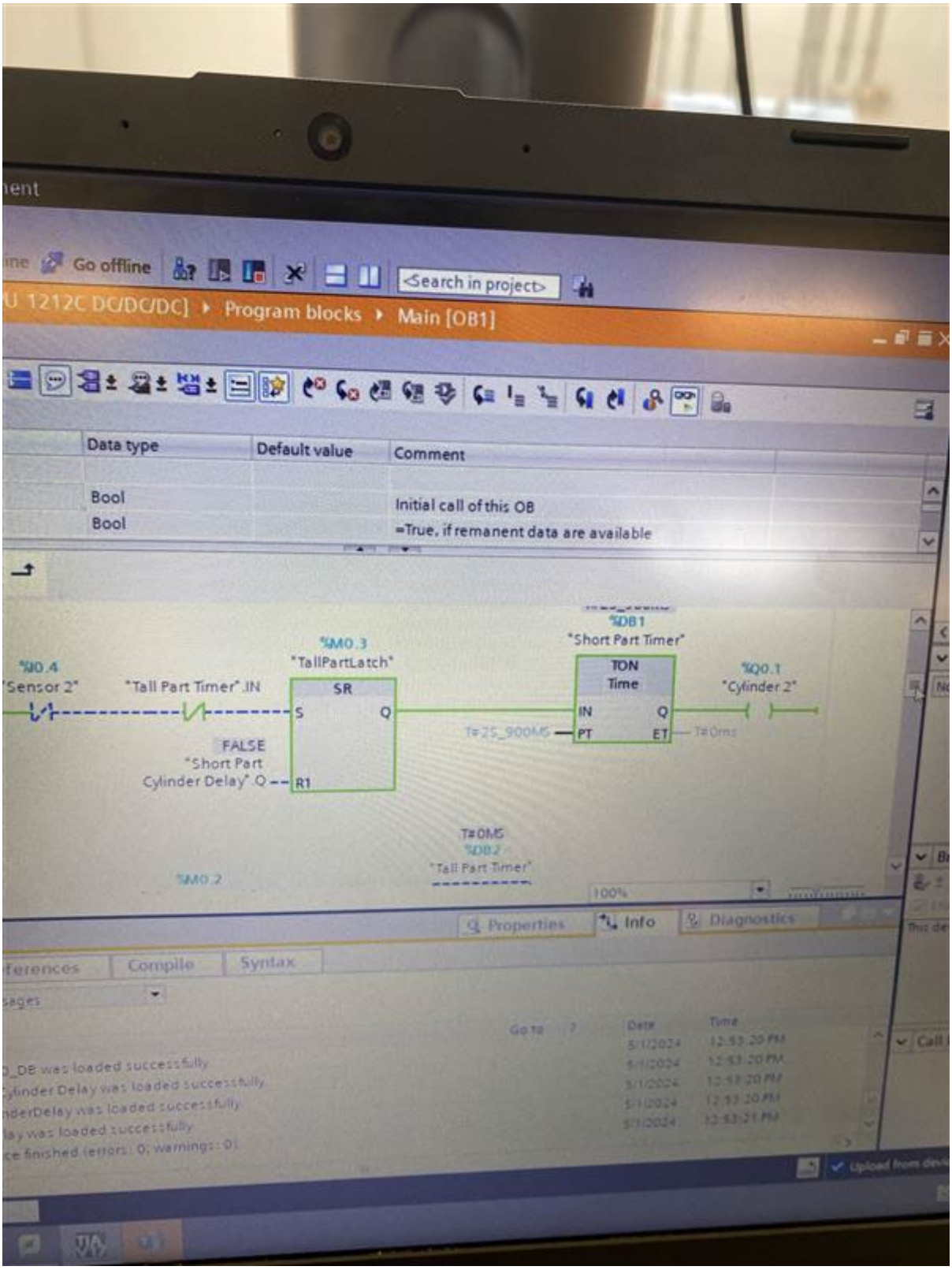


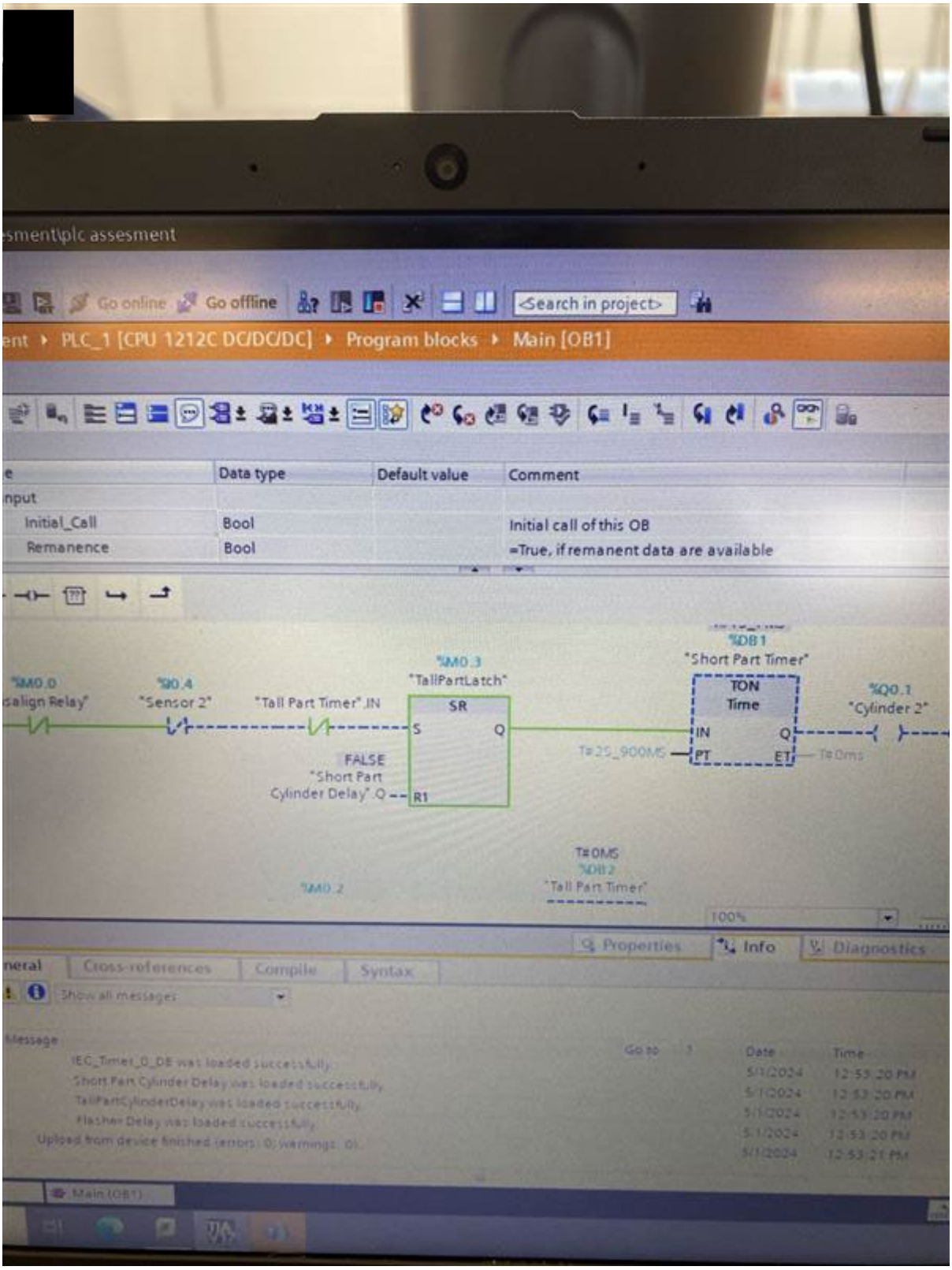

What else was Wrong
R2 was touching the conyer belt / How it was Fixed - by using a flat head screw driver
The system was off and isolated.
Maitanence
• Fixed faults
• Cleaned system - using compressor and Clean rags
• Checked plc codeing
• Checked wiring and put out put 3 back into (E)

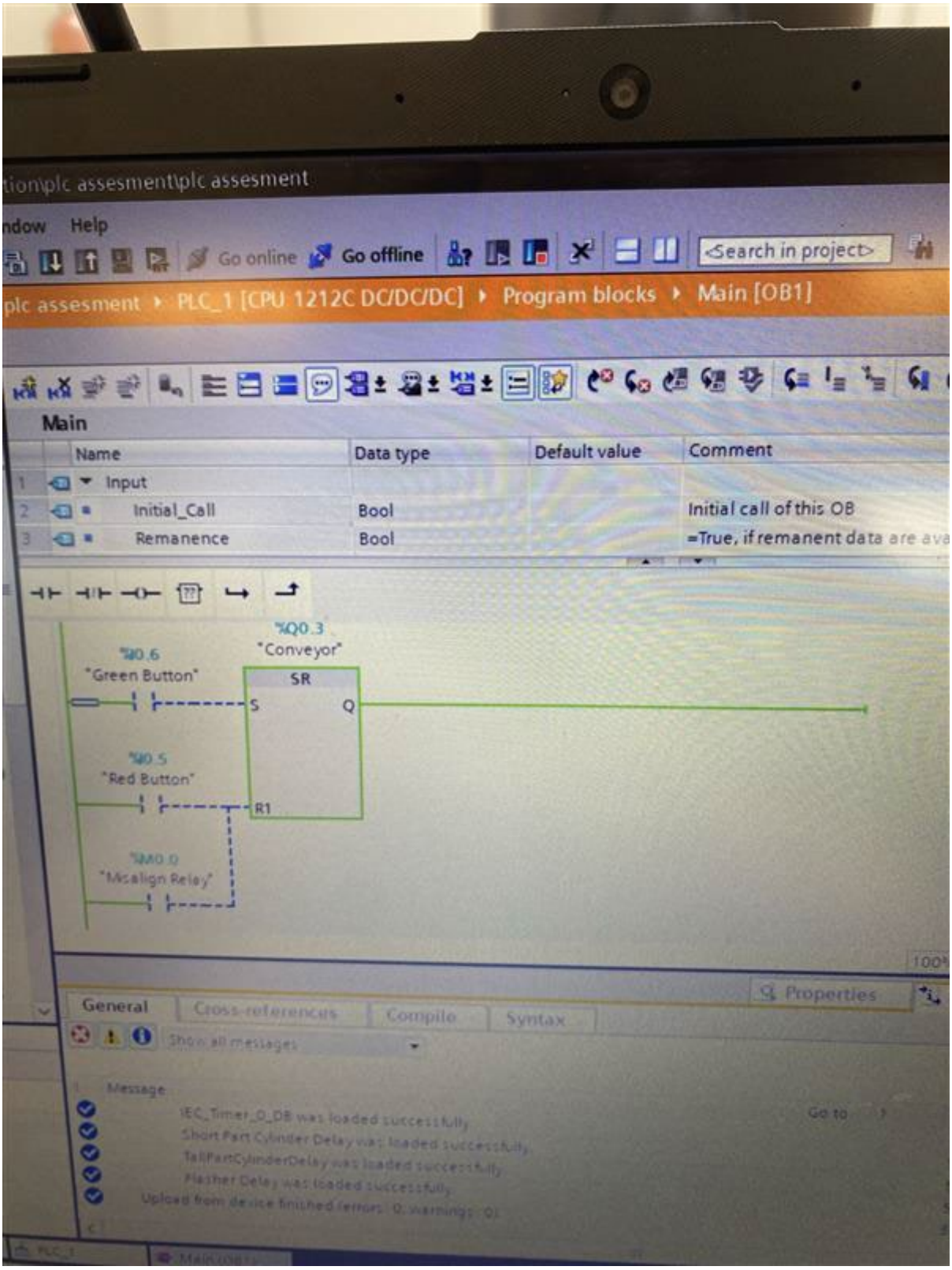

R3
R2
C3
M
S1
LJCREATE
Learning for life
Sensor Status
Manual Controls
Manual Override
LG
LR
SWG
SWR
VR
Controls


R3
R2
C3
Air Supply
Maximum Input to
Pressure Regulator -
0.6 MPa (6 bar, 90 PSI)
S1
Sensor Status

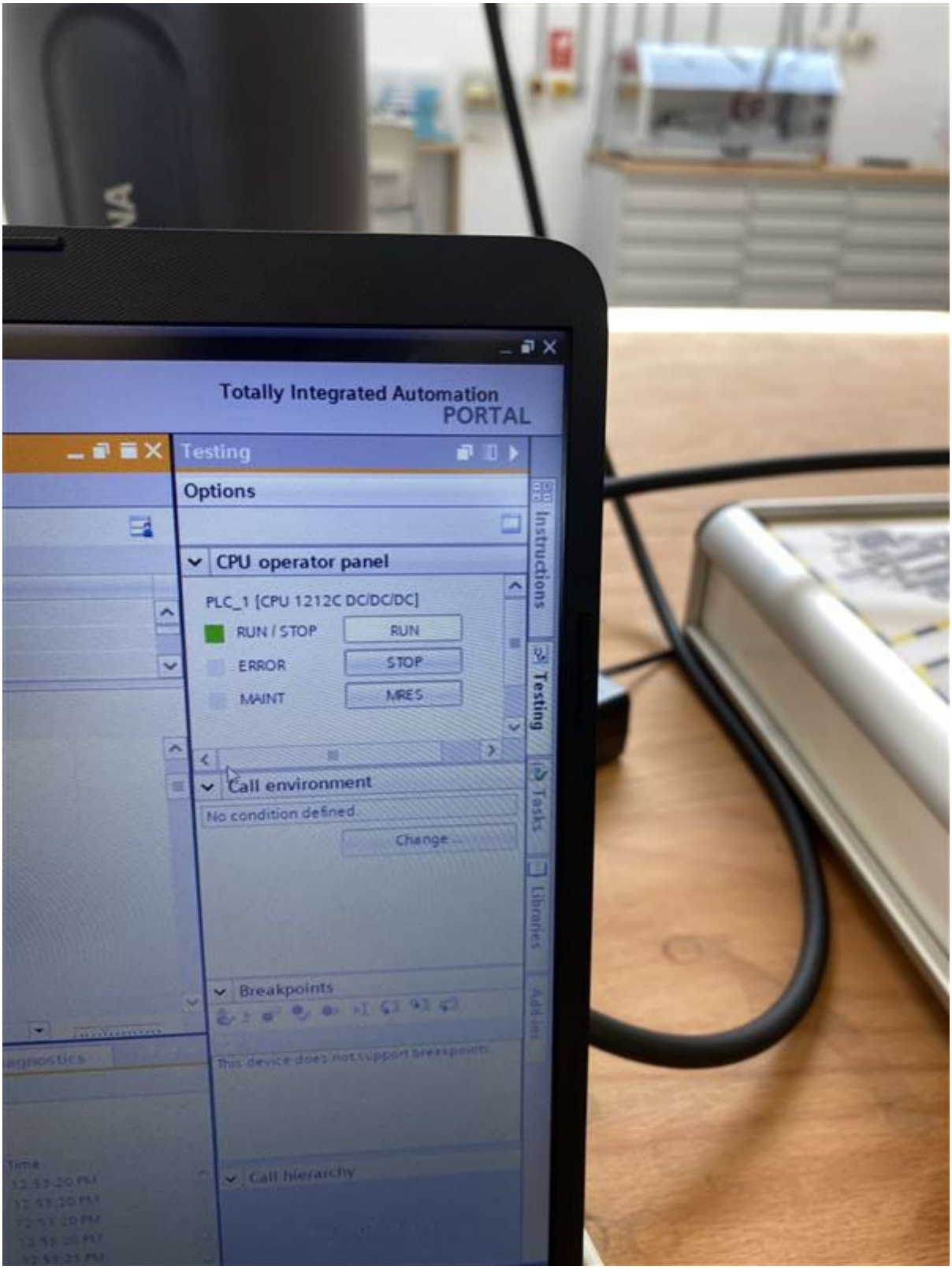

GARDENA
Controls

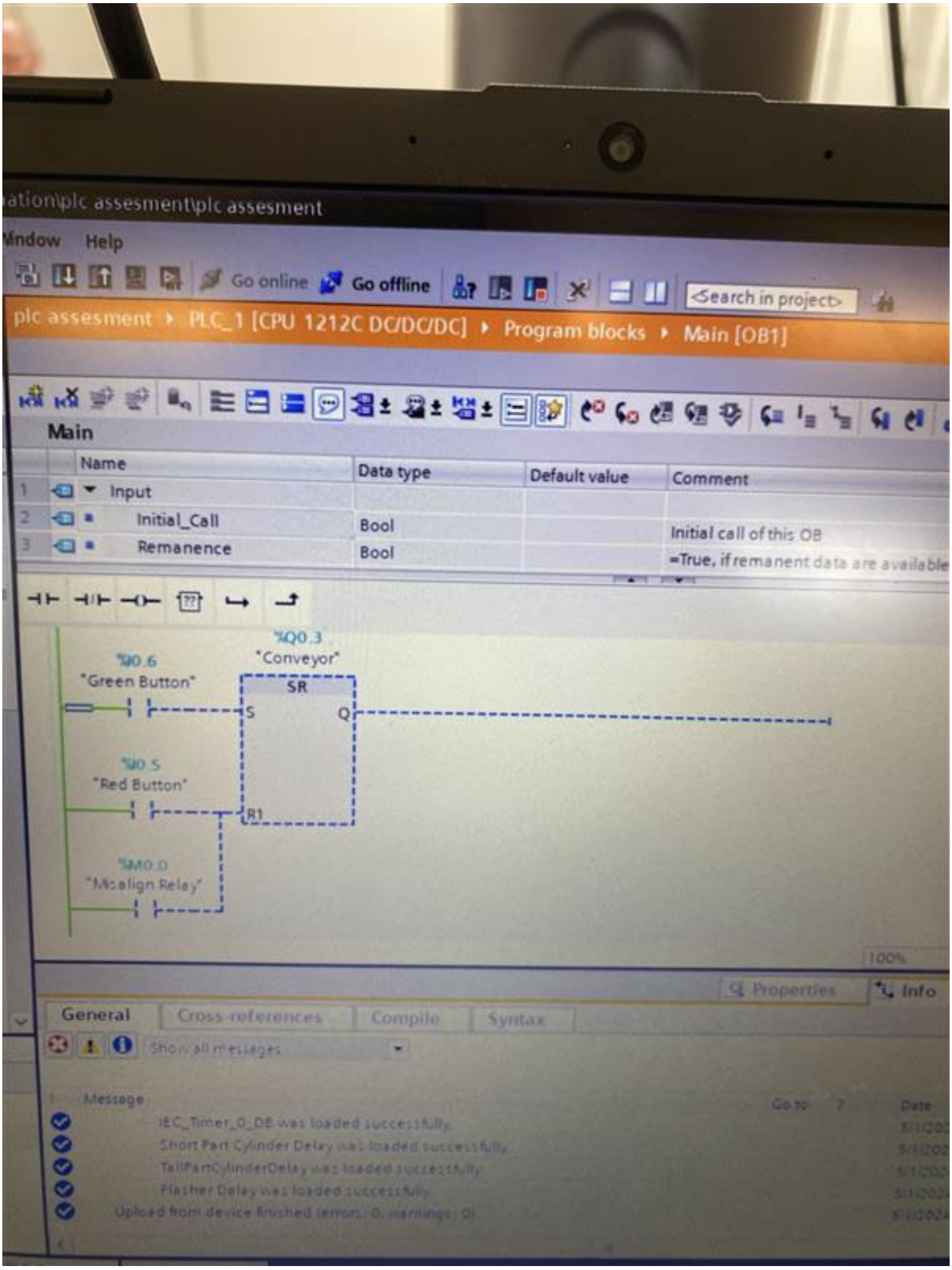

Go offline
Search in project
U 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Data type
Default value
Comment
Bool
Initial call of this OB
Bool
=True, if remanent data are available
%M0.3
"TallPartLatch"
%DB1
"Short Part Timer"
%I0.4
"Sensor 2"
"Tall Part Timer".IN
SR
S
Q
TON
Time
IN
Q
PT
ET
%Q0.1
"Cylinder 2"
T#25_900MS
T#0ms
FALSE
"Short Part
Cylinder Delay".Q
R1
T#0MS
%DB2
"Tall Part Timer"
%M0.2
100%
Properties
Info
Diagnostics
References
Compile
Syntax
Go to
Date
Time
_DB was loaded successfully
ylinder Delay was loaded successfully
derDelay was loaded successfully
ay was loaded successfully
e finished (errors: 0; warnings: 0)


smentiplc assesment
Go online
Go offline
Search in project
ent ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Data type
Default value
Comment
nput
Initial_Call
Bool
Initial call of this OB
Remanence
Bool
=True, if remanent data are available
%M0.0
salign Relay"
%I0.4
"Sensor 2"
"Tall Part Timer".IN
%M0.3
"TallPartLatch"
SR
S
Q
R1
FALSE
"Short Part
Cylinder Delay".Q
%DB1
"Short Part Timer"
TON
Time
IN
Q
PT
ET
T#25_900MS
T#0ms
%Q0.1
"Cylinder 2"
T#0MS
%DB2
"Tall Part Timer"
%M0.2
100%
Properties
Info
Diagnostics
neral
Cross-references
Compile
Syntax
Show all messages
Message
Go to
Date
Time
IEC_Timer_0_DB was loaded successfully.
Short Part Cylinder Delay was loaded successfully.
TallPartCylinderDelay was loaded successfully.
Flasher Delay was loaded successfully.
Upload from device finished (errors: 0; warnings: 0).
5/1/2024 12:53:20 PM
5/1/2024 12:53:20 PM
5/1/2024 12:53:20 PM
5/1/2024 12:53:20 PM
5/1/2024 12:53:21 PM
Main (OB1)

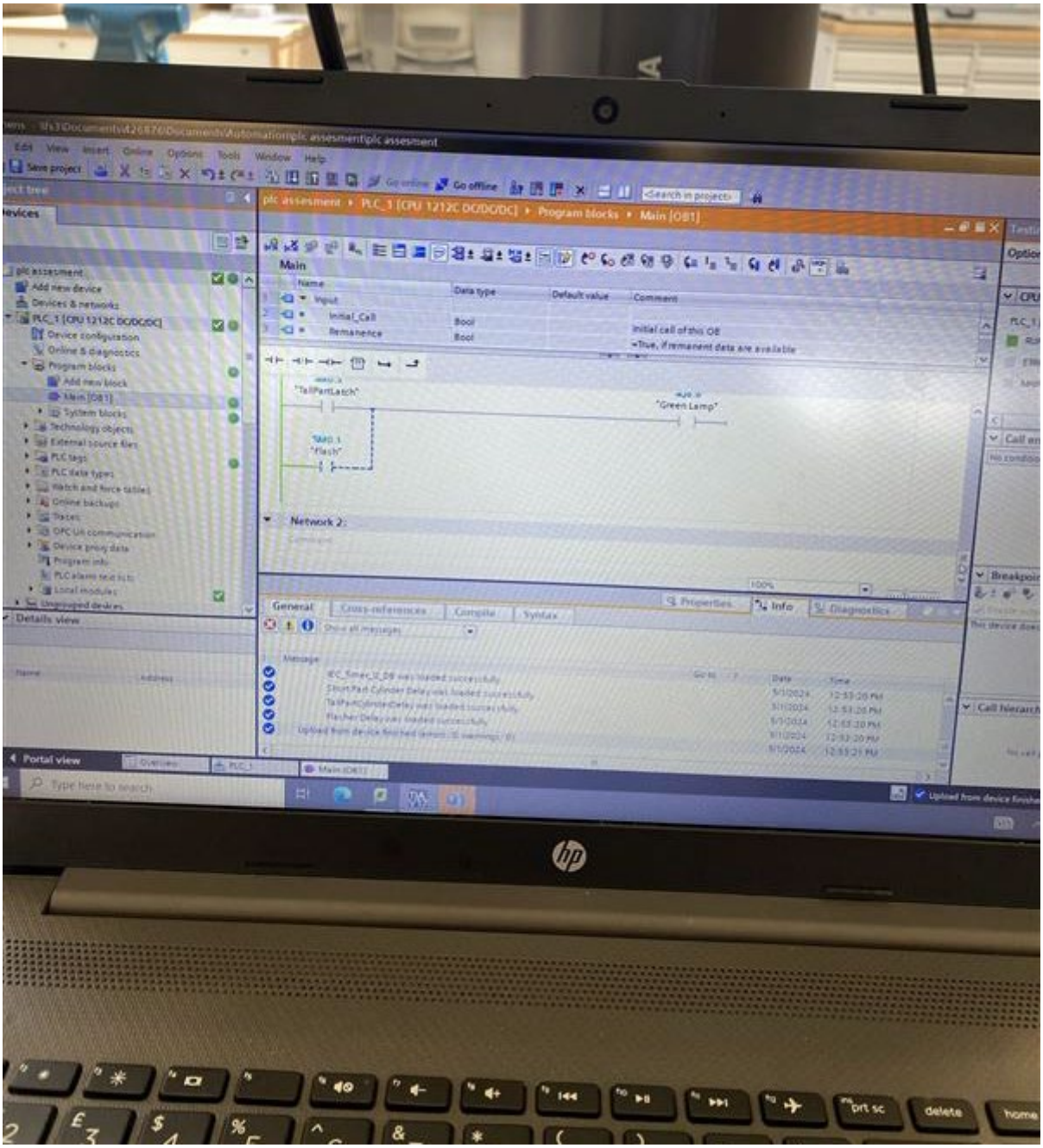

tion\plc assesment\plc assesment
ndow Help
Go online
Go offline
<Search in project>
plc assesment ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Main
Name
Data type
Default value
Comment
Input
Initial_Call
Bool
Initial call of this OB
Remanence
Bool
=True, if remanent data are ava
%Q0.3
"Conveyor"
%I0.6
"Green Button"
SR
S
Q
%I0.5
"Red Button"
R1
%M0.0
"Mealign Relay"
Properties
General
Cross-references
Compile
Syntax
Message
Go to

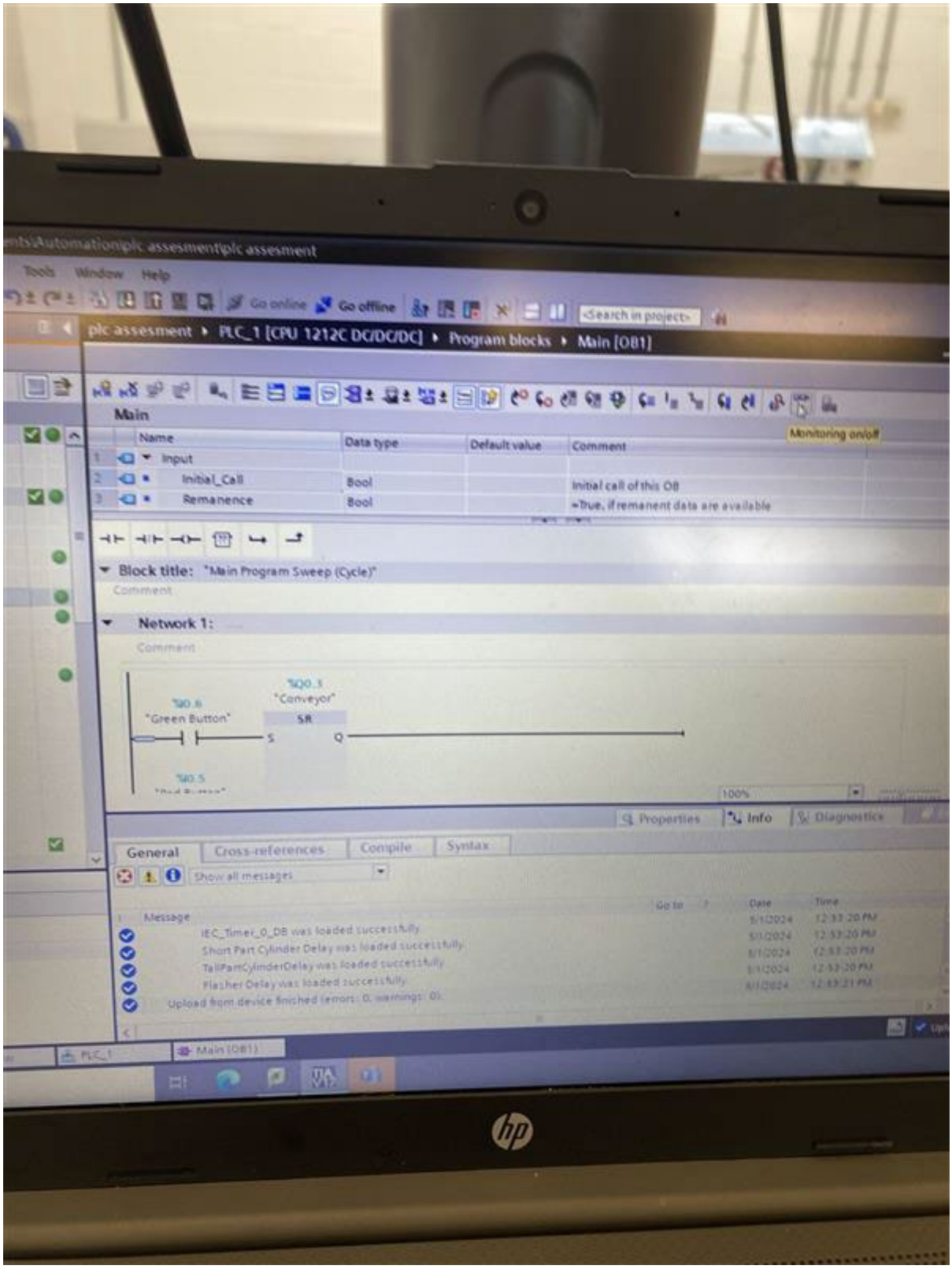

R3
R2
S1
R3
R2
R1

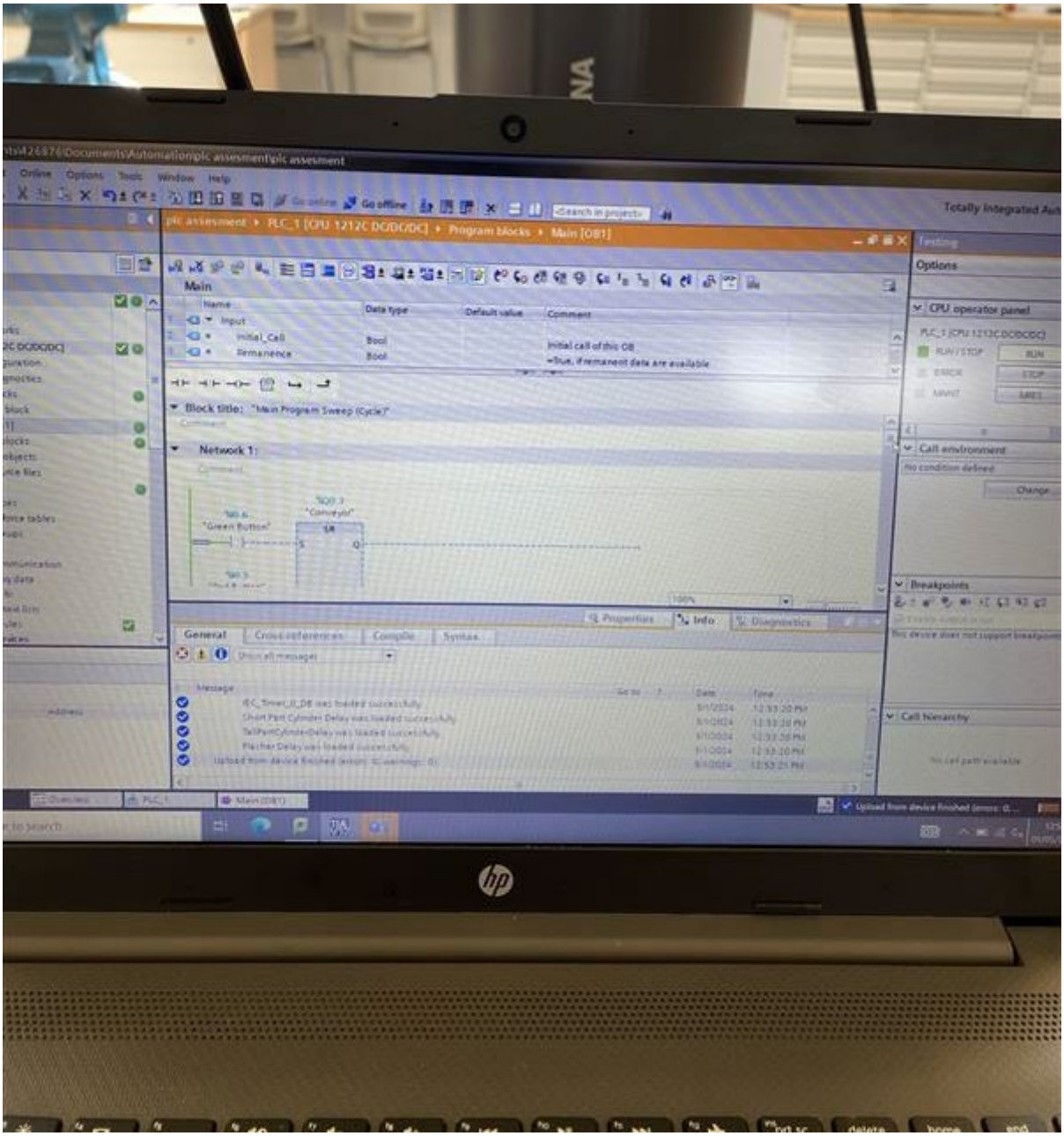

Totally Integrated Automation
PORTAL
Testing
Options
CPU operator panel
PLC_1 [CPU 1212C DC/DC/DC]
RUN / STOP
RUN
ERROR
STOP
MAINT
MRES
Call environment
No condition defined.
Change ...
Breakpoints
This device does not support breakpoints.
Call hierarchy
Instructions
Testing
Tasks
Libraries
Add-ins

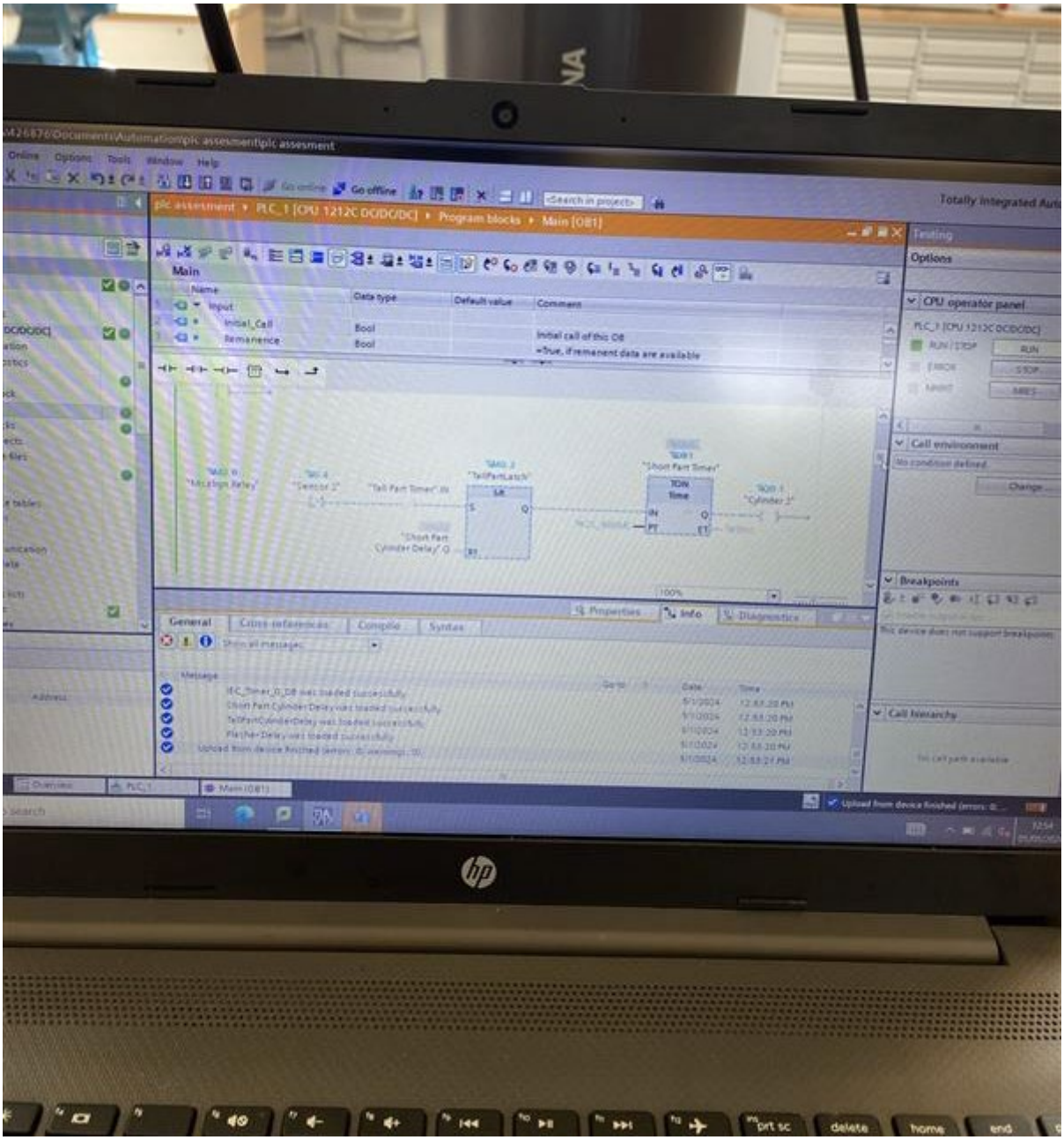

ation\plc assesment\plc assesment
Window Help
Go online
Go offline
Search in project
plc assesment ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Main
Name
Data type
Default value
Comment
1 Input
2 Initial_Call Bool Initial call of this OB
3 Remanence Bool =True, if remanent data are available
%Q0.3
"Conveyor"
%I0.6
"Green Button"
SR
S
Q
%I0.5
"Red Button"
R1
%M0.0
"Misalign Relay"
100%
Properties
Info
General
Cross-references
Compile
Syntax
Show all messages
Message
Go to
Date
IEC_Timer_0_DB was loaded successfully.
Short Part Cylinder Delay was loaded successfully.
TallPartCylinderDelay was loaded successfully.
Flasher Delay was loaded successfully.
Upload from device finished (errors: 0, warnings: 0).


CREATE
Learning for life
S2
S1
Sensor Status
R3
R2
R1
S2
S1
SWG
SWR
Manual Controls
1
0
C3
C2
C1
R
E
LG
LR
Manual Override
LG
LR
SWR
VR
SB1
Control

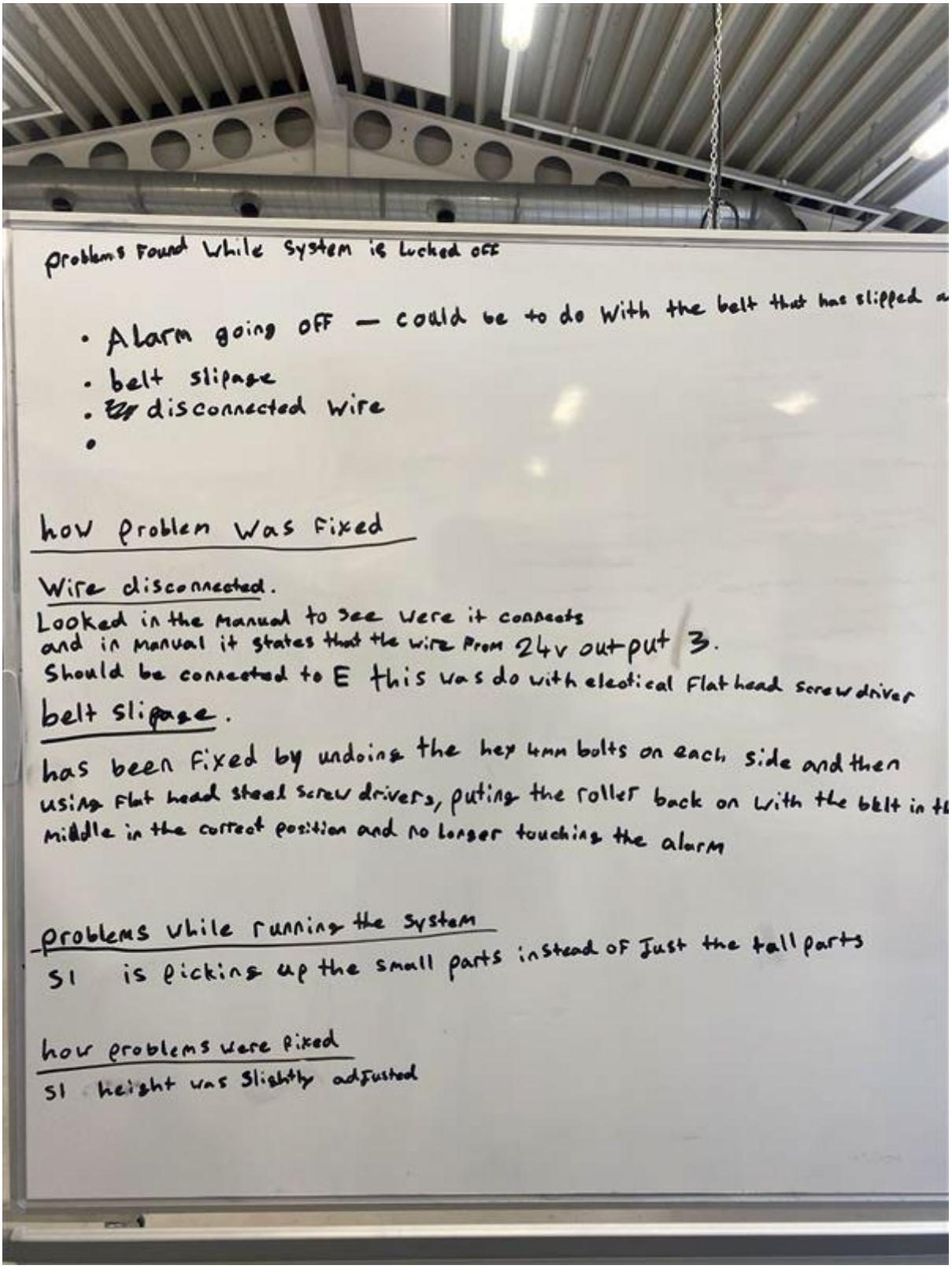

plc assessment ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Main
Name
Data type
Default value
Comment
Initial_Call
Bool
Remanence
Bool
"TailPartLatch"
"Green Lamp"
"Flash"
Network 2:
Portal view
Overview
PLC_1
Main [OB1]
Type here to search

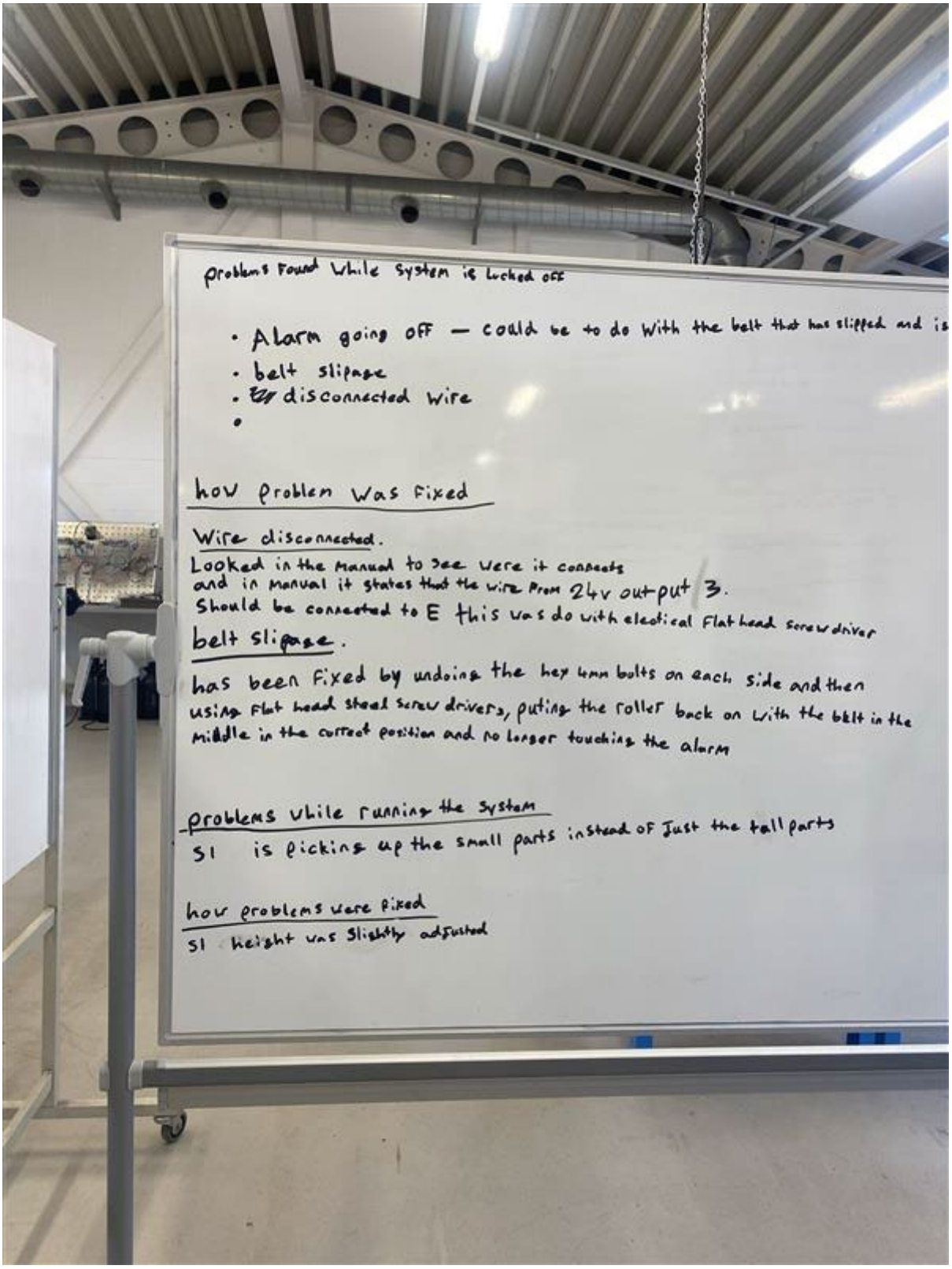

Tools Window Help
Go online Go offline
plc assesment ▸ PLC_1 [CPU 1212C DC/DC/DC] ▸ Program blocks ▸ Main [OB1]
Main
Name Data type Default value Comment
Input
Initial_Call Bool Initial call of this OB
Remanence Bool =true, if remanent data are available
Block title: "Main Program Sweep (Cycle)"
Comment
Network 1:
Comment
%Q0.3
"Conveyor"
SR
%I0.6
"Green Button"
S Q
%I0.5
Properties Info Diagnostics
General Cross-references Compile Syntax
Show all messages
Message
IEC_Timer_0_DB was loaded successfully.
Short Part Cylinder Delay was loaded successfully.
TallPartCylinderDelay was loaded successfully.
Flasher Delay was loaded successfully.
Upload from device finished (errors: 0, warnings: 0).
PLC_1
Main [OB1]


Main
Block title: "Main Program Sweep (Cycle)"
Network 1:
"Green Button"
"Conveyor"
Initial call of this OB
=True, if remanent data are available


Main
Name
Data type
Default value
Comment
Initial_Call
Bool
Initial call of this OB
Remanence
Bool
=true, if remanent data are available
Options
CPU operator panel
Call environment
Breakpoints
Call hierarchy
Properties
Info
Diagnostics
General
Cross-references
Compile
Syntax
delete
home
end


R3
R2
R1
S2
S1
R3
R2
R1
S2


Problems Found While System is Locked off
• Alarm going off — could be to do With the belt that has slipped
• belt slipage
• disconnected wire
how problem Was Fixed
Wire disconnected.
Looked in the manual to see were it connects
and in manual it states that the wire from 24v output 3.
Should be connected to E this was do with electical Flat head screwdriver
belt slipage.
has been fixed by undoing the hex 4mm bolts on each side and then
using Flat head steal screw drivers, puting the roller back on with the belt in t
middle in the correct position and no longer touching the alarm
problems while running the system
S1 is picking up the small parts instead of Just the tall parts
how problems were fixed
S1 height was slightly adjusted


problems found while system is locked off
• Alarm going off — could be to do with the belt that has slipped and is
• belt slipage
• disconnected wire
•
how problem was fixed
Wire disconnected.
Looked in the manual to see were it connects
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Should be connected to E this was do with electical Flat head screwdriver
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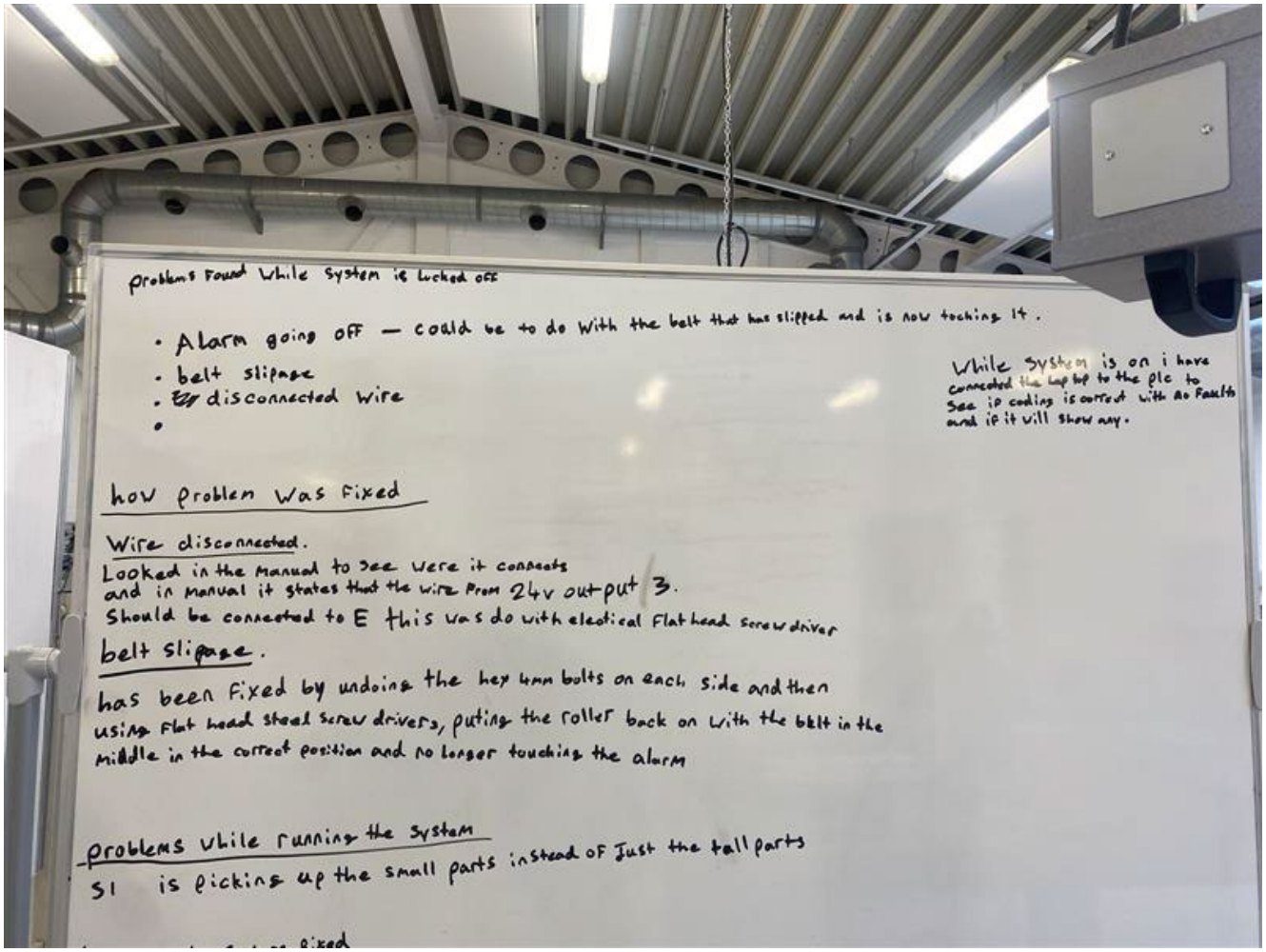
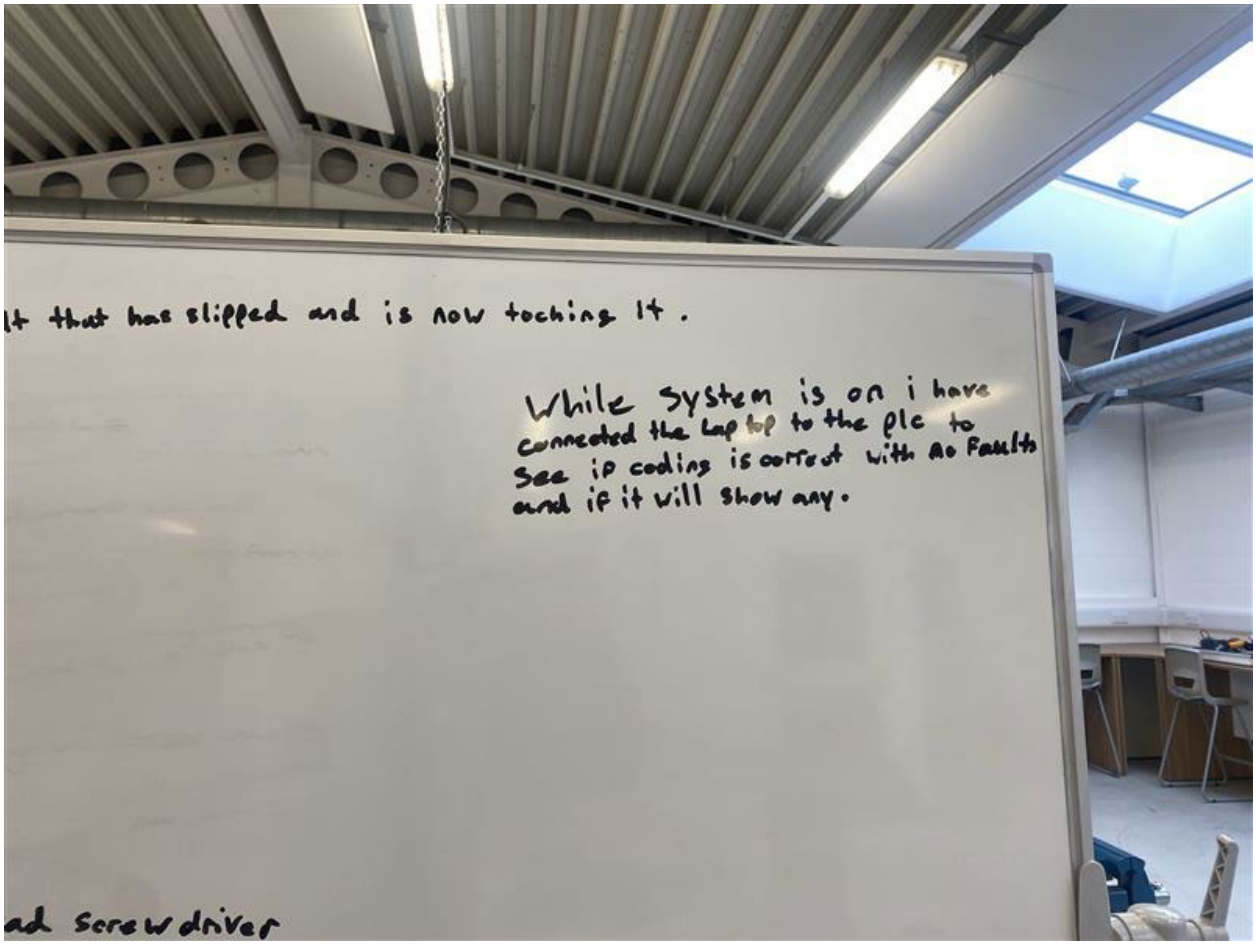
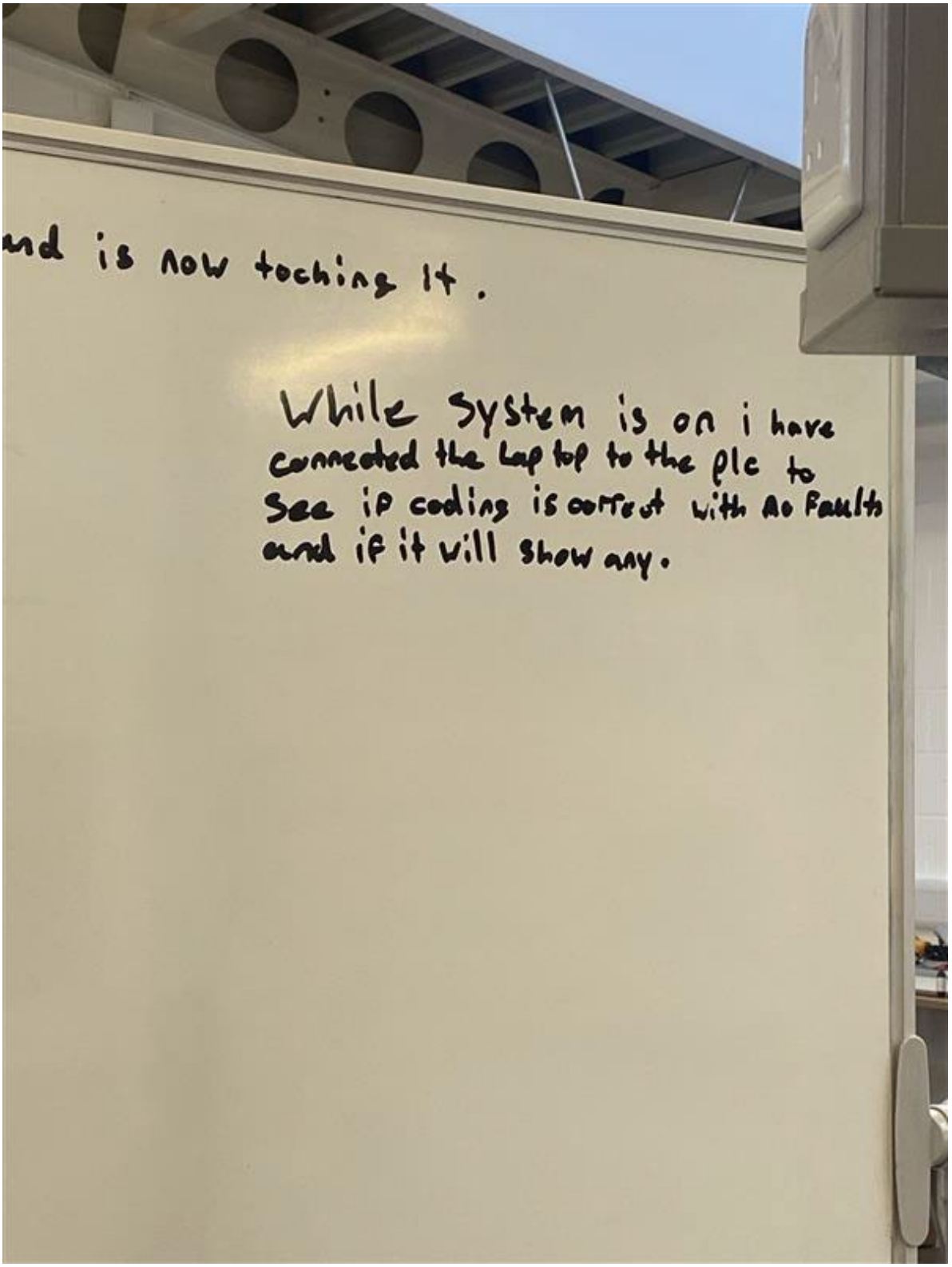
using Flat head steal screw drivers, puting the roller back on with the bklt in the
middle in the correct position and no longer touching the alarm
problems while running the system
S1 is picking up the small parts instead of just the tall parts
how problems were fixed
S1 height was slightly adjusted


problems found while system is locked off
• Alarm going off — could be to do with the belt that has slipped and is now touching it.
• belt slipage
• disconnected wire
•
while system is on i have connected the lap top to the plc to see if coding is correct with no faults and if it will show any.
how problem was fixed
Wire disconnected.
Looked in the manual to see were it connects and in manual it states that the wire from 24v out-put 3.
Should be connected to E this was do with electical Flat head screw driver
belt slipage.
has been fixed by undoing the hex 4mm bolts on each side and then using flat head steal screw drivers, puting the roller back on with the bekt in the middle in the correct position and no longer touching the alarm
problems while running the system
S1 is picking up the small parts instead of just the tall parts

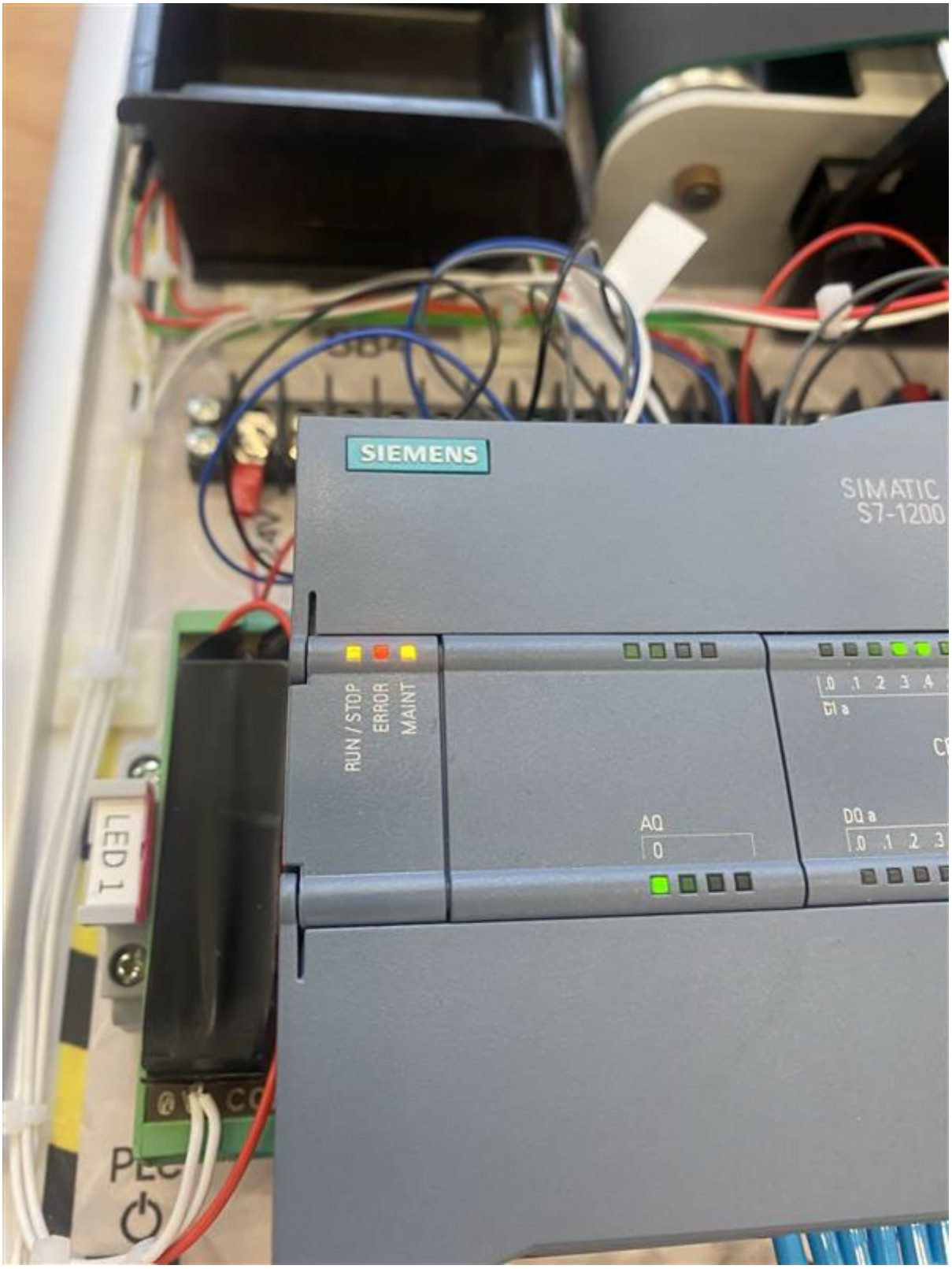

lt that has slipped and is now toching it.
While system is on i have connected the laptop to the plc to see ip coding is correct with no Faults and if it will show any.
ad Screwdriver


nd is now toching it.
While system is on i have connected the lap top to the plc to see if coding is correct with no faults and if it will show any.


R1
CREATE
Learning for life
S2
S1
Sensor Status


R3
R2
CREATE
Learning for life
Air Supply
S2
S1
Sensor Status
R3
R2
R1
S2
S1
SWG
Manual Controls
C3
C2
C1
R
E
SB2
SB1


S2
S1
Sensor Status
R3
R2
R1
S2
S1
SWG
SWR
Manual Controls
1
0
C3
C2
C1
R
E
LG
LR
1
0
Manual Override
LG
LR
SWG
SWR
VR
Controls


SIEMENS
SIMATIC
S7-1200
RUN / STOP
ERROR
MAINT
LED 1
AQ
0

Task 3A Review and report the maintenance activities

Assessment number (eg 1234-033)	8712-312
Assessment title	Mechatronic Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	3A
Evidence title / description	Technical report Revised maintenance schedule, including justifications
Date submitted by candidate	DD/MM/YY

Task 3A

Assessment themes:

- Health and safety
- Systems and components
- Reviewing and reporting

You must:

- produce a technical report for the supervisor. This should typically be 850 words and include:
    - a review of the maintenance activities, including fault diagnosis/detection techniques and suggestions for future improvements
    - the faults found and how they were rectified
    - any outstanding faults, including recommendations that may require attention before the next planned maintenance activity according to the current maintenance schedule
    - reporting of stock levels and waste disposal
- produce a revised maintenance schedule from your activities and findings, this should include:
    - recommendations for future planned maintenance, including justifications
    - due date of next maintenance activity.

Additional evidence of your performance that must be captured for marking:
none.

Candidate evidence

Task 3a – Technical report

The scheduled maintenance for the Conver belt system was completed, including inspecting, testing and diagnostic and repairing faults found within the system. The inspecting technique includes visual, vibration, and smell and fault finding, the oblique used. The Maintenace completed went well with only a few issues to be fix with the maintenance schedule. Upon scheduled maintenance, there was an issue with the alarm going off and the system was not running.

During the scheduled Maintenace there were four faults that I discovered, investigated, diagnosed, and fixed these were.

- An issue with a disconnected wire on output 3
- Belt that had slipped into the sensor and gone off
- S1 sensor
- C1 and C2 being slightly off and with C2 touching the belt

I ensured that I followed the method statement as best as possible with unexpected events that happened such as faults and problems, I rectified this by updating the method statement and filling out the maintenance schedule and records I made sure to get any necessary permits to work and asked permission to work and followed the safety legislation such as LOTO and COSHH (control of substances hazardous to health) to prevent work shop accidents.

I went over the machine after using LOTO procedures disconnecting the power and locking it off along with the pneumatic air supply and with PPE on, then I checked the machine for faults using the oblique method and looking in the manual. Output three blue wire was out of place, I rectified that by looking in the manual and putting it in the correct position which was (E) and used an electrical screwdriver to do so. after I could see why the alarm when of that was due to the belt that had slipped off, to fix this I removed the hex four bolts from both sides then relined the belt in the correct position, and then refitted it accordantly with the use of two steel flat head screw drivers to get it in position, to hand tighten it on both sides, and then used a belt tensioner to check the tension and adjusted the tension as with accordant to spec.

After that was complete, I could run the system and further check for faults within it. I plugged in a laptop to the plc using an ethernet cable and turned it on, and then proceeded to run the system and could see that the program on the computer was working however during the run and testing the tall and small parts I found a fault with the s1 sensor, this was quickly fixed by adjusting the height of both sensors so then it could no longer detect both parts.

I found another issue with the system and that was with the pneumatic actuators C1 and C2, and that was with the fact that they were both too close and would sometimes miss the parts, along with C2 that was touching the Conver belt. This was corrected by moving both actuators further back to the left using a flat head to adjust and moving C2 higher, so it was no longer touching the Conver belt and kept running while putting the parts on the belt to check the timing of the actuators.

I then cleaned the system with rags and proceeded to check that all the assemblies and sub-assemblies where tightened and did a final visual check Then I ran the system again to ensure that the system was running as intended and made sure to look at the coding on the laptop and see that it is correctly running with everything green.

The recommendations for future maintenance I have put into the Maintenace schedule and records sheet, and these exclaim, to clean the system with an air gun including the PLC and other components to help stop them breaking down over time and increase the speed at which maintenance is completed in.

For future improvements I suggest that we order replacement parts for the roller as I could see some damage, however we did not have the spare resources to fix the issue. I would also like to include more frequent maintenance to ensure optimum output out of the system, and keep it clean to prevent it from collecting dust in the wrong areas such as the motor and PLC.

Stock used and recorded

- Rags.

There was not a lot of waste, and nothing needed to go in the WEEE bin however dirty rags were disposed of in the general waste overall the maintenance went well as in what cost effective with little money needed for rags and no components were replaced to prevent the

alarm being sounded have the employees try to look out for vibrations and see if they can spot the problem before hand to prevent further maintenance and use of the system.

Task 3a – Revised maintenance schedule

System:	What was Found during maintenance.	Recommendations to be made.	Justification on why.	Date for next maintenance
Conver belt	Wire out of place stopping the system from functioning as it should. Belt slipped off into sensors causing the alarm to go off. Pneumatic actuators both a little too close causing them to miss the parts sometimes and C2 needed to be lifted as was touching the belt. S1 sensor would detect both small and tall parts.	Clean the system with an air gun including the PLC and other components to help stop them breaking down over time. For future improvements I suggest that we order replacement parts for the roller as I could see some damage, however we did not have the spare resources to fix the issue. I would also like to include more frequent maintenance to ensure optimum output out of the system, and keep it clean to prevent it from collecting dust in the wrong areas such as the motor and PLC.	If an air gun was used it would speed up the maintenance time and reduce company costs on maintenance time. Roller will have to be replaced if not done so could shatter over time and cause more damage to surrounding components and parts. More frequent maintenance would save money on replacement parts if it's well-maintained, it will take components longer to break or need fixing.	25/10/2024

Task 3B Peer review

Assessment number (eg 1234-033)	8712-312
Assessment title	Mechatronic Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	3B
Evidence title / description	Completed peer review forms Candidates amended document following peer review, including justifications (revised method statement)
Date submitted by candidate	DD/MM/YY

Task 3B

Assessment themes:

- Health and safety
- Systems and components
- Reviewing and reporting

You must:

- carry out a peer review on two annotated method statements provided by the assessor. You must consider the following:
    - *how well does the method statement enable planned maintenance activities to be performed and recorded over time?*
    - *how appropriate is the method statement and why?*
    - *what are the implications to the business of the proposed method statement?*
    - *how could the method statement be optimised/improved?*
- write up feedback for each of the annotated method statement produced by other candidates on separate peer review forms
- update your own annotated method statement following feedback from the peer review. Any updates need to include justifications for these changes and any changes not made will be reviewed in the handover.

Additional evidence of your performance that must be captured for marking:
none.

Candidate Evidence

Task 3b – Peer Review Forms

Assessment ID	Qualification number
MIR Mechatronic Occupational Specialism	8712-312
Candidate name	**Candidate number**
xxx	xx
Provider name	**Provider number**
xxx	xxx
Date	**Series**
08/5/24	Summer 24

Question	Feedback
How well does the method statement enable planned maintenance activities to be performed and recorded over time?	Really well thought out however Could be improved by adding a ruff estimated time on how long each process should take I would also like to add the fact that step by step guide would better benefit the planned maintenance and make it easier to follow.
How appropriate is the method statement and why?	It is on point however there could be a more in-depth description on things such as what techniques were used.
What are the implications to the business of the proposed method statement?	This has a clear recommendation for the design of the system this will save production as it will reduce the break downs by changing the sensors so it can detect the belt slipping before it comes off.
How could the method statement be optimised/ improved?	Add times to how long things could take Increase the amount of detail

Assessment ID	Qualification number
MIR Mechatronic Occupational Specialism	8712-312
Candidate name	**Candidate number**
xxx	xx
Provider name	**Provider number**
xxx	xxx
Date	**Series**
08/5/24	Summer 24

Question	Feedback
How well does the method statement enable planned maintenance activities to be performed and recorded over time?	Great however I there was nothing written about what legislation need to be used such as WEEE bin for disposal. Also, could add the amount of time that is needed as this would benefit the business more and make it easier to time how long future maintenance will take.
How appropriate is the method statement and why?	Was good because it has all the necessary key information on the system and how to fix it.
What are the implications to the business of the proposed method statement?	If the system breaks again this could be a good, why for future repairs to be made quicker saving time and company money. However, this could add the time in which things may take to further help the company order parts on the right dates and help maintain the system along with more detail on what makes them go wrong.
How could the method statement be optimised/ improved?	Add what legislation needs to be used Time in which things should take Why things go wrong in the first place and how it can be prevented.

Task 3b - Revised method statement

Maintenance plan

Premaintenance checks

first Step

I shall carry out this by obtaining the required PPE (gloves, safety, glasses, steel toe cap boots and overalls) Then I will continue to check over PPE ensuring the quality of the garments and that they are up to standard of completing this task, if any damages to the PPE are found this would be noted down and then reported to the appropriate people and new PPE to be inspected and put on. Once checked and the PPE is on, we can safely enter the workspace. Once Permission was granted, I then did enter the working area, I headed to the work bench where the conveyor belt system is. I will check the area by doing a visual inspection of the area to make sure it is clear and safe for work to start. If necessary, I will collect the right cleaning stuff, and make sure to put things such as electrical components in the WEEE bin, COSHH (control of substances hazardous to health) products such as cleaning products back in a COSHH cupboard, I shall also make sure there are not any tools lying around to prevent accidents such as slip, trips and falls. And of course, I will follow all the PPE in HASAWA regulations and make sure any necessary work permits are good to go, if needed and ask for permission to work.

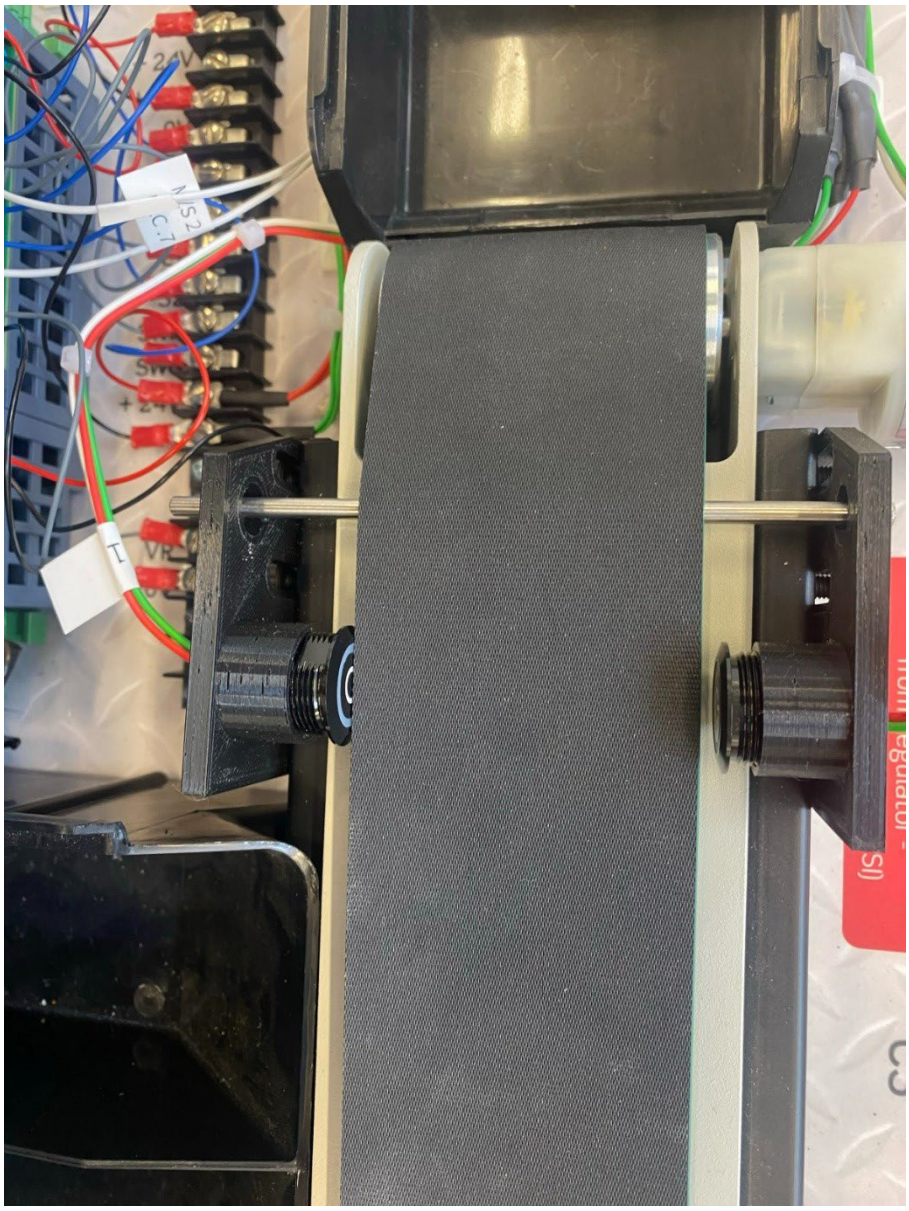
Because we are working on a conveyor belt, we did not wear gloves because as we know it is not safe to do so when working on moving parts as this could cause you to get pulled in and cause more harm therefore, they were not worn.

Undertaking the maintenance activity

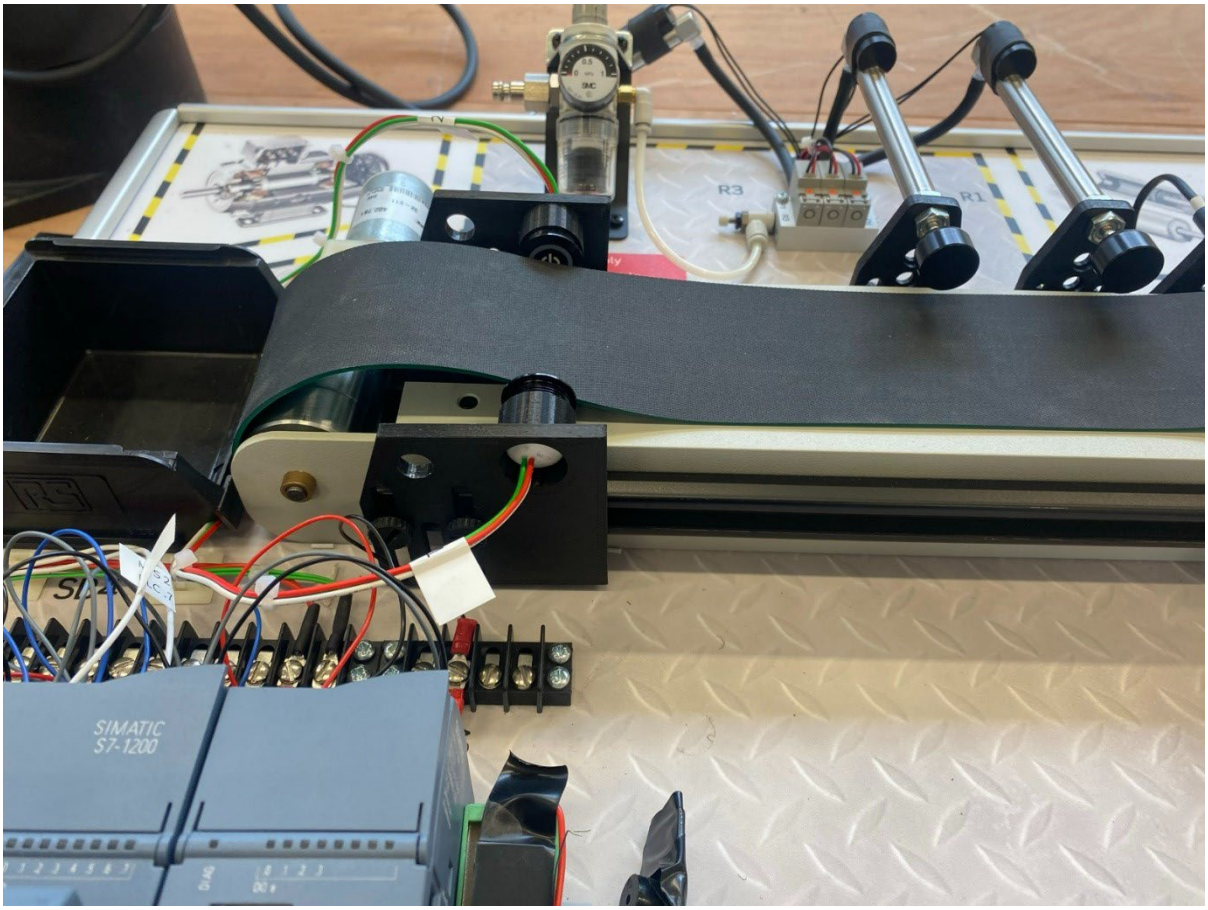
Second step

To start the maintenance work, the system was already on, and the alarm was going on loudly so to avoid not hearing anything else which could have been a hazard so I unplug the power supply and lock it off, if possible, then disconnect the pneumatic air supply and turn the system off using the of button in the right side, and the off button to the left of the PLC as the system would not run as it was. Also to stop the alarm going off, then checked the system with a multi-meter to see if the system was dead to then be able to safely work. After

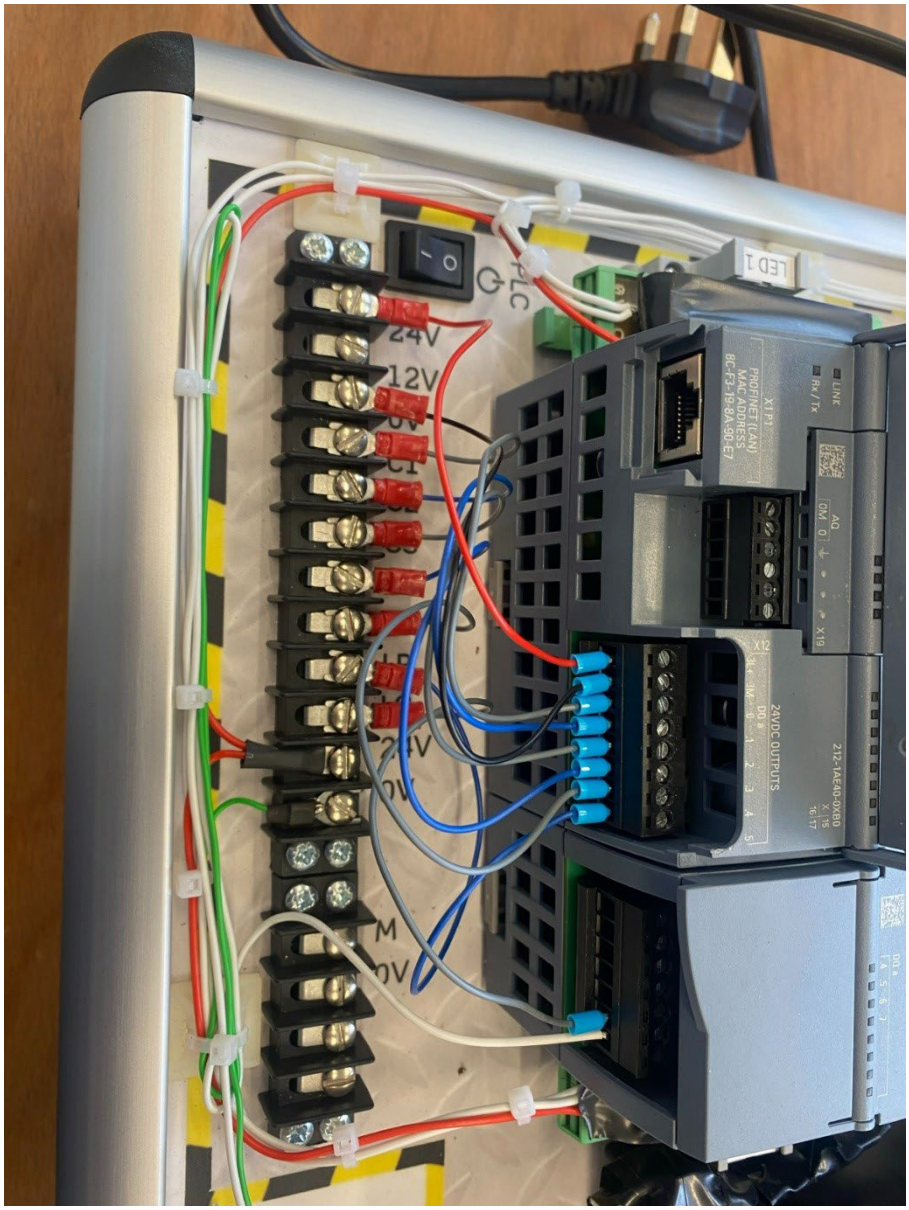
I looked over the system checking the condition it was in and, for hazards that I could avoid and to see what was out of place, such as the wire from output 3 that was not connected to anything which I found out was why the system would not run along with the conveyor belt that has slipped into the belt sensor.



I then fixed these issues first with the conveyor belt by undoing the hex 4mm bolts on each side



and then relining the belt and putting the Bearing with the belt in the correct position back on using two flat head steel screwdriver and putting the roller back in then the 4mm hex key to screw it back on in place. Then I fix the wiring by looking in the manual and seeing that output 3 blue wire connects to (E) on the board.



Then I was able to carefully look over the conveyor belt system, checking its overall condition now and looking for any more things I may have missed I then plugged in the power cord and connect the pneumatic air supply to the pressure regulator then run a program on the laptop and connect it to the PLC using an ethernet cable to see how exactly it is currently running on the program and check the control console, computer and plc for any signs of faults while also listing to see if I can hear any weird noises and vibrations.

What I could see on the PLC was the codding which looks like

And there was no issue with the motor or conveyor belt and then use different fault-finding methods such as: normal, reverse, strike-slip, and oblique. to find and diagnose any problem with the system also using the multi-meter if needed to further find the issue. And found that the S1 (sensor) was picking up small and tall parts instead of just tall parts. And found that C2 (pneumatic actuator two) was touching the conveyor belt and that C1 and C2 was firring a bit late causing them to sometimes miss the tall and small parts. This step took around 80 minutes which was unexpected but necessary.

Third step

Once I saw the issues using the laptop and testing the system, I unplugged the power supply and lock it off, if possible, disconnect the pneumatic air supply and turn the system off using the button on the right side, and the off button to the left of the PLC, also to put sighs up and to let people know not to touch the power while I work on it, to avoid the possibility of being electrocuted, following the LOTO procedures. start by giving the system a good clean using clean rags as part of the maintenance routine. This helps prevent any dust or debris from causing problems when I perform the Maintenance to C1 and C2 and the S1 sensor with that. And clean those key parts using compressed air to ensure no further damage to the parts while cleaning as cleaning chemicals could damage the system. After I will visually check the conveyor belt components and wiring to make sure everything is connected properly to the PLC and there is no damage or signs of wear and tear. I did not spot anymore issues with the wiring or the system, If I did, I would have made a note and order replacement wiring of the same wires used as in the specs of the manual. Grease was no longer needed as the system did not use any as in the specs of the manual it did not say whether it did or did not. and follow the IET guidance this procedure took 68mins to complete.

Fourth step

I began by inspecting the belt to make ensure there is just the right amount of tension on it. If the tension is off - either too little or too much - it can lead to belt slippage, improper tension, and not enough traction and could lead to vibrations. This imbalance can also put strain on the belts, resulting in noisy squealing and grating sounds. To fix this, I followed the manual's instructions and adjusted the belt using a 4mm hex key to correctly move it to have more tension. Then I fixed the S1 issue by using a flat head screwdriver and adjusting the height of both sensors. After I fixed the issues with C1 and C2 by using a flat head and adjusting them

slightly to the left more on both and just for C2 the height, so it no longer torched the conveyor belt. This task took 70 minutes

Fifth step

After I retested the system to check it all runs okay and it did, then went over the entire system and, including the assemblies and sub-assemblies, to check for tightness and security. And to see if I missed anything which I did not. And this took 13 minutes.

Post maintenance Once I have done all the necessary maintenance on the conveyor belt system, I did one more test to ensure a fully operational system, and I will set up a regular maintenance plan to prevent any future issues. This will help optimise the system's performance, boosting the company's profitability, and saving them an increase of money over time.

Task 4 Complete Handover

Assessment number (eg 1234-033)	8712-312
Assessment title	Mechatronic Occupational specialism

Candidate name	<first name> <surname>
City & Guilds candidate No.	ABC1234

Provider name	<provider name>
City & Guilds provider No.	999999a

Task(s)	4
Evidence title / description	Handover Documentation Assessor observation of handover meeting (Practical observation form)
Date submitted by candidate	DD/MM/YY

Task 4

Assessment themes:

- Health and safety
- Reviewing and reporting

You must now hold a meeting with the line manager to return to service and complete handover procedures, including:

- demonstration of system functionality
- confirmation of work completed
- amended method statement and how you addressed peer review feedback, including any suggested changes that were not made and why
- appropriate handover documentation.

Additional evidence of your performance that must be captured for marking:
none.

Candidate Evidence

Task 4 – Handover Document

Candidate name	**xxx**
Candidate number	xxx
Date	09/05/24
Provider name	xxx
Provider number	xxx
Assessment Number	8712-312
Assessment Title	MIR Mechatronic Occupational Specialism
Task	Task 4

Handover document

System at hand

Conver belt

Handed over by

xxx

Received by

xxx

Location

workshop

Subject matter of handover

Maintenace documents on the Conver belt

Notes

Conver belt was worked on and repaired accordantly to the specs of the manual. What was fixed/repaired: sensor, pneumatic actuators adjusted, belt realigned, output 3 wire connected back to (E).

Date and time of handover

09/05/2024 - 13:19

Signed by xxx _____

Signed by xxx _____

Task 4 – Practical Observation Form

8712-312 Maintenance Engineering Technologies: Mechatronic - summer 2024

Candidate Name	**Candidate number**
xxx	xxx
Provider name	**Date**
xxx	10/05/24

Complete the table below referring to the relevant marking grid, found in the assessment pack.

Do not allocate marks at this stage.

This observation must cover	Assessor observation should include:	Assessment Themes
Handover	• the handover of the work completed.	• Health and Safety • Reviewing and Reporting

Notes – *detailed, accurate and differentiating notes which identify areas of strength and weakness are necessary to distinguish between different qualities of performance and to facilitate accurate allocation of marks once all evidence has been submitted.*
Handover -PPE – glasses, overalls and boots -check operation – went through each part of system - very good description - good demo -Fault – sensor, accuator, sensor (M/S) – realigned, PLC motor wire -Peer – spelling – rectify go through – post maintenance – update method statement – gloves -overall candidate performed really well and used the correct terminology. A good range of communication methods were used. Explanation of work carried out thoroughly.

Internal assessor signature	**Date**

Get in touch

The City & Guilds Quality team are here to answer any queries you may have regarding your T Level Technical Qualification delivery.

Should you require assistance, please contact us using the details below:

Monday - Friday | 08:30 - 17:00 GMT

T: 0300 303 53 52

E: **technicals.quality@cityandguilds.com**

W: **http://www.cityandguilds.com/tlevels**

Web chat available **here**.

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