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

8712-314 Control and Instrumentation Occupational Specialism

Grade Standard Exemplification Material

Distinction - Summer 2025

Version 1.1

Version and date	Change detail	Section
v1.0 31st October 2025	First published	N/A
V1.1 24th November 2025	Amendments in relation to City & Guilds Limited	Back Cover

Contents

Introduction

Summer 2025 Results

This document is aimed at providers and learners to help understand the standard that was required in the summer 2025 assessment series to achieve a distinction grade for the 8712-314 Maintenance, Installation and Repair in Control and Instrumentation Occupational Specialism (OS).

The Grade Standard Exemplification Material (Grade SEM) evidence provided for the distinction grade displays the holistic standard required across the tasks to achieve the distinction grade boundary in the summer 2025 series.

The aim of these materials is to provide examples of knowledge, skills and understanding that attested to **three marks above** distinction competence in summer 2025.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 for the maintenance activities
Task 2 - Perform and record the maintenance activities
Task 3a - Review and report the maintenance activities
Task 3b – Peer reviews
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 (https://www.gov.uk/government/publications/ofqual-guide-for-schools-and-colleges-2025/ofqual-guide-for-schools-and-colleges-2025#grading), whilst also recognising the standards required for these qualifications.

- The evidence presented, as a whole, was three marks above the distinction grade boundary. 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:

a. 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.

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

c. Demonstrate comprehensive technical skills for diagnosing components, assemblies and sub-assemblies to complete maintenance, installation, service and repair activities, in line with the requirements of the brief, working systematically, logically and efficiently.

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

e. Demonstrate comprehensive knowledge and understanding of the principles and processes required for disassembly, repair, configuration and re-assembly of control and instrumentation systems, ensuring that all tolerances and calibrations are in-line with specification.

f. 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.

g. 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 for the maintenance activities

Assessment number (eg 1234-033)	8712-314
Assessment title	Control and Instrumentation 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	A list of requirements and resources required, including justifications for the selections Completed risk assessment Method statement
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 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 – Resources

Item	Quantity	Justification
Tools and equipment		
Multimeter	1	Used for conducting electrical checks on the system such as continuity and voltage and will be used for fault finding with the power to the system issue.
Oscilloscope	1	Used to identify if the system is outputting the desired frequency to the PLC
Screwdriver (Phillips)	3	| will need various sizes as | do not know which shape and type fixings are part of the system. Will be used for deconstructing and reconstructing the system during maintenance
Oscilloscope probe	1	To be connected to the oscilloscope to carry out checks on the sensor signal being outputted
Small soft bristle brush	1	Used to clean dirt and debris from components without damaging them
Laptop with relevant software	1	Apply any software updates to the system as part of routine maintenance
Screwdriver (Flathead)	3	will need various sizes as | do not know which fixings are part of the system. Will be used for deconstructing and reconstructing the system during maintenance
Matherials/Components	Quantity	Justification
Water level sensor	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
Wireless transmitter	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
Wireless receiver	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
HMI	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
Alarm	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
Resistor	1	Known to be working spare on hand should the current one be discovered as faulty or not fit for purpose
Power supply	1	The issue with no power reaching the system may be due to a faulty power supply so a known working power supply that is compatible with the system could be crucial for fixing this issue

Insulated jumper wires	5	Known to be working spare on hand should a current one be discovered as faulty or not fit for purpose
Consumables	Quantity	Justification
Absorbent cloth	10	If any waste water is spilled It will need to be cleaned up and dried to prevent the risk of slips and trips as well as damage to electrical components
Clean microfiber cloths	5	To be used in the cleaning of the system as a necessary part of maintenance to remove any dirt, dust or debris that could be built up on components
PPE	Quantity	Justification
Electrostatic discharge mat	1	Prevents damage to components and prevents risk of stray current connecting the electrical components and wastewater as the work desks are metal.
Safety goggles	1	Protection from contaminated wastewater or projectiles damaging eyes.
Pair of Rubber soled, Steel toe safety boots	1	Mitigates risk of electric shocks And protects feet from damage from risks such as dropped tools.
Overalls/Dustcoat	1	Protects skin and clothing from potential contaminants in the wastewater
Insulated gloves	2	Mitigates risk of electric shocks as hands are protected
Technical Information	Quantity	Justification
Method statement	1	To allow me to follow a logical process during the maintenance activity ensuring all necessary steps are followed and in the correct order
Risk assessment	1	For studying before undertaking the maintenance activity to ensure a safe working process is followed and all potential risks are mitigated before the task is carried out
System Block diagram	1	Used to clearly identify the process the system follows to produce the signal and then get it to perform the desired output. Can also be used to aid in fault finding as it clearly shows the purpose/role of each component in the system additionally allowing for the input output fault finding technique to be applied
System Schematic diagram	1	Used to gain a clear understanding of where each component is within the system and how everything is connected. Useful when reconstructing the system post-maintenance and also for identifying faults as it will allow techniques such as the Half split method to be applied
Assignment brief	1	To refer back to throughout the process to ensure all requirements of the task are met
PPE List	1	Will tell me what personal protective equipment to wear when carrying out the maintenance

		activity to allow for safe working practices in line with HASAWA.
Timings of maintenance activity		
Activity	Time needed	Justification
Studying of risk assessment and PPE list	20 mins	Crucial for carrying out the work safely and not causing harm to yourself whilst working making you aware of risks in the work area
Visual inspection of work area	5 mins	Ensuring it is safe to carry out the work in the area and all hazards around it are mitigated
Preparation of work area	20 mins	Ensuring everything you may need is available to you and the area is safe to carry out the work
Visual inspection of tools and equipment	5 mins	Ensuring anything used to aid with the work is fit for purpose
Visual inspection and application of PPE	10 mins	Ensuring the PPE will do its job e.g. Does the dustcoat have holes in it if so it will not protect your skin
Reading of technical information	2 hours	Gain a clear understanding of the system you are working on and what faults may be there. How will you fix them if they are there? What are the requirements of the brief? How does the system work? What is the desired output? Etc.
Fault finding and fault fixing	Up to 3 hours	Identify and fix the power fault and any others that may arise during maintenance
Routine maintenance	2 hours	Cleaning down the system, replacing worn components, Updating software and firmware.
Calibration	1 hour	Calibrate the system so the readings of the water level are accurate and will maintain said accuracy over time
Writing up findings	25 mins	Keep record of findings to refer back to during the handover and for aid with future maintenance
Clean working area	30 mins	Return all tools and equipment to dedicated storage ensuring it is not damaged and the workspace is returned to its original condition
Waste disposal	25 mins	Ensure waste is organised into categories and is disposed of in line with relevant regulations
Contingency	30 mins	If any tasks overrun the activity can still be completed in the budgeted time

Wastage requirements	
Type of waste	Explanation
Electrical components	Any electrical waste such as faulty components is to be disposed of in line with WEEE regulations at a relevant recycling centre

Waste water	If the waste water contains contaminants it is to be taken to a chemical waste site that deals with hazardous/contaminated waste.
Non-electrical waste	Any other waste that is not electrical or contaminated is to be disposed of at the relevant section the local HWRC (Household waste recycling centre).
Fault finding methods	Explanation and application
Input to output	This technique is where you run a functionality check on the system and one part of the system isn't producing the desired output you know to work backwards from that point helping to identify where in the system the fault is located for example if there is no power to the sensor you know the issue is with the power input to the system.
Sensory checks	This method involves using various senses to identify a fault in a system. Visual Inspection-This is the process of looking over a system to identify clear faults such as loose connections, frayed wires or components connected in the wrong place. Hearing Checks-This is listening out for any noises during a functionality test that the system should not be making such as vibration noises or buzzing noises Smell Checks-This is using your sense of smell to identify issues for example the smell of burning would suggest a component has burnt out which may be the fault
Half split method	This technique involves powering the system and identifying which half of the system contains the fault for example you could use a multimeter to identify that the power is not reaching the wireless transmitter meaning the fault lies in the first half of the system
Unit substitution	This method involves changing out faulty parts for known working parts this is particularly effective when used in combination with other techniques as you can use one technique to identify the area of the fault and then replace the components in that area of the system with known working ones to identify the faulty component

Task 1 – Risk assessment

Hazard	Risk	Mitigation	Likelihood	Severity
Human				
Wet floors	Slips trips and falls	Ensure floor around the working area is dry and if anything is spilled use absorbent cloths to dry them straight away	2	4
Floors with trip hazards	Slips trips and falls	Ensure any objects such as tools or cables are off of the floor in your working area	2	4
Live electricity	Electric shocks	Ensure any live electricity is isolated using LOTO and tested for dead with a multimeter before working on electrical equipment. Wear isolated gloves and boots with rubber soles	2	3
Handling sharp objects	Cuts and skin abrasions	Handle sharp objects such as screwdrivers with care	2	2
High frequency sounds from alarm	Damage to hearing	Wear ear protection if the alarm is loud enough to cause discomfort	3	2
Contaminants in waste water	Skin irritation, Damage to eyes	Wear protective eyewear throughout the maintenance activity, Wear long sleeves and a dustcoat/overalls to prevent contact with skin	3	1
Water and electricity	Electric shocks	Ensure ware reservoir is handled with care during maintenance, ensure the system is isolated using LOTO before handling the reservoir in any way	2	4
Falling objects overhead	Head injury	Ensure the overhead shelf is not overfilled and nothing is hanging over the edge	1	3
System/Project				
Waste water spillage	Damage or destruction of component or whole system	Ensure water reservoir is handled with care, electrical components are removed or protected before reservoir is handled	N/A	N/A
Electrostatic	Damage to component	Ensure all electrical components are handled on an electrostatic discharge mat	N/A	N/A

Time	Running out of time	Ensure time is managed correctly and work is carried out in line with the method statement there is also 30 mins allocated into the timings to account for tasks taking longer than expected	N/A	N/A

Risk matrix

	Severity	Irritation	Permanent damage	Lost of limb	Death	Multiple death
Likelihood		1	2	3	4	5
Very Unlikely	1	1	2	3	4	5
Unlikely	2	2	4	6	8	10
Likely	3	3	6	9	12	15
Very likely	4	4	8	12	16	20
Will happen	5	5	10	15	20	25

Access requirements	Explanation
Trained personnel	Due to the nature of the equipment in the workshop a trained supervisor must be in the room with the engineer carrying out maintenance.
Confined spaces	Some parts of the workshop are deemed confined spaces such as a walk in storage room so the engineer must be comfortable entering these areas to obtain certain equipment

Task 1 – Method statement

Scope of works

I will be carrying out planned maintenance on a wastewater monitoring system as well as fixing an issue with power not reaching the system. I plan to use a combination of two fault finding techniques the Input to output method and unit substitution to resolve this fault as I feel this will be the most efficient way to resolve this issue as the power fault will most likely lie at the start of the system so I will work from the input towards the output until the fault is identified. All work will be performed in line with PPE regulations, HASAWA and Electrical regulations section 4. Once I have fixed this fault I will proceed to carry out the standard annual maintenance for this system including a calibration to ensure longevity of accuracy and reliability within the system.

Start of works

The first thing I will do before entering the work area is ensuring I have all the necessary technical information to hand. I will then proceed to analyse these documents in detail starting with the risk assessment and PPE list. Once I am satisfied with the work I am carrying out and understand the risks and how to mitigate them I will proceed to visually inspect the work area for any potential hazards and if any are found I will mitigate them in line with what is written in the risk assessment. Next I will acquire my PPE in line with the PPE list and proceed to check it over ensuring it is fit for purpose, if not I will report this to my supervisor and find a replacement once I am satisfied my PPE is fit for purpose I will equip it and proceed to set up my work area now checking over all of my tools and equipment ensuring I have access to anything I could need and that all of it is in acceptable condition to carry out the work.

Step by step process

Once I have the system in front of me and my workspace is prepared I will proceed to carry out my investigation as to why the system is not receiving power, I will apply the relevant fault finding techniques with the aid of my tools and equipment to fix this issue most likely a combination of Input to output and unit substitution. Once the system is receiving power I will proceed to isolate the system using Lock out tag out and then test the system for dead with a multimeter. When I am confident the system is isolated from power I will carry out a visual inspection of the system ensuring there is no loose connections, frayed wires which has been previously known to happen in this system according to the maintenance records or obvious damaged components and will replace them with known working components. I will then carry out a functionality check to ensure the system is producing the desired output to an accurate level and this is displayed as intended on the HMI. If it isn't producing an output, I will proceed to carry out the relevant fault finding methods, if it is producing an output but is not accurate I will proceed to carry out a calibration to the sensor and look to update firmware on the PLC. Once I am satisfied the system is working as intended I will once again isolate the system in the same way then begin to carry out my routine maintenance using clean microfiber cloths and a soft bristle brush to remove any build-up of dirt or debris in the system without damaging any components. I will carry out any software or firmware updates to the PLC and fill up the reservoir to maximum capacity and ensure the alarm sounds as intended if not I will apply my fault finding methods once again. If the original readings were accurate I will calibrate the system anyway to ensure it continually maintains accuracy and reliability over time. Once all updates have been completed, any

worn components are replaced, the system is calibrated and is outputting the desired signal on the HMI Panel I will deem the routine maintenance as complete and proceed to my end of works process.

End of works

Once I am happy with the functionality of the system I will proceed with reporting my findings on the maintenance record for aid in the handover as well as supporting future maintenance and to keep a clear record for legal reasons. I will follow my waste disposal requirements such as WEEE to dispose of any waste produced by the maintenance. Once waste is disposed of in line with the relevant regulations I will return my tools to designated storage checking them for damages first, if there are any damages I will report them to my supervisor. Once my working area is clean and everything is returned to dedicated storage, I will proceed to handover the system to the assessor demonstrating its functionality as part of the handover agreement.

Task 2 Perform and record the maintenance activities

Assessment number (eg 1234-033)	8712-314
Assessment title	Control and Instrumentation 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 Practical observation form Updated maintenance records and control documents Annotated method statement, including any recommendations for further investigation if required
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:

a) prepare the work area for the maintenance activities
b) perform the maintenance activities following your 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
    - demonstration of system functionality to the supervisor
    - reinstating the work area
c) record the maintenance activities, to include:
    - calibration results
    - completed test record sheets
    - updated maintenance records and control documents
    - annotated method statement, including any recommendations for further investigation if required.

Additional evidence of your performance that must be captured for marking:

- assessor observations:
    - of the work area preparation
    - of the maintenance activities
    - of the system functionality demonstration.
- Photographic evidence which shows:
    - the prepared work area
    - the work area after disassembly
    - the refitted components follow fault rectification (where applicable)
    - the re-instated work area.

Candidate evidence

Task 2 Test report

Fault 1

No power to the system meaning there is an issue with power supply, I then used my knowledge of common faults with power supplies to identify the issue was a faulty fuse, I changed the fuse and the system performed as expected.

Fault 2

No data reaching HMI, HMI displaying 0% at all times, I started by carrying out a visual inspection where everything looked OK, I then began with sensory checks where I smelt burning due to my ultrasonic sensor overheating so I replaced it with a known working sensor and the system worked as expected

Fault 3

Signal interpreted incorrectly by Arduino UNO sending wrong signal to buzzer and no signal to HMI due to a faulty section of code, I swapped to a known working PLC and the system performed the desire function.

Fault 4

No Display on HMI, I first checked using Arduino Cloud that the sensor was outputting a signal and it was reaching the laptop which it was, which meant the fault lied with the PLC. I then used the input to output method to identify everything had power and then identified everything had continuity with my multimeter, this lead me to realize the issue was due to the HMI being wired up incorrectly so I corrected this using my diagram. The HMI now had power but was not displaying Anything which told me that was the faulty component so I swapped it for a known working one and the system worked as expected.

Routine Maintenance/Calibration

I have calibrated the system using 250ml increments of water to the reservoir ensuring the system picks up on water level accuratly and that the buzzer sounds when full capacity is reached, I have cleaned down the system and carried out a visual inspection as part of the maintenance, no other issues were identified from this point.

Water level (actual)	HMI reading	Error	In tolerance ± 50ml
0ml	0%	0	✓
250ml	10%	0	✓
500ml	20%	0	✓
750ml	30%	0	✓

1000ml	40%	0	✓
1250ml	50%	0	✓
1500ml	60%	0	✓
1750ml	70%	0	✓
2000ml	80%	0	✓
2250ml	90%	0	✓
2500ml (buzzer sounds)	100%	0	✓

Post Maintenance calibration results

Notes and workings

Waste water ⟶ Level sensor ⟶Wireless transmitter⟶Wireless reciever⟶

PLC ⟶ HMI⟶level reading and info

PLC⟶Alarm⟶warning sound

No power to system

Sensor measure water level

When level reached maximum capacity the PLC will send a signal to an alarm

HMI shows real time level

PPE

Technical information

Tools equipment

Materials/consumables

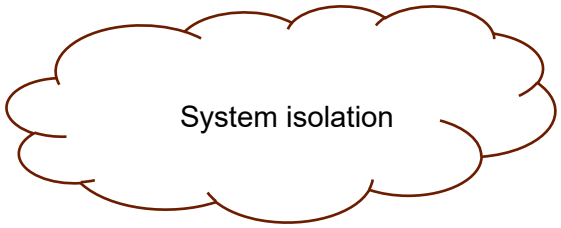
Wastage and disposal

Time needed – revise at end

Fault finding methods

Risk assessment

Access requirements



Block diagram to clearly lay out the process the system follows to create the desired output and function

Schematic diagram to gain a new understanding of where each component is within the system and how everything is connected.

<u>PLC/HMI</u>

Grey = GND ⟶GND

Purple = VCL ⟶ 5v

Blue = SDA ⟶ A4

Green = SCL ⟶ A5

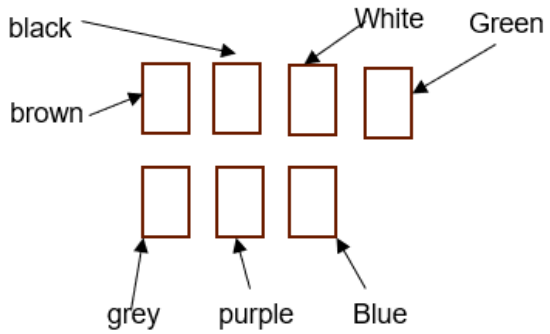
Red chip ⟶ breadboard

<u>Buzzer</u>

White – GND

Black – D7

Black chip/receiver



Brown – GND

Black – D9

White – D13

Green D12

Grey bottom left 2 in

Purple D10

Blue – Top left 2 in

Ultrasonic sensor → Breadboard → Chip

Brown = GND → GND

Red = Echo → D5

Orange = Trig → D4

Yellow = VCC → 5v

↑ ↑

Sensor → Arduino

Arduino → Chip

Brown → 2nd from far right top

Black → D10

Light grey ⟶ 2nd from right bottom

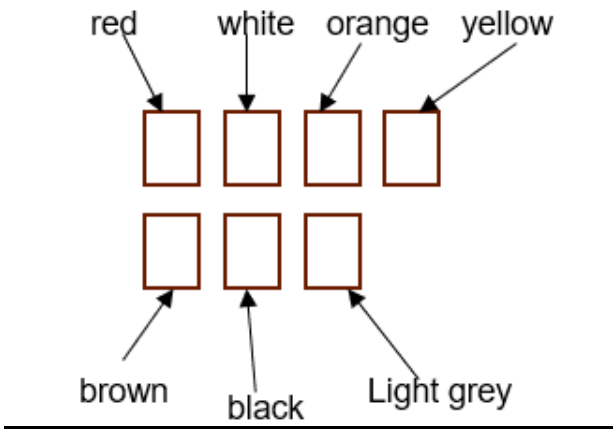
Yellow ⟶ bottom right

Orange ⟶ top right

White ⟶ D9

Red ⟶ GND

Black chip/ receiver



Task 2 Maintenance Schedule and Records

Equipment/System type	Identification No.
Wastewater control system	8712-314
Brand/Model	**Location**
City and Guilds	Workshop

Equipment/System specification
When in normal operation, the system should function as follows: • The water level sensor should monitor the water level within the wastewater reservoir and send this information to the PLC via the wireless transmitter and receiver. • The PLC should be programmed to monitor and record the information received from the water level sensor. • When the wastewater level reaches maximum capacity, the PLC will send a signal to the alarm to make it sound. • The human machine interface (HMI) should indicate the water level in the wastewater reservoir in real time. • The HMI should show the current operational state of the control system.

Maintenance records					
Service No	Maintenance date	Maintenance type (routine/scheduled, fault/repair)	Checked by	Repair details (where relevant)	Maintenance Engineer - signature
01	20/4/2023	routine/scheduled	xx	No faults or repairs are required. System functionality as per specification.	x
02	28/5/2024	routine/scheduled + fault/repair	xx	Issues with power supply and associated wiring found: • Intermittent power to the system. The power supply was found to be faulty and replaced with a new unit. System functionality as per specification after replacement. • Noted power supply wiring insulation frayed so wiring was also replaced at the same time.	x
03	dd/mm/yy	Routine/scheduled + fault repair	xx	- No power to system, Fuse was faulty so was replaced - Sensor cleaned with microfibre cloth, Visual inspection – no issues identified with system	<candidate>

04	dd/mm/yy	Fault/repair		- No data displayed on HMI, sensor was overheating so was replaced	<candidate>
05	dd/mm/yy	Fault/repair		- Buzzer sounding continually, no HMI signal – error in program, PLC swapped for known working one.	<candidate>
06	dd/mm/yy	Fault/repair		- No HMI display, wiring in incorrect places – rewired. - Still no display so HMI swapped for known working one.	<candidate>

Maintenance Schedule – annual unless specified otherwise					
Service No	Year	Detail inspection	Recommended planned maintenance	Maintenance Head Engineer signature	Maintenance Engineer signature
01	2023	Annual – routine/scheduled	Annual	x	x

02	2024	Annual – routine/scheduled	Annual	x	x
03	2025	Annual – routine/scheduled	Annual	x	
04	2025	Annual – routine/scheduled	Bi-monthly		<candidate>
05					
06					

Commentary	
Service No	Recommendations for future maintenance activity
04	Use the input-output approach to fault finding as this process allowed me to complete fault finding efficiently, start with visual inspection first as you may pick up on things such as loose connections.

Task 2 – Annotated method statement

Scope of works

I will be carrying out planned maintenance on a wastewater monitoring system as well as fixing an issue with power not reaching the system. *3) I will also carry out a calibration of the sensor ensuring it has not lost accuracy over time. I plan to use a combination of two fault finding techniques the Input to output method and unit substitution to resolve this fault as I feel this will be the most efficient way to resolve this issue as the power fault will most likely lie at the start of the system so I will work from the input towards the output until the fault is identified. All work will be performed in line with PPE regulations, HASAWA and Electrical regulations section 4. Once I have fixed this fault I will proceed to carry out the standard annual maintenance for this system including a calibration to ensure longevity of accuracy and reliability within the system.

Start of works

The first thing I will do before entering the work area is ensuring I have all the necessary technical information to hand. I will then proceed to analyse these documents in detail starting with the risk assessment and PPE list. Once I am satisfied with the work I am carrying out and understand the risks and how to mitigate them I will proceed to visually inspect the work area for any potential hazards and if any are found I will mitigate them in line with what is written in the risk assessment. Next I will acquire my PPE in line with the PPE list and proceed to check it over ensuring it is fit for purpose, if not I will report this to my supervisor and find a replacement once I am satisfied my PPE is fit for purpose I will equip it and proceed to set up my work area now checking over all of my tools and equipment *4) Ensuring the tools have been calibrated recently ensuring their accuracy ensuring I have access to anything I could need and that all of it is in acceptable condition to carry out the work.

Step by step process

Once I have the system in front of me and my workspace is prepared I will proceed to carry out my investigation as to why the system is not receiving power, I will apply the relevant fault finding techniques with the aid of my tools and equipment to fix this issue most likely a combination of Input to output and unit substitution. Once the system is receiving power I will proceed to isolate the system using Lock out tag out and then test the system for dead with a multimeter. When I am confident the system is isolated from power I will carry out a visual inspection of the system ensuring there is no loose connections, frayed wires which has been previously known to happen in this system according to the maintenance records or obvious damaged components and will replace them with known working components. I will then carry out a functionality check to ensure the system is producing the desired output to an accurate level and this is displayed as intended on the HMI. If it isn't producing an output, I will proceed to carry out the relevant fault finding methods, *1) Start by using Sensory checks alongside a visual inspection, if nothing is picked up on use input-output as this approach could save time if working on a strict time scale. if it is producing an output but is not accurate I will proceed to carry out a calibration to the sensor and look to update firmware on the PLC. Once I am satisfied the system is working as intended I will once again isolate the system in the same way then begin to carry out my routine maintenance using clean microfiber cloths and a soft bristle brush to remove any build-up of dirt or debris in the system without damaging any components. I will carry out any software or firmware updates to the PLC and fill up the reservoir to maximum capacity and ensure the

alarm sounds as intended if not I will apply my fault finding methods once again. *2) I will fill up the resevoir in 250ml increments to ensure accuracy as part of calibration on the system checking accuracy aswell as for function. If the original readings were accurate I will calibrate the system anyway to ensure it continually maintains accuracy and reliability over time. Once all updates have been completed, any worn components are replaced, the system is calibrated and is outputting the desired signal on the HMI Panel I will deem the routine maintenance as complete and proceed to my end of works process.

End of works

Once I am happy with the functionality of the system I will proceed with reporting my findings on the maintenance record for aid in the handover as well as supporting future maintenance and to keep a clear record for legal reasons. I will follow my waste disposal requirements such as WEEE to dispose of any waste produced by the maintenance. Once waste is disposed of in line with the relevant regulations I will return my tools to designated storage checking them for damages first, if there are any damages I will report them to my supervisor. Once my working area is clean and everything is returned to dedicated storage, I will proceed to handover the system to the assessor demonstrating its functionality as part of the handover agreement.

Task 2 Practical observation form

8712-314 Maintenance Engineering Technologies: Control and Instrumentation - Summer 2025

Candidate Name	Candidate number
<candidate>	ABC1234
Provider name	**Date**
<provider>	dd/mm/yy

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
Maintenance activities	• Decommissioning and inspection of the system. • Disassembly and reassembly of the system. • Diagnosing faults within the system, including carrying out appropriate tests. • Repairing the faults and replacing components as required. • Using appropriate tools and equipment. • Recommissioning of the system. • Demonstration of system functionality to your supervisor • Re-instating the work area.	• Health and Safety • Planning and Preparation • Systems and Components • Working with faults • 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.*

Work area preparation:

The candidate prepared their working environment to an acceptable standard. They collected the necessary tools, equipment, and personal protective equipment (PPE) listed in their resource plan and carried out basic visual checks on their condition. While the candidate did not verify calibration status for all instruments, they laid out tools in a generally organised way within their workspace. Obvious trip hazards were removed, and they made use of waste bins to keep the area relatively clean and safe. Although not fully thorough, the preparation allowed for safe progression of the task.

Maintenance activities:

Decommissioning and inspection of the system

The candidate followed standard isolation procedures and ensured the system was powered down before starting. A short cool-down period was observed. Their inspection was basic but covered the main system components. They showed awareness of the system layout but required guidance to understand the purpose of some parts. Their inspection identified areas that required deeper fault investigation.

Disassembly and reassembly of the system

The candidate correctly disassembled the system, carefully removing components and managing cables without causing damage. Although there was some uncertainty in the sequence of disassembly, they kept components together reasonably well. During reassembly, all parts were reconnected, and wiring was safe with no exposed conductors. The system was rebuilt successfully.

Diagnosing faults within the system (including carrying out appropriate tests)

The candidate approached fault-finding with effort but relied heavily on guesswork. They did not use voltage testing to confirm signal paths or component function, which limited the effectiveness of their initial diagnosis. Nevertheless, they did identify all four faults after trial and error:

1. Blown fuse - confirmed by using a continuity test.
2. Defective sensor - eventually identified by observing irregular trigger and echo voltages.
3. Sporadic alarm - traced to a PLC coding error, though it took several attempts to confirm.
4. Display issue – identified through a process of elimination during power-up.

Although their process lacked structure, the candidate was able to identify the faults with guidance and persistence.

Repairing the faults and replacing components as required

The candidate replaced the failed fuse and sensor once the faults were identified. They made changes to the PLC program to address the alarm issue and swapped the faulty

display with a working one. While they carried out the repairs successfully, they needed support to confirm correct replacements and to test that functionality had returned.

Using appropriate tools and equipment

The candidate used tools safely but did not always choose the most efficient tool for the task. Multimeter use was acceptable for basic continuity checks, though they did not apply it effectively for voltage testing. Diagnostic equipment was handled safely, and all tools were returned at the end of the task. Overall, equipment was used adequately, though technical application was limited.

Recommissioning of the system

The system was re-energised after all faults had been addressed, and the candidate carried out basic operational checks. While they did not conduct full functional testing or calibration, the system was shown to operate correctly. They would benefit from developing a more methodical approach to verifying that all functions meet specifications.

Demonstration of system functionality to your supervisor

The candidate explained the steps they had taken to resolve the faults, though some of the technical language used was unclear. With prompting, they were able to describe the faults and how they had identified them. Their explanation showed awareness of what was done, though confidence in justifying the methods used was limited.

Re-instating the work area.

The candidate cleared their work area, removed waste, and returned tools and equipment to storage. Some items were not returned to their original locations, but the area was left in a clean and safe condition. They followed good general practice in re-instating the workspace.

Internal assessor signature	Date
X	dd/mm/yy

If completing electronically, double-click next to the ‘X’ to add an electronic signature once the record is **finalised**.

Task 3a Review and report the maintenance activities

Assessment number (eg 1234-033)	8712-314
Assessment title	Control and Instrumentation 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 Maintenance Schedule and Records (updated)
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 your supervisor. This should be typically 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

I have now carried out the scheduled maintenance on the waste water system. This includes a visual inspection of the system, calibration of the sensor, cleaning down of the system and functionality testing.

During maintenance I identified four faults:

The fault originally mentioned of no power to the system was due to a faulty fuse, I identified this by using the fault finding method Input to Output where I started multimeter checks from the power input and identified there was no current reaching the system. I then applied my knowledge of common power supply faults to identify the mains fuse was blown, I replaced this with a known working one restoring power to the system.

The next fault was the sensor signals not being displayed on the HMI. The first method I used was a visual inspection and sensory check. From the sensory check I identified the smell of burning coming from the sensor so I switched off the system and waited for the sensor to cool down before replacing it with a known working one.

Another fault was the buzzer sounding continually. I used the input output method and identified that all components were working through functionality and continuity checks. This lead me to the conclusion that the wrong signal being recieved by the PLC was due to a programming error

Finally, I identified the HMI had no display. I first used arduino cloud to identify there was a sensor coming from the system proving the fault lied within the PLC. I then used a visual inspection to identify that the HMI was wired incorrectly according to my wiring diagram so I amended this and the HMI still had no display so I used unit substation to replace the HMI where the system carried out the desired function.

Once I fixed these faults and a functionality check was passed I went on to clean down the system and calibrate the sensor by filling up the reservoir in 250ml incriments and comparing the actual water level to the sensor reading where it was all in tolerance.

I also decided to ammend my method statement by adding calibration into it as I fell this should be an essential part of scheduled maintenance. I have also reccomended the maintenance become Quarterly instead of annual due to how many faults I picked up on, this would move the maintenance to a preventative approach instead of a corrective one.

I have produced an ammended maintenance schedule, updated method statement and test report for the work carried out in addition to a tools and equipment list and risk assessment.

Task 3a - Maintenance Schedule and Records (updated)

Equipment/System type	Identification No.
Wastewater control system	8712-314
Brand/Model	**Location**
City and Guilds	Workshop

Equipment/System specification
When in normal operation, the system should function as follows: • The water level sensor should monitor the water level within the wastewater reservoir and send this information to the PLC via the wireless transmitter and receiver. • The PLC should be programmed to monitor and record the information received from the water level sensor. • When the wastewater level reaches maximum capacity, the PLC will send a signal to the alarm to make it sound. • The human machine interface (HMI) should indicate the water level in the wastewater reservoir in real time. • The HMI should show the current operational state of the control system.

Maintenance records					
Service No	Maintenance date	Maintenance type (routine/scheduled, fault/repair)	Checked by	Repair details (where relevant)	Maintenance Engineer - signature
01	20/4/2023	routine/scheduled	xx	No faults or repairs are required. System functionality as per specification.	x
02	28/5/2024	routine/scheduled + fault/repair	xx	Issues with power supply and associated wiring found: • Intermittent power to the system. The power supply was found to be faulty and replaced with a new unit. System functionality as per specification after replacement. • Noted power supply wiring insulation frayed so wiring was also replaced at the same time.	x
03	30/04/2025	Routine/scheduled + fault repair		System calibrated and cleaned down, 4 faults rectified. System functionality now as per specification. Issues with power supply, program, wiring and components found: -Mains fuse was found to be faulty and replaced with a new one.	<candidate>

			xx	-HMI found to be faulty and replaced with a new one. -Sensor wired up incorrectly and faulty, replaced with new sensor and wiring errors rectified. -PLC program found to be faulty, program error rectified.	
04	30/07/2025	Routine/scheduled			
05	30/10/2025	Routine/scheduled			
06	30/1/2026	Routine/scheduled			

Maintenance Schedule – annual unless specified otherwise					
Service No	Year	Detail inspection	Recommended planned maintenance	Maintenance Head Engineer signature	Maintenance Engineer signature
01	2023	Annual – routine/scheduled	Annual	x	x
02	2024	Annual – routine/scheduled	Annual	x	x
03	2025	Annual – routine/scheduled	Quarterly	x	<candidate>
04	2025	Quarterly–routine/scheduled	Quarterly		
05	2025	Quarterly–routine/scheduled	Quarterly		
06	2026	Quarterly–routine/scheduled	Quarterly		
07	2026	Quarterly–routine/scheduled	Quarterly		

Commentary	
Service No	Recommendations for future maintenance activity
04	Scheduled maintenance to become every 3 months as 4 faults that compromised system functionality were found, every 3 months will allow maintenance to become preventative not corrective.

	Ensure all components are wired up and grounded correctly to prevent components becoming damaged or faulty. Checking PLC program now to become mandatory part of routine maintenance as a programming fault had to be fixed that stopped the system's functionality. Next scheduled maintenance due:30/07/2025

Task 3b Peer review

Assessment number (eg 1234-033)	8712-314
Assessment title	Control and Instrumentation 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	Peer Review Form 1 Peer Review Form 2 Updated 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 maintenance activities to be performed?
    - 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 statements, 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 Form 1

Assessment ID	Qualification number
Candidate Name	**Candidate number**
<candidate>	ABC1234
Provider name	**Provider number**
<provider>	
Date	**Series**
dd/mm/yy	Summer 2025

Question	Feedback
How well does the method statement enable maintenance activities to be performed?	The method statement is very detailed and covers listed faults for each individual components and the tooling and method to resolve them. It allows maintenance to be performed easily as in each step you can clearly read what is happening and why. This allows a very easy to read method statement.
How appropriate is the method statement and why?	The method statement is well suited to this maintenance activity. All of the fault finding methods and tooling are reasonable and what is expected to be used on a system like this. All health and safety considerations are there to ensure no harm and are not over the top, nor are there any serious missing that could cause a problem.
What are the implications to the business of the proposed method statement?	Implications to the business are costs where unit substitution is mentioned and also providing all tooling, h and s equipment, access requirements and training to ensure all legislation and code is followed. All implication is eithe time based or monetary
How could the method statement be optimised/improved?	Could be broken down so it's easier to read/follow along. Could specify fault finding methods and tooling insted of saying "relevant" or "calibration tooling" could say use half-split and use oscilloscope.

Task 3b - Peer Review Form 2

Assessment ID	Qualification number
Candidate Name	**Candidate number**
<candidate>	ABC1234
Provider name	**Provider number**
<provider>	
Date	**Series**
dd/mm/yy	Summer 2025

Question	Feedback
How well does the method statement enable maintenance activities to be performed?	- Method statement provides helpful separation of pre, start, step by step and post maintenance to break the schedule up - Descriptive on fault finding techniques throughout. - Needs spacing between each activity, spacing (paragraphs/new line) will help it be less confusing to read.
How appropriate is the method statement and why?	- The method statement is appropriate for the maintenance tasks as it has step by step process, describes why there is a need to check the loose connection and frayed wire. Explains what to do if there isn't the desired reading.
What are the implications to the business of the proposed method statement?	Unit substitution will require the operator to have every piece of equipment in the system. May implicate that operator has to carry around a lot of equipment.
How could the method statement be optimised/improved?	- As stated, needs to have clearer spacing between steps. As a reader I lost track of where I was many times – needs to be easy to read when following during activity. - I agree with the annotations already on the sheet. - How did you know if there was a power issue.

Task 3b – Updated method statement

Scope of works

I will be carrying out planned maintenance on a wastewater monitoring system as well as fixing an issue with power not reaching the system. I will also carry out a calibration of the sensor ensuring no accuracy is lost over time. I plan to use a combination of two fault finding techniques the Input to output method and unit substitution to resolve this fault as I feel this will be the most efficient way to resolve this issue as the power fault will most likely lie at the start of the system so I will work from the input towards the output until the fault is identified. All work will be performed in line with PPE regulations, HASAWA and Electrical regulations section 4. Once I have fixed this fault I will proceed to carry out the standard annual maintenance for this system including a calibration to ensure longevity of accuracy and reliability within the system.

Start of works

[first thing I will do before entering the work area is ensuring I have all the necessary technical information to hand. I will then proceed to analyse these documents in detail starting with the risk assessment and PPE list. Once I am satisfied with the work I am carrying out and understand the risks and how to mitigate them I will proceed to visually inspect the work area for any potential hazards and if any are found I will mitigate them in line with what is written in the risk assessment].

Next I will acquire my PPE in line with the PPE list and proceed to check it over ensuring it is fit for purpose, if not I will report this to my supervisor and find a replacement once I am satisfied my PPE is fit for purpose I will equip it and proceed to set up my work area now checking over all of my tools and equipment Also ensuring tools have been calibrated to guarantee their accuracy ensuring I have access to anything I could need and that all of it is in acceptable condition to carry out the work.

Step by step process

Once I have the system in front of me and my workspace is prepared I will proceed to carry out my investigation as to why the system is not receiving power, I will apply input to output to identify where in the system there is no power starting at the power supply. (To check which fault finding method to use in this scenario).with the aid of my tools and equipment to fix this issue most likely a combination of Input to output and unit substitution.

[Once the system is receiving power I will proceed to isolate the system using Lock out tag out and then test the system for dead with a multimeter. When I am confident the system is isolated from power I will carry out a visual inspection of the system ensuring there is no loose connections, frayed wires which has been previously known to happen in this system according to the maintenance records or obvious damaged components and will replace them with known working components].

I will then carry out a functionality check to ensure the system is producing the desired output to an accurate level and this is displayed as intended on the HMI. If it isn't producing an output, I will proceed to carry out the Input to output fault finding technique (to clarify which method to use in this scenario.), Start by using sensory checks and visual inspection, if nothing is picked up on use input-output as this approach will save time when working on a

strict timescale if it is producing an output but is not accurate I will proceed to carry out a calibration to the sensor and look to update firmware on the PLC.

[Once I am satisfied the system is working as intended I will once again isolate the system in the same way then begin to carry out my routine maintenance using clean microfiber cloths and a soft bristle brush to remove any build-up of dirt or debris in the system without damaging any components. I will carry out any software or firmware updates to the PLC and fill up the reservoir to maximum capacity and ensure the alarm sounds as intended if not I will apply my combination of input to output and unit substitution (to clarify which method to use in this scenario) once again].
I will fill up the resevoir in 250ml incriments to ensure system accuracy as part of calibration and also to test the buzzer is working when intended as part of functionality checks.

If the original readings were accurate I will calibrate the system anyway to ensure it continually maintains accuracy and reliability over time. Once all updates have been completed, any worn components are replaced, the system is calibrated and is outputting the desired signal on the HMI Panel I will deem the routine maintenance as complete and proceed to my end of works process.

End of works

[Once I am happy with the functionality of the system I will proceed with reporting my findings on the maintenance record for aid in the handover as well as supporting future maintenance and to keep a clear record for legal reasons].

I will follow my waste disposal requirements such as WEEE to dispose of any waste produced by the maintenance. Once waste is disposed of in line with the relevant regulations I will return my tools to designated storage checking them for damages first, if there are any damages I will report them to my supervisor. Once my working area is clean and everything is returned to dedicated storage, I will proceed to handover the system to the assessor demonstrating its functionality as part of the handover agreement.

Feedback notes

I knew there was a power fault as it was mentioned in the brief (response to “how did you know there was a power issue feedback”)

Tools and equipment may be expensive or hard to carry around but are neccesary for efficient and effective maintenance on this system (response to feeback stating it is alot to carry or may be expensive).

I used my peer review feedback to ammend my method statement clearly stating which fault finding method to use for each scenario.

I decided to not act on the feedback stating the equipment may be too much to carry or too expensive as I feel it is all essential to carry out maintenance within the allocated time.

Task 4 Complete Handover

Assessment number (eg 1234-033)	8712-314
Assessment title	Control and Instrumentation 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	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 supervisor to complete handover procedures, including:

- confirmation of the work completed
- amended annotated 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:

- assessor observations of the handover meeting.

Candidate evidence

Task 4 Practical observation form

8712-314 Maintenance Engineering Technologies: Control and Instrumentation - Summer 2025

Candidate Name	Candidate number
<candidate>	ABC1234
Provider name	**Date**
<provider>	dd/mm/yy

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

The candidate carried out maintenance on a water system and identified four faults during the process. These included a power issue, a missing sensor signal, a programming error, and a general fault that required unit substitution.

They applied basic fault-finding methods, using an input/output approach with a multimeter to address the no-power issue. When the sensor signal failed to appear on the human machine interface (HMI), the candidate conducted a visual and sensory inspection and replaced the faulty sensor with a new one. For the programming-related fault, they used input/output testing to isolate the problem and ultimately resolved it through unit substitution, continuing until the system produced the correct outcome.

The candidate calibrated the system by adding water in 250 ml increments and comparing the actual volume with the sensor readings. They confirmed that the results were all within the acceptable tolerance range, demonstrating a functional calibration process.

Despite receiving peer review feedback, the candidate chose not to incorporate suggested changes, citing potential cost concerns. However, they did recommend that calibration be maintained as a routine part of the maintenance process due to its importance. Based on the number of faults found during the task, the candidate also recommended that maintenance

be performed quarterly rather than annually to reduce system downtime and catch issues earlier. There was no walkthrough or explanation of how the overall system operates, and no technical terminology was used throughout the task. While the candidate addressed each fault and completed the maintenance successfully, the communication and technical details were minimal. A more in-depth explanation of the system and clearer use of technical language would have strengthened the handover.

Internal assessor signature	Date
X	dd/mm/yy

If completing electronically, double-click next to the 'X' to add an electronic signature once the record is **finalised**.

Principal Moderator Commentary

The candidate has analysed the technical drawings and service schedule thoroughly, producing a clear, justified method statement. Safe working methods were embedded, e.g. full lock-out/tag-out with signage and proving dead. Work was carried out logically, with measured values compared to specification, ensuring compliance with regulations and standards producing an excellent quality of work.

The candidates risk assessment identified hazards such as electrocution, water spills, and stored energy, with detailed mitigations. The work area was kept organised, tools returned to storage, and waste segregated (WEEE bin for wiring). The assessor noted that the area was left clean and safe after completion, evidencing exemplary housekeeping to allow safe and efficient working.

The candidate demonstrated comprehensive technical skills for diagnosing components, assemblies and sub-assemblies, they haves used a range of diagnostic techniques, including half-split testing and input/output checks, to identify faults. All four faults (fuse, wiring, transmitter, resistor) were correctly diagnosed in a structured manner. Faults were recorded clearly, showing logical sequencing and efficiency.

Selected tools and equipment were appropriate and use the of tools demonstrated exemplary technical skills e.g. Tools were selected and used appropriately: oscilloscope for wireless signal analysis, multimeter for voltage checks, crimp tools for secure terminations. Components were safely isolated before removal, with replacements fitted accurately and tested. The candidates annotated method statement recorded changes in process, demonstrating systematic, logical and efficient working.

The candidate demonstrated comprehensive knowledge and understanding of principals ad processes required for disassembling and reassembling the system, this was completed with accuracy, ensuring all terminations were secure and polarity correct. Calibration records showed the water level sensor was within 1% of specification, and recommissioning confirmed the HMI, PLC, and alarm operated correctly.

The candidate has justified tool selection in Task 1 (e.g. oscilloscope for waveform checks, clamp meter for current draw), and these were used effectively during Task 2. Decisions were consistent with manufacturer specifications and health and safety standards, demonstrating both technical and safety awareness.

Task 3a report and Task 4 handover used correct technical language throughout (e.g. “pull-down resistor,” “proving dead,” “calibration tolerance”). The technical report was well-structured for supervisory review, while the handover explanation was clear and accessible, showing consideration for both technical and managerial audiences.

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**.

The T Level is a qualification approved and managed by the Institute for Apprenticeships and Technical Education.