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

8712-313 Electrical & Electronic

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 8712-313 Maintenance, Installation and Repair in Electrical & Electronic 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 for 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 diagnosing components, assemblies and sub-assemblies to complete maintenance, installation and repair activities in line with the requirements of the brief, working systematically, logically and efficiently.

Demonstrate exemplary technical skills using tools and equipment for electrical and electronic 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 re-assembly of electrical and electronic systems, ensuring that all tolerances and calibrations 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 for the maintenance activities

Assessment number (eg 1234-033)	8712-313
Assessment title	Electrical and Electronic 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, 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 needed to carry out 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 techniques 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 - List of requirements and resources

Tools and equipment required	quantity needed	Reason needed
230 v capacitors	1	We need a 230v capacitor so the circuit is being supplies by the correct voltage with what runs through your house and what the circuit needs to be supplied therefor the circuit will not blow and run well.
Step down transformer	2	We need this to successfully step down the voltage that is being supplied to us from the national grid to 230v, so our circuit has the correct amount of voltage running through it.
Soldering iron	1	We need a soldering iron in case we run into ant issues such as a wire being open where we need to solder it back together.
Soldering iron stand and sponge	1	We need a place to store the solder as it will be too hot to just leave on a table and could be a fire hazard and we need a way to clean the soldering iron so it will work to its best abilities and need to use a soldering sponge so there is no risk of fire.

De-soldering pump	1	We need a de-soldering pump to get rid of any parts left over or remove parts we have soldered wrong as these will be too hot to handle meaning they will be a safety hazard.
Philips head screwdriver	1	In case we come across and screws or bolts where a Philips head screwdriver would be ideal that a flathead would not do, and I you tried it is likely to grind the head of the screw making you unable to remove it.
Flat head screwdriver	1	In case we come across and screws or bolts where a flat head screwdriver would be ideal that a Philips head would not do, and I you tried it is likely to grind the head of the screw making you unable to remove it.
hammer	1	In case we need to hammer any components into place such as wire holders or screws into position, be careful when using these to not catch your fingers as this could become a safety hazard.

Wire crimping tools	1	We may need one of these to make it easier and save time while crimping and stripping wires as we save time instead of using the snips.
oscillometer	1	We need one of these so we can check everything coming In and out of the circuit.
Multi meter	1	We need one of these so we can check If the wires have voltage running through them.
Snips	1	In case we need to cut a wire down to size or if we need to strip the wire down to size.
Voltmeter	1	We need one of these to read voltages throughout the circuit to see which of our wires have a current or voltage running throughout them this shows us if the problem is with our wires.
Wire cutters	1	We need these if we need to cut wires down to size and may also be used for stripping the cable these can be a good back up to snips if you do not have them.
LED Lights	3	The circuit has LED lights so we could do with having some in case the issue is with the

		LED lights, and they cannot be fixed, and they must be fully replaced.
AC to DC converter	2	We need an AC to DC converter to convert the currents from AC which is what they will. come in as to DC so the circuit can successfully run……

Switch	1	We may need a switch as this is on the circuit and could have completely blown and need completely replacing.
Soldering materials to use	1	We need materials to that we can use to solder otherwise the soldering iron is completely useless.
Brush and pan	1	I will require a brush and a pan for when I clean up so I can thoroughly clean the area around me
Material bins	2	I will require the correct material bins for different things such as wires and screws overwise it could be a safety hazard and at risk of a fire hazard

Materials screws and components	**quantity needed**	**reason needed**
screws	1 box full	We need screws in case anything needs removing and put back in or added we need screws so we can insure it is in well and will not break off and move
3 core wire barrels	1 barrel	We need 3 core wire in case the circuit is using 3 core wire and we must replace the wire we need to insure we are replacing it with the correct wires
4 core wire barrels	1 barrel	We need 4 core wire in case the circuit is using 4 core wire and we must replace the wire we need to insure we are replacing it with the correct wires
Wire holders	1 box full	We need these to hold wires that are going between boxes into a neat and tidy position that looks good overwise they are going to be all over the place and look tacky this could ultimately bring you reputation down
Wire backboxes	4	In case backboxes are damaged or cracked we should bring spares to ensure

		it is going to be working to its best standard and not broken

PPE needed.

PPE needed	quantity needed	reason needed
Hard hat	1	Needed in case of falling objects landing on your head a hardhat reduces the risk of a fatal injury that this causes
Safety boots	1 pair	In case objects land on your feet the stee caps at the end will protect you, from serious harm and cushion your feet, also protect you from harmful chemicals that an ordinary shoe would not be able to repel by soaking into the fabric and leaking onto your foot while with safety boots it cannot do this and will only splash on
Safety goggles	1	Protects your eyes from harmful projectiles that may be coming your way and protects you from dangerous chemicals that may splash in your eyes and could potentially blind you or burn your face also protects you rom splintering while doing activities such as

		hammering where a splinter could shoot out and hit you
Overalls	1	Protects your whole entire body from dangerous chemicals getting onto your skin which could cause swelling, a rash, burning and maybe could be fatal the fabrics on the overalls are too thick to let the chemicals soak through, they also protect your body from cuts and bruises due to there thick fabric material used to create them projectiles will have little to no affect or be severely numbed down.
Ear protection	1 pair	These will protect you from loud noises that could harm your eardrums, if working in a loud environment your ears could be permanently affected if the correct steps aren't taken such as wearing ear protection weather that be ear buds or protective headphones and taking breaks at appropriate times but not staying in the loud noise for to long.
Respiratory equipment	1	Respiratory equipment may not be needed but is always

		safe to have as you do not know the condition of what you are repairing because If it isn't looked after there may be a lot of dust on the item which you could then breath up meaning you are inhaling a lot of dust and over items which ultimately may be very bad for your health so I would recommend bringing respiratory equipment.
Protective gloves	1 pair	Protective gloves should be worn to protect you from cuts and chemicals, these gloves will give you protection from sharp objects due to there thickness so if you do end up getting a cut it is way better than it would have been and protects your hands from chemicals reaching the skin which could leave burns and swealing and sometimes cause the hand to have to get amputated.

Task 1 – Risk Assessment

Risk	Why it's a risk	Severity	Possibility	Overall
Slips trips and falls	Slips trips and falls are the leading hazard in the workplace and can cause harm like bruises and in extreme cases broken bones or death if landed on head, to stop this make sure workplace is tidy and regularly cleaned	1	2	2
Working with electricity	Working with electricity can be fatal if not done correctly as there is enough voltage running through our circuit to kill a human and electricity like to arc so you don't even have to be stood close this could leave you with burn and bruise marks and can be fatal, to prevent this make sure electrical circuit is constantly checked and correct PPE is always worn	3	1	3

Falling from hights	Falling from heights can be fatal if not performed safely and can leave you with severe concussion, broken bones and in some cases death the working at heights regulation goes into depth with this, to prevent this make sure a harness is worn and you are complying with the regulations	2	2	4
Manual handling	Manual handling can be done any place and time and to counter this you should learn the proper lifting techniques if not this could cause you severe back pain, slipping disc and in extreme cases broken bones	1	2	2
Objects falling from height	This is a risk because if objects fall on your head and you are not wearing your correct PPE this could cause a fatal blow if falling from heigh enough or a concussion and you would be liable If not wearing the correct PPE, to prevent this I would recommend keeping a tidy workplace	2	1	2
Sharp objects	This could cause cuts, bruising and severe blood loss depending on where you are cut and could be caused by any thing from tools left out to metals , this could also cause infection if not dealt with properly and urgently by cleaning the wound out then wrapping it n bandage and if severe enough could leave you out of work , to counter this make sure your work place is clean and constantly tidied and that	2	1	2

	you are wearing the correct PPE such as protective gloves and overalls			
Breathing issues	If working in a location wear there is lots of dust and particles in the air and on the components, you are working on you could be at risk to breathing in all the dust causing your lungs to get flooded which could cause your breathing to become shallow and fast you may be effected long term by this as well, I would recommend using breathing apparatus to counter this	1	1	1
Lack of training	This could be a risk because if people have a lack of effective training on the equipment's they could harm themselves and others , for instance not ever one knows how to use a saw or hammer correctly and this could cause cuts and broken fingers , or counter act this make sure everybody who is working on the tools if at least trained to an average level and is competent and confident the tools and if your not confident ask for help.	1	1	1

Time needed to carry out this task.

For this task of repairing the circuit I have been given I will have been given a time frame of 11h to complete the task, within this 11h I will be expected to find the problem within the circuit and fix said problem but in total I have 22 hours to complete the entire project.

Wastage and disposal requirements

For this I would expect to find separate bin for my rubbish such as a bin for wires being separate to a bin used for spare screws overwise this could cause some safety hazards such as fires and I would like it to be expertly exposed off and not through in with general waste because this also causes fire hazards.

Access requirements

the LED should stay on for a minimum of 20secinds after movement was last detected.

The internal PIR should switch internal front door and corridor LED lights on if movement is detected in the building and then go of after 10 seconds.

Fault diagnosis techniques

Visible inspection of the circuit to check for any obvious problems using this technique I had eliminate many issues straight away and it helps me focus on what I need to do.

Electrical inspection, using this I would go into a deeper dive of the circuit and check all the electrical components using a multi meter or a voltmeter.

Multi meter or voltmeter, using this I would check which wires and components have power running throughout them and which done, and this would help me determine what the issue is.

Task 1 – Method Statement

Firstly I will start by putting on the correct PPE I need which would be a hardhat , steel cap boots , overalls , eye protection and ear protection if it was necessary then I will a risk assessment on where I am working to make sure it is a safe environment for me to work In , after this I would start by doing an inspection of the circuit to check for any visible problems that can be seen by eye , ill go over each component of the circuit checking for cracks in the back boxes or any of the components then ill check all the wires for snags and breaks or to see if they have come loose from where they are supposed to be , by doing this I will be eliminating possible errors and narrowing down until I find the actual problem with the circuit and if errors are found I will do what is necessary to fix said error whatever it may be .

After this, I will do a further inspection into the circuit but this time I will be using the tools at my disposal such as the multi meter and the voltmeter. I will start by using my multi meter on the wires and checking for voltage and will be doing this by putting one of the prongs from my multi meter at the base of the wire where it connects from and getting the other prong from the multi meter and putting it were the wire connects into the circuit then I will check or a reading and if it is between 0 and 1 it meant we have power in that specific wire and that it is running fine I will then further this check by repeating the process I have just described onto every single wire in the circuit to check if they have power flowing throughout them and if they are found to not have power running throughout them it means they are broken and need repairing so I will take the necessary steps towards fixing the problem.

If problems have been located during my checks I will then put in place the necessary process to fix them , for example if I found one of my wires to be broken and have to voltage running throughout them I will use a Philips head screw driver to take of the boxes the wire is connected to I will then unscrew each cable from the wire which is earth , live and neutral and will remove the cable and replace is with a new one using my crimping tools then putting the correct wire in the correct spot before putting the box back on ad doing another test with the multi meter to check for volts . If the problem is visible like a cut in the wire, I will first further investigate to check the wire still works and if it does, I will use my soldering iron and solder the wire back together.

After I have located and fixed the problem I am going to check every thing once again for any errors I may have missed the first time and if none are located I will then move on and actually check what I have fixed to make sure it works properly and as its supposed to , I will

repeat the same process I did when I found out the components wasn't working for example if I had replaced a wire I would use my multi meter and check weather there was a volt running throughout the wire and if there was after I had made my repairs I would know that I have successfully fixed the component I wanted to.

After this I would start tidying up my work area by putting all the tools, I have used away in the correct allocated storage space so I know they are out the way and cannot cause ay hazard as they are being stored safely and then put any loose components like screw back where they belong either back into there boxes or into a correct bin where they cannot cause a hazard. After everything like my tools and random components have been cleaned up I would ten get a sweeping brush and pan out and sweep up the surrounding area to where I have worked to make sue for a clean finish.

Finally, I would wash my hands with the correct soap that the workshop has that kills everything on my hand and then after this I would take my PPE off and correctly store this back from where I obtained it and would recommend getting the system regularly serviced by an engineer.

Task 2 Perform and record the maintenance activities

Assessment number (eg 1234-033)	8712-313
Assessment title	Electrical and Electronic 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 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
    - updating the 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 records

Problem	solution	why it was a problem
Live wire in switch had not been grounded	I removed the wire before snipping I then feeding it back into the system and did a continuity test and new it worked	If not replaced the switch would have never worked as was receiving no power
LED needed replacing	Replaced the LED as it was broken ad nothing was coming through	Led was broken so would have emitted no light
Earth wire in rcb connected to neutral with neutral sleeve	Removed wire completely from circuit	The circuit would have kept tripping
Time on sensors wrong	Changed time on top of sensors with screwdriver changing the screw	LEDS would not stay on for time required

Task 2 – Maintenance Schedule and Records

Equipment/System type	Identification No.
Security lighting system	8712-33
Brand/Model	**Location**
City & Guilds	Workshop

Equipment/System specification
• The residual current device (RCD) should protect the system from any electrical issues. • The AC/DC convertor converts 230 V AC to 12 V DC • The external passive infrared sensor (PIR) should switch on the external LED of the building if it detects movement up to a maximum of a 10-metre range. • External LED should be on for a minimum of 20 seconds after movement was last detected. • The internal PIR should switch internal front door and corridor LED lights on if movement is detected in the building and then go off after 10 seconds once movement has stopped.

Maintenance records					
Service No	Maintenance date	Maintenance type (routine/scheduled, fault/repair)	Checked by	Repair details (where relevant)	Maintenance Engineer - signature
01	20/4/2022	routine/scheduled	JS	No faults or repairs required. System functionality as per specification	J Smith
02	28/5/2023	routine/scheduled + fault/repair	AB	Two faults found; • Replaced external motion sensor as intermittently working, system functionality as per specification after replacement component installed. **Noted** water penetrated external motion sensor. • Replaced loose wiring to RCD output	A Bloggs
03	24/04/2024	Fault/repair +replacing components		4 faults found. • Live cable into socket had not correctly been grounded and could not conduct, meaning no power was going to the switch – removed wire and stripped it before re-installing into circuit then testing for continuity which there was	

				• Earth cable found with sleeve on it in the rcb causing the whole circuit to trip making it a hazard – removed the wire which was connected between the earth bar and the neutral bar. • Replaced the LED, after turning the circuit on I found the external led to not be emitting light while the internal LEDs were this lead me to test or continuity throughout the circuit and the only place that didn't have any was the led . after replacing the led I rewired it back into the circuit and then turned it back on and found that all 3 LEDS where emitting light. • Time the light stayed on was found to be incorrect on both internal and external LEDS which I checked with a stopwatch , the external one had to be on for 1 minute 20seconds while the internal ones had to stay on for 1 minute 10 seconds so I used a small flat head screw driver and changed the time they stayed on in the sensor by twisting the screw inside which changed the time taken .	

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	2024	Every 3 months	Monthly – routine/scheduled		
05					
06					

Commentary	
Service No	Recommendations for future maintenance activity
01	Maintain regularly so nothing like this happens again – maintain once every 3 months

Task 2 – Assessor Observation

Task 2 Practical observation form

8712-313 Maintenance Engineering Technologies: Electrical and Electronic - summer 2024

Candidate Name	Candidate number
Provider name	**Date**
	08/05/24

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
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. • 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: Before entering the workshop, Candidate checked his PPE and then put it on. Candidate removed the covers and looked for loose wires or snags. During continuity testing Candidate identified a S/C between the DB and the socket on the live wire. The cable needed to be re-terminated and connected to the live terminal in the socket. Candidate also found a wire going from the neutral block to the earth block in the DB. This was causing a short so was removed. Once power was supplied to the system both internal LEDs were found to be good, but the Ext LED had a fault. Candidate decided to replace the Int LED. Candidate then started to calibrate the system. The Int LEDs were set to 1:03 and 1:43 for the Ext LED when he stopped the task. He isolated the circuit, disposed of the waste and tidied his tools away. 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 • Re-instating the work area.

Internal assessor signature	**Date**
	08/05/24

Task 2 – Photographic Evidence

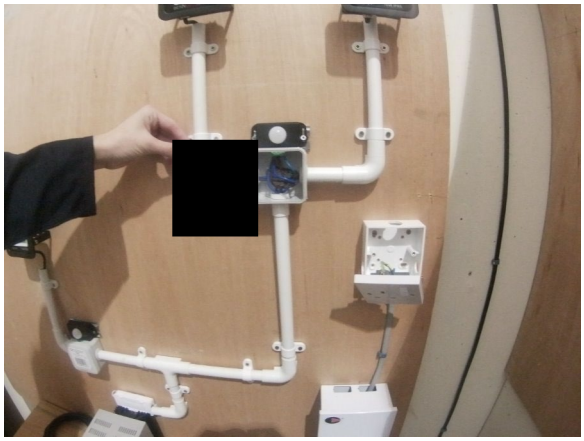
PRIOR TO TASK

Checked his PPE and isolated the power supply.



Continuity testing

Candidate has removed the covers to complete continuity testing on the circuit.

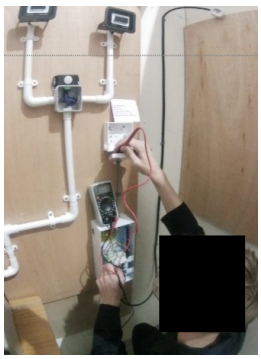


Fault 1 – RCD Tripping

Testing the socket and DB to identify what was causing the RCD to trip.

Fault 2 – Open Circuit on PSU

Located an open circuit within the 3-pin socket.



End of day 1

At the end of the first period candidate has tidied his work area and isolated the power.

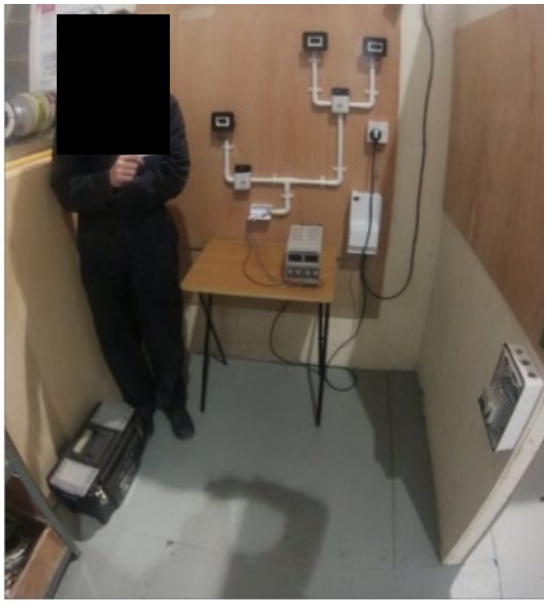
Fault 3 – External Light Blown

Found that the Ext LED was blown so needed to be replaced.

All lights now work and he has moved onto to calibrating the system.

Post Task

He has finished the task. His work area is tidy, and the power has been locked off.



Task 3A Review and report the maintenance activities

Assessment number (eg 1234-033)	8712-313
Assessment title	Electrical and Electronic 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
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 must 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 successfully carried out the maintenance required to spec on the LED system which includes fault finding, fixing the faults found, replacing parts if required and changing the time the LEDs stay on for after the PIR sensors last detect motion as the external LED had to stay on for 1minute 20 seconds and the internal LEDs had to stay on for 1 minute 10 seconds after last detecting motion. I did this in a safe manner by following all engineering guidelines and regulations required such as working with electricity and always wearing the correct PPE which includes wearing steel cap boots, overalls and safety glasses which prevented me from any hazards that could have happened in the duration of this maintenance. I also used the LOTO (Lock out tag out) techniques throughout this maintenance and repair to ensure maximum safety to me or whoever Is working on the circuit , the LOTO meant that when some one is working on the circuit you lock out at the mains so no power can be sent through and you are working on a dead circuit unless removed but would keep the key on you at all times so no accidents can happened , this is vital because if it came liver while you where working on it you could potentially suffer life threatening injuries such as severe burn and sometimes even death .

I mostly followed the method statement that I created in task 1 throughout this test as when I started, I first did a visible check looking for any cuts or breaks on the wires and also did a smell test to see if I could smell any burning which could suggest a wire or a component has broken and burnt out which led me to find no obvious faults suggesting all the faults where internal. After this I did an electrical analysis on the circuit using fault finding techniques such as testing for continuity with a multi meter throughout the circuit , this led me to find that a live wire going from the RCD to the switch was not correctly grounded and therefore could not carry a charge which I then removed and used the appropriate tools at my disposal to snip the wire and leave the copper showing so it would work as required and I also did a time check using a stopwatch and seeing how long the external and internal LEDs stayed on for after the PIRs last detected motion . As the assignment brief stated that the residual current device is constantly tripping, I was inclined to check there, where I found an earth wire with sleeving on going between the earth bar and the neutral bar and this was the cause of the trip.

Faults found and how they were rectified.

- Live wire going from the main supply box into the switch was not grounded causing no power to be transmitted so the switch would not work, I then used the tools at my disposal to take the wire out at the end it had not been grounded which I then grounded it myself before placing it back into the correct place it goes in switch ., for this the tools I needed where a Philips head screw driver and wire cutters which I used to ground the wire .
- Earth wire with neutral sleeving inside the main supply causing the RCD to trip needed removing so I removed this from the circuit entirely only using a Philips head screwdriver.
- External LED did not work when supplied with power which needed replacing by a new LED which worked after I replaced it , to replace it I first had to disconnect at the connector block between the LED and the PIR and then use a Allen key to remove the LED from its bracket to replace it I placed the new LED in the bracket and then using the Allen key I tightened it up then re connected the wires with the PIRs wires at the connector block to do this I needed a Allen key and a small flat head screw driver .
- The time the internal and external LEDs stayed on for after the PIRs sensors last sensed motion , I fixed this by firstly timing how long they stayed on for after last sensing motion and I found that it was to short so I changed the dial on top of the PIR that changed the time on how long they last seen motion and then went through the process again and timed how long it took with a stopwatch . I got my times to 1 minute 40 seconds for the external and 1 minute and 3 seconds for the internal LEDs, I did not get then bang on as the PIR did not work in increments of seconds and instead minutes so I got them too as close as I could in the time allocated.

I would recommend that you get the systems maintained more frequently as I believe that there would not have been this number of faults if you had, I would recommend getting the system checked and maintained at least once every 3 months so that the faults cannot build up and ultimately causing the circuit to be un fixable and need replacing which would cost much more than simply getting the circuit maintained on a more regular basis.

After I had finished the maintenance and repair I tidied up where has worked by putting any loose materials and components that were not needed any more in the appropriate bin such as wires in the wire bin so I could correspond with regulations and keep the work space safe

from hazards , I then swept down my area so no hazards where left so things such as slips trips and falls could not happen and leave me reliable . I put the tools I used in the correct place and any additional components / tools I returned to where they belong or gave them back to who gave them to me.

In total I believe that I have done a good job of the maintenance and repair of this system as it is almost fixed to spec and a few minor adjustments and I’m sure it would work perfectly to spec all you would need to do it change the dial gently clockwise more to lower the time on the external LED and rotate the dial anti clock wise to increase the time on the internal LEDs slightly which is what I would have done if I had more time . I believe this task to have been done in an efficient and cost-effective way while ensuring safety always is a key component to the task, I kept with all safety regulations throughout and I hope you are happy with what has been produced.

Task 3a – Revised Maintenance Schedule

Equipment/System type	Identification No.
Security lighting system	8712-33
Brand/Model	**Location**
City & Guilds	Workshop

Equipment/System specification
• The residual current device (RCD) should protect the system from any electrical issues. • The AC/DC convertor converts 230 V AC to 12 V DC • The external passive infrared sensor (PIR) should switch on the external LED of the building if it detects movement up to a maximum of a 10-metre range. • External LED should be on for a minimum of 20 seconds after movement was last detected. • The internal PIR should switch internal front door and corridor LED lights on if movement is detected in the building and then go off after 10 seconds once movement has stopped.

Maintenance records					
Service No	Maintenance date	Maintenance type (routine/scheduled, fault/repair)	Checked by	Repair details (where relevant)	Maintenance Engineer - signature
01	20/4/2022	routine/scheduled	JS	No faults or repairs required. System functionality as per specification	J Smith
02	28/5/2023	routine/scheduled + fault/repair	AB	Two faults found; • Replaced external motion sensor as intermittently working, system functionality as per specification after replacement component installed. **Noted** water penetrated external motion sensor. • Replaced loose wiring to RCD output	A Bloggs
03	24/04/2024	Fault/repair +replacing components		4 faults found. • Live cable into socket had not correctly been grounded and could not conduct, meaning no power was going to the switch – removed wire and stripped it before re-installing into circuit then testing for continuity which there was • Earth cable found with sleeve on it in the rcb causing the whole circuit to trip making it a hazard – removed the	

				wire which was connected between the earth bar and the neutral bar. • Replaced the LED, after turning the circuit on I found the external led to not be emitting light while the internal LEDs were this lead me to test or continuity throughout the circuit and the only place that didn't have any was the led . after replacing the led I rewired it back into the circuit and then turned it back on and found that all 3 LEDS where emitting light. • Time the light stayed on was found to be incorrect on both internal and external LEDS which I checked with a stopwatch , the external one had to be on for 1 minute 20seconds while the internal ones had to stay on for 1 minute 10 seconds so I used a small flat head screw driver and changed the time they stayed on in the sensor by twisting the screw inside which changed the time taken .	

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	2024	Every 3 months	Monthly – routine/scheduled		

Commentary	
Service No	Recommendations for future maintenance activity
01	Maintain once every 3 months as the amount of faults found suggest it needs to be maintained more often to prevent the system from completely breaking and needing to be replaced in total which would cost significantly more money than just getting it tested monthly

Task 3B Peer review

Assessment number (eg 1234-033)	8712-313
Assessment title	Electrical and Electronic 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
Date submitted by candidate	DD/MM/YY

Task 3B

Assessment themes:

- 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?*
  - *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 forms

Assessment ID	Qualification number
Candidate name	**Candidate number**
Provider name	**Provider number**
Date	**Series**
17/05/2024	Summer 2024

Question	Feedback
How well does the method statement enable planned maintenance activities to be performed and recorded over time?	Explains what he is going to do to find t he fault. Annotated to show what was found and how (testing). Allows for maintenance completed to easily be added to the maintenance log.
How appropriate are the recommended planned maintenance intervals and why?	Every 3 months very appropriate as the system is regularly checked so faults can be fixed efficiently. Gives reason for the 3 months maintenance as there is lots of faults.
What are the implications to the business of the proposed maintenance schedule?	The system is maintained more so it's likely to have faults causing the system to be unstable which would cost lots of money/ time to replace the whole system rather than the low cost of maintaining the system regularly.
How could the maintenance schedule be optimised/ improved?	On repair details you could mention setting up the PIR timing to the specification, if it went well or if it couldn't be set-up due to the timing being from 1m to 10m so it was hard to calibrate.

Assessment ID	Qualification number
Candidate name	**Candidate number**
Provider name	**Provider number**
Date	**Series**
17/05/2024	Summer 2024

Question	Feedback
How well does the method statement enable planned maintenance activities to be performed and recorded over time?	The method statement is very organised which will help with his planned maintenance activities to be performed.
How appropriate are the recommended planned maintenance intervals and why?	They are detailed and planned out which is good to understand and is also shows each step of what he did.
What are the implications to the business of the proposed maintenance schedule?	The company may not understand each paragraph and what it is for due to not having any headings and locations of each fault.
How could the maintenance schedule be optimised/ improved?	The only thing to improve this would be to add headings to give whoever is reading a better understanding. Pre maintenance During maintenance After maintenance

Task 3b – Candidate's amended document

Tools and equipment required	quantity needed	Reason needed
230 v capacitors	1	We need a 230v capacitor so the circuit is being supplies by the correct voltage with what runs through your house and what the circuit needs to be supplied therefor the circuit will not blow and run well.
Step down transformer	2	We need this to successfully step down the voltage that is being supplied to us from the national grid to 230v, so our circuit has the correct amount of voltage running through it.
Soldering iron	1	We need a soldering iron in case we run into ant issues such as a wire being open where we need to solder it back together.
Soldering iron stand and sponge	1	We need a place to store the solder as it will be too hot to just leave on a table and could be a fire hazard and we need a way to clean the soldering iron so it will work to its best abilities and need to use a soldering sponge so there is no risk of fire.
De-soldering pump	1	We need a de-soldering pump to get rid of any parts left over or remove parts we have soldered wrong as these will be too hot to handle meaning they will be a safety hazard.
Philips head screwdriver	1	In case we come across and screws or bolts where a Philips head screwdriver would be ideal that a flathead would not do, and I you tried it is likely to grind the head of the screw making you unable to remove it.
Flat head screwdriver	1	In case we come across and screws or bolts where a flat head screwdriver would be ideal that a Philips head would

		not do, and I you tried it is likely to grind the head of the screw making you unable to remove it.
hammer	1	In case we need to hammer any components into place such as wire holders or screws into position, be careful when using these to not catch your fingers as this could become a safety hazard.

Wire crimping tools	1	We may need one of these to make it easier and save time while crimping and stripping wires as we save time instead of using the snips.
oscillometer	1	We need one of these so we can check everything coming In and out of the circuit.
Multi meter	1	We need one of these so we can check If the wires have voltage running through them.
Snips	1	In case we need to cut a wire down to size or if we need to strip the wire down to size.
Voltmeter	1	We need one of these to read voltages throughout the circuit to see which of our wires have a current or voltage running throughout them this shows us if the problem is with our wires.
Wire cutters	1	We need these if we need to cut wires down to size and may also be used for stripping the cable these can be a good back up to snips if you do not have them.
LED Lights	3	The circuit has LED lights so we could do with having some in case the issue is with the LED lights, and they cannot be fixed, and they must be fully replaced.
AC to DC converter	2	We need an AC to DC converter to convert the currents from AC which is

		what they will. come in as to DC so the circuit can successfully run……

Switch	1	We may need a switch as this is on the circuit and could have completely blown and need completely replacing.
Soldering materials to use	1	We need materials to that we can use to solder otherwise the soldering iron is completely useless.
Brush and pan	1	I will require a brush and a pan for when I clean up so I can thoroughly clean the area around me
Material bins	2	I will require the correct material bins for different things such as wires and screws overwise it could be a safety hazard and at risk of a fire hazard

Materials screws and components	**quantity needed**	**reason needed**
screws	1 box full	We need screws in case anything needs removing and put back in or added we need screws so we can insure it is in well and will not break off and move
3 core wire barrels	1 barrel	We need 3 core wire in case the circuit is using 3 core wire and we must replace the wire we need to insure we are replacing it with the correct wires
4 core wire barrels	1 barrel	We need 4 core wire in case the circuit is using 4 core wire and we must replace the wire we need to insure we are replacing it with the correct wires
Wire holders	1 box full	We need these to hold wires that are going between boxes into a neat and tidy position that looks good overwise they are going to be all over the

		place and look tacky this could ultimately bring you reputation down
Wire backboxes	4	In case backboxes are damaged or cracked we should bring spares to ensure it is going to be working to its best standard and not broken

PPE needed.

PPE needed	quantity needed	reason needed
Hard hat	1	Needed in case of falling objects landing on your head a hardhat reduces the risk of a fatal injury that this causes
Safety boots	1 pair	In case objects land on your feet the stee caps at the end will protect you, from serious harm and cushion your feet, also protect you from harmful chemicals that an ordinary shoe would not be able to repel by soaking into the fabric and leaking onto your foot while with safety boots it cannot do this and will only splash on
Safety goggles	1	Protects your eyes from harmful projectiles that may be coming your way and protects you from dangerous chemicals that may splash in your eyes and could potentially blind you or burn your face also protects you rom splintering while doing activities such as hammering where a splinter could shoot out and hit you
Overalls	1	Protects your whole entire body from dangerous chemicals getting onto your skin which could cause swelling, a rash, burning and maybe could be fatal the fabrics on the overalls are too thick to let the chemicals soak through, they also protect your body from cuts and bruises

		due to there thick fabric material used to create them projectiles will have little to no affect or be severely numbed down.
Ear protection	1 pair	These will protect you from loud noises that could harm your eardrums, if working in a loud environment your ears could be permanently affected if the correct steps aren't taken such as wearing ear protection weather that be ear buds or protective headphones and taking breaks at appropriate times but not staying in the loud noise for to long.
Respiratory equipment	1	Respiratory equipment may not be needed but is always safe to have as you do not know the condition of what you are repairing because If it isn't looked after there may be a lot of dust on the item which you could then breath up meaning you are inhaling a lot of dust and over items which ultimately may be very bad for your health so I would recommend bringing respiratory equipment.
Protective gloves	1 pair	Protective gloves should be worn to protect you from cuts and chemicals, these gloves will give you protection from sharp objects due to there thickness so if you do end up getting a cut it is way better than it would have been and protects your hands from chemicals reaching the skin which could leave burns and swealing and sometimes cause the hand to have to get amputated.

RISK ASSESMENT

Risk	why it's a risk	severity	possibility	overall
Slips trips and falls	Slips trips and falls are the leading hazard in the workplace and can cause harm like bruises and in extreme cases broken bones or death if landed on head, to stop this make sure workplace is tidy and regularly cleaned	1	2	2
Working with electricity	Working with electricity can be fatal if not done correctly as there is enough voltage running through our circuit to kill a human and electricity like to arc so you don't even have to be stood close this could leave you with burn and bruise marks and can be fatal, to prevent this make sure electrical circuit is constantly checked and correct PPE is always worn	3	1	3
Falling from hights	Falling from heights can be fatal if not performed safely and can leave you with severe concussion, broken bones and in some cases death the working at heights regulation goes into depth with this, to prevent this make sure a harness is worn and you are complying with the regulations	2	2	4
Manual handling	Manual handling can be done any place and time and to counter this you should learn the proper lifting	1	2	2

	techniques if not this could cause you severe back pain, slipping disc and in extreme cases broken bones			
Objects falling from height	This is a risk because if objects fall on your head and you are not wearing your correct PPE this could cause a fatal blow if falling from heigh enough or a concussion and you would be liable If not wearing the correct PPE, to prevent this I would recommend keeping a tidy workplace	2	1	2
Sharp objects	This could cause cuts, bruising and severe blood loss depending on where you are cut and could be caused by any thing from tools left out to metals , this could also cause infection if not dealt with properly and urgently by cleaning the wound out then wrapping it n bandage and if severe enough could leave you out of work , to counter this make sure your work place is clean and constantly tidied and that you are wearing the correct PPE such as protective gloves and overalls	2	1	2
Breathing issues	If working in a location wear there is lots of dust and particles in the air and on the components, you are working on you could be at risk to breathing in all the dust causing	1	1	1

	your lungs to get flooded which could cause your breathing to become shallow and fast you may be effected long term by this as well, I would recommend using breathing apparatus to counter this			
Lack of training	This could be a risk because if people have a lack of effective training on the equipment's they could harm themselves and others , for instance not ever one knows how to use a saw or hammer correctly and this could cause cuts and broken fingers , or counter act this make sure everybody who is working on the tools if at least trained to an average level and is competent and confident the tools and if your not confident ask for help.	1	1	1

Time needed to carry out this task.

For this task of repairing the circuit I have been given I will have been given a time frame of 11h to complete the task, within this 11h I will be expected to find the problem within the circuit and fix said problem but in total I have 22 hours to complete the entire project.

Wastage and disposal requirements

For this I would expect to find separate bin for my rubbish such as a bin for wires being separate to a bin used for spare screws overwise this could cause some safety hazards such as fires and I would like it to be expertly exposed off and not through in with general waste because this also causes fire hazards.

Access requirements

the LED should stay on for a minimum of 20secinds after movement was last detected.

The internal PIR should switch internal front door and corridor LED lights on if movement is detected in the building and then go of after 10 seconds.

Fault diagnosis techniques

Visible inspection of the circuit to check for any obvious problems using this technique I had eliminate many issues straight away and it helps me focus on what I need to do.

Electrical inspection, using this I would go into a deeper dive of the circuit and check all the electrical components using a multi meter or a voltmeter.

Multi meter or voltmeter, using this I would check which wires and components have power running throughout them and which done, and this would help me determine what the issue is.

Method statement

Pre maintenance

Firstly I will start by putting on the correct PPE I need which would be a hardhat , steel cap boots , overalls , eye protection and ear protection if it was necessary then I will a risk assessment on where I am working to make sure it is a safe environment for me to work In , after this I would start by doing an inspection of the circuit to check for any visible problems that can be seen by eye , ill go over each component of the circuit checking for cracks in the back boxes or any of the components then ill check all the wires for snags and breaks or to see if they have come loose from where they are supposed to be , by doing this I will be eliminating possible errors and narrowing down until I

During maintenance

find the actual problem with the circuit and if errors are found I will do what is necessary to fix said error whatever it may be . This is correct as this is what I did , I put on my PPE Then checked for any visual damage which I did not see on my first time of looking , I checked all the wired and boxes but nothing obvious was wrong with them.

After this, I will do a further inspection into the circuit but this time I will be using the tools at my disposal such as the multi meter and the voltmeter. I will start by using my multi meter on the wires and checking for voltage and will be doing this by putting one of the prongs from my multi meter at the base of the wire where it connects from and getting the other prong from the multi meter and putting it were the wire connects into the circuit then I will check or a reading and if it is between 0 and 1 it meant we have power in that specific wire and that it is running fine I will then further this check by repeating the process I have just described onto every single wire in the circuit to check if they have power flowing throughout them and if they are found to not have power running throughout them it means they are broken and need repairing so I will take the necessary steps towards fixing the problem. I did this after my visual inspection as I was checking for continuity between all the wires which led me to find a fault in the socket from the rcb as I found the wire had not been grounded correctly so I removed it from the circuit before snipping it the re installing to make sure it worked after this then checked for continuity again but found it meaning the fault was fixed

If problems have been located during my checks I will then put in place the necessary process to fix them , for example if I found one of my wires to be broken and have to voltage running throughout them I will use a Philips head screw driver to take of the boxes the wire is connected to I will then unscrew each cable from the wire which is earth , live and neutral and will remove the cable and replace is with a new one using my crimping tools then putting the correct wire in the correct spot before putting the box back on ad doing another test with the multi meter to check for volts . If the problem is visible like a cut in the wire, I will first further investigate to check the wire still works and if it does, I will use my soldering iron and solder the wire back together. I located 4 problems during my checks which included a lice wire not been correctly grounded , a earth wire with neutral sleeving installed between the earth and neutral bars in the rcb causing it to trip which I removed ,replacing the external LED as it was broken which I figured out after performing a continuity test on which then worked after I had replaced it and then changing the speed on the sensors for how long the LEDs stayed on after last sensing motion which was 1minute and 20seconds for the eternal LED and 1 minute 10 seconds for the internal LED .

After I have located and fixed the problem I am going to check every thing once again for any errors I may have missed the first time and if none are located I will then move on and actually check what I have fixed to make sure it works properly and as its supposed to , I will repeat the same process I did when I found out the components wasn't working for example if I had replaced a wire I would use my multi meter and check weather there was a volt

running throughout the wire and if there was after I had made my repairs I would know that I have successfully fixed the component I wanted to. After I had located and fixed al the faults I had found I systematically went through the whole system again checking for any faults or lack of continuity I could see and did not manage to locate any and the LEDs worked to the spec they were required to

After maintenance

After this I would start tidying up my work area by putting all the tools, I have used away in the correct allocated storage space so I know they are out the way and cannot cause ay hazard as they are being stored safely and then put any loose components like screw back where they belong either back into there boxes or into a correct bin where they cannot cause a hazard. After everything like my tools and random components have been cleaned up I would ten get a sweeping brush and pan out and sweep up the surrounding area to where I have worked to make sue for a clean finish. Before I tidied up my work station I checked the system was working for one final time and set of the motion sensors and timing with a stop watch how long the LEDs stayed on for , and then after this I did tidy my work station and remove all my tools and use a dust pan and brush.

Finally, I would wash my hands with the correct soap that the workshop has that kills everything on my hand and then after this I would take my PPE off and correctly store this back from where I obtained it and would recommend getting the system regularly serviced by an engineer. This is what I did after and I would recommend getting the system service at least every 3 months as one of the LEDs is outside and effected by the weather . Checking th system regularly for faults would prevent anything major from happening or components needing replacing , the circuit had not been serviced in over a year when I worked on it ad it shows by 4 faults been found .

Test record sheet

Problem	solution	why it was a problem
Live wire in switch had not been grounded	I removed the wire before snipping I then feeding it back into the system and did a continuity test and new it worked	If not replaced the switch would have never worked as was receiving no power
LED needed replacing	Replaced the LED as it was broken ad	Led was broken so would have emitted no light

	nothing was coming through	
Earth wire in rcb connected to neutral with neutral sleeve	Removed wire completely from circuit	The circuit would have kept tripping
Time on sensors wrong	Changed time on top of sensors with screwdriver changing the screw	LEDS would not stay on for time required

After reading my peer review feed back I have decided to add headlines on my method statement to make it easier to read , follow and understand .

Task 4 Complete Handover

Assessment number (eg 1234-033)	8712-313
Assessment title	Electrical and Electronic 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 (handed over documents from tasks 1 to 3) Assessor observation
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 client to return to service and complete handover procedures, including:

- demonstration of system functionality
- confirmation of work completed
- amended method statement and how they 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 – Assessor observation

Task 4 Practical observation form

8712-313 Maintenance Engineering Technologies: Electrical and Electronic - summer 2024

Candidate Name	Candidate number
Provider name	**Date**
	17/05/24

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 Candidate explained he locked off the power then did a visual inspection of the system. He first checked for loose wires and checked for any signs of burning. He then explained that he started to carryout continuity testing on the system and found the first fault in the socket which was an open circuit. Candidate discussed re-terminating the cable removing the O/C. Candidate said he then read the brief again and decided to check the DB. Through a visual inspection he identified the S/C in the DB. This was caused by a wire which he removed. Candidate was then able to power the circuit up, he explained that the Ext LED had blown so he removed the trunking and replaced the unit. With all 3 LEDs working he try to calibrate the system. He explained he was close but with more time he would have tried to get closer to the required spec. Candidate then demonstrated the system working. The Int switched off at 1:03 instead of 1:10. The Ext switched off at 1:40 instead of 1:20. Candidate then discussed what could have made the system better such as getting the time delay closer and then discussed the need to lock off the power. 1 minute 10 seconds for internal lights 1 minute 29 seconds for external lights (The PIR only have a setting off between 1 minute and 10 minutes so could not be set for the original 10 seconds and 20 seconds. The group were therefore given the new criteria by the assessor).

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**.