Fire Detection and Alarm Systems – Technical Handbook 2023

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Overview

With constant innovations in technology, a greater demand for life safety measures, and a change with how we all want to protect our property and information, the Fire and Security industry has had to quickly adapt and evolve.

Working within the Fire and Security industry requires a wide range of skills, critical thinking and process application, problem solving and working to multiple industry standards to satisfy the needs of not only the customer, but building regulations, Fire Authorities and Police Forces.

This guide will provide you with a clear path to follow, from initial registration to the national finals and beyond.

Career Pathway

What is the job role?

The most common systems found in the sector are; Domestic and Non-Domestic Smoke Detection Systems, Aspirating and Air Sampling Systems, and Evacuation and Alarm Systems. Each of these systems cover a broad spectrum of applications and may require to be integrated with each other to serve a specific purpose.

A technician within the sector could be expected to carry out the Installation of a number of systems, requiring them to follow agreed system specifications, drawings and timelines. The Installation technician would be responsible for laying the system infrastructure, installing all devices and system component, making interconnection between equipment and initiating power up.

Some technicians will take on a more specialised role as a Commissioning Engineer where they will be responsible for programming and the set-up of each system to ensure it meets both the customer requirements and complies with industry standards. This role can be very technical based and require the technician to have good planning, a good eye for detail, good IT skills and a good understanding for process.

Others may take on the role as a Maintenance technician, responsible for both the preventative maintenance of a system checking system diagnostics and operation, and the corrective maintenance of a system requiring fault finding and component replacement. A maintenance technician will require to have great communication skills, the ability to use specialist testing equipment, the ability to follow written and verbal instructions, and be able to work well under pressure.

Qualifications

- Fire Emergency & Security Systems level 3 Apprenticeship - England
- Electronic Fire and Security Modern Apprenticeship (Level 3) – Scotland
    - PDA SCQF Level 6 – electronic fire and security
    - SVQ Level 3 – electronic fire and security
- Electronic Fire and Security Modern Apprenticeship (Level 3) – Northern Ireland and Wales
    - Diploma Level 3 – electronic fire and security
    - NVQ Level 3 – electronic fire and security

Working Hours and Salary

You will normally work from 9am to 5pm Monday to Friday; however, the opportunity to work overtime in the evenings and weekends is very likely to be available.

The working environment may vary depending of the job. For the Installation of a system you may be required to work on a building site and will be expected to wear safety clothing for the duration of the installation works. But for the commissioning and maintenance of a system you will most likely be working in an indoor environment.

As an apprentice technician you may earn between **£7,000 - £13,000 per year.**

As a qualified technician the average salary for a Fire and Security Engineer in the UK is **£31,500 per year**, or **£16.15 per hour.**

With entry level positions starting at **£27,000.**

(average salary's taken from https://uk.talent.com/salary?job=fire+and+security+engineer)

There are several progression opportunities after the apprenticeship:

- Lead/Senior Engineer
- Surveyor
- Design Engineer
- Installation/Maintenance Manager
- Project Manager

However, many qualified fire and security engineers go onto own their own business or work as consultants too.

Competition Registration:

For helpful information and resources, including registration, competition rules, and entry criteria visit: https://www.worldskillsuk.org/competitions/fire-security/

Registration opens Early 2023 to all candidates wishing to participate in this year's WorldSkills UK competition, lead up events and qualifiers. This process will be streamlined by involving Colleges and Training Providers to make recommendation for which students they believe have both the practical ability and knowledge & understanding to progress throughout the competition.

It is advised that all suitable candidates who participate in the Entry stages must be registered with WorldSkills UK before registration closing date.

Prior to the registration opening date, the colleges and training providers will be provided with links taking them to a variety of online forms to obtain agreement and commitment from both the candidate and the candidates employer to ensure that, if successful, the candidate will be available and willing to progress though each stage to the final if successful.

Once initial registration is complete, the colleges and training providers will then be able to send out the online assessment link to all participating candidates to log in and complete.

All online registration is to be completed by no later than 24th March. Online assessments or training provider preferred entry stage results returned by 29th April 2023.

Note: All competitors registered will receive notification by email that they need to complete registration by agreeing to the Terms and Conditions. This is mandatory and part of the GDPR and Data Protection rules. If the competitor does not agree, then registration

Pre-competition Activity:

During Pre-competition registration, competitors should try to familiarise themselves with competition style activities, for example you could have a fellow student to judge a completed work task during a practical session at college/training provider.

Candidates should familiarise themselves with current industry standards and Code of Practice relating to:

- Fire Detection Systems
- Fire Alarm Systems
- UK Wiring Regulation
- Building Regulations – Including DDA and Listed Building Requirements

Entry Stage Competition – Online Knowledge and Understanding Assessment:

The "Entry" stage of this competition consists of a knowledge-based assessment that aims to evaluate each candidate's knowledge of Industry Standards, Design, Installation, System Commissioning & Maintenance, and a Specialist Topic directed towards fire detection and alarm systems.

The assessment will be conducted in an online medium using "Google Forms" under CLOSED BOOK conditions with a time limit set at 60 minutes.

note, Students will be able to complete the online assessment after the 60 minute time limit has lapsed but this will show as a late submission and will not be valid.

Candidates will be provided the assessment link via their College and/or Training Provider who will be responsible for distribution of the assessment links within the agreed time frame.

All results will be automatically collated within Google Forms and these are only accessible by approved assessing staff appointed to mark the assessments before redistribution of scores.

All candidates carrying out this assessment must either:

1. Be in attendance at an approved Training Provider or College with prior notice of attendance being provided, or

2. Be in attendance at their place of work. This may change as government guidelines develop.

note, Training provider or college to schedule set dates for candidates for online invigilation. These details will be communicated to you in advance through your college/training provider.

Any candidate found to be in breach of any of the above will face disqualification.

Entry Stage Competition - Assessment Breakdown:

Assessment Criteria:

A	Survey and Design	9 points
B	System Installation	6 points
C	System Commissioning & Maintenance	12 points
D	Industry Standards and Compliance	5 points
E	Specialist area	8 points
Total score		40

National Qualifying Heats – IFSEC/EOT

The highest scoring candidates in the entry stage will be selected to compete at the Engineers of Tomorrow event at IFSEC in London between the 16th and 18th of May 2023.

The competitors will be asked to select 2 out of the 3 days that is preferable for them to compete in, with the top 10 (8 + 2 back-ups) highest scoring candidates will progress through to the WorldSkills UK Live event in November 2023 *(Final venue not yet confirmed)* for the WorldSkills UK Live Final.

The National Qualifiers will be a live practical installation designed to test the following:

- reading and interoperating Project Specifications, Drawings and System Operational Requirements
- following correct procedures
- working efficiently whilst minimising waste (time and materials)
- organisational and preparation skills

- wiring and Testing of System Components (Fire Alarm Systems)
- identifying and correcting faults (Fire Alarm Systems)
- maintaining Industry standards (Fire Alarm Systems
- accurately program and commissioning of systems (Fire Alarm Systems)
- accurately provide and record electrical reading
- successfully setting up remote access to systems

National Qualifying Heats - Assessment Breakdown:

Assessment Criteria:

A	Health and Safety for Competition	10.00
B	Planning and Preparation	10.00
C	Takeover Of Existing, Part Installed System(s) – Fire Detection and Alarm Systems	35.00
D	Commissioning – Fire Detection and Alarm Systems	25.00
E	Signalling – Fire Detection and Alarm Systems	20.00
Total score		100.00

WorldSkills UK National Final – Fire Detection and Alarm Systems

This competition is generously sponsored by the following industry partners; BAFE, C-Tec Electronics, CSL & Skills for Security

The competition will include the installation of an addressable fire alarm system connected to industry standards and codes of practice. The systems will only require partial installation as some of the equipment will be pre-installed. Competitors should follow the specifications to meet these requirements.

The system will require programming to relevant industry standards and specification and then fully tested and commissioned, with all results recorded on documentation provided in the specification. The system will then be required to be handed over to the end user, with a full demonstration of the system function and operation.

Faults will be added to the system once the Handover is complete and the competitor will be responsible for logging in remotely and identifying the fault during a scheduled maintenance visit. This information will allow the learner to rectify the fault and re-commission the system to industry standard.

The Fire Alarm System, as per specification, will be connected to a CSL Dualcom – EN54 Variant, with all signals being tested and recorded.

8 winners from the National Qualifiers (EOT or regionally held events) will be selected to compete at WorldSkills UK National Finals in November 2023.

There will be 2 reserves to cover any potential dropouts who will continue with the other 8 competitors to the Boot Camp stage and any other scheduled prior training event. The 2 reserves will be given

as much prior notification as possible in the event that they are required to compete at WorldSkills UK National Finals.

Fire Alarm System Technical information - Install Addressable Fire Alarm System

- The system will be part installed, including most system cabling, back boxes, devices, 3rd party devices.

- panel will be pre-installed as per specification

- PSU's will be pre-installed as per specification

- The cabling in the panel will be left un-marked

Day 1

- conduct a system takeover, identify issues, and complete the installation as per specification & drawing

- install and address all detection device and system components

- terminate wiring for devices that are wired

- power up system (safely)

- connect signalling device

- connect any 3rd party devices

- programme system as per specification

- fully test system

- record results

- commission system

- complete all system documentation i.e. commissioning checklist, handover checklist, electrical checks and readings & completion certificate

- hand the system over to the assessor

Day 2

- carry out a full system maintenance

- identify and record faults

- test/rectify faults

- check all system paperwork and record results from your maintenance

- check functionality of all 3rd party connected devices

- re-commission the system (if required)

- test signalling device

Assessment Criteria:

Aspect	Description	Max. marks
A	Health and Safety for Competition	5.00
B	Planning and Preparation	10.00
C	Takeover Of Existing, Part Installed System(s)	20.00
D	Commissioning	25.00
E	Signalling	10.00
F	System Handover	15.00
G	System Maintenance	15.00
		100

A panel of judges have been drawn from industry, colleges and training providers.

Boot Camp

Further details on the bootcamp will be announced at the competition cycle progresses. However, at present the suggested delivery of the boot camp will take place in a remote setting so as not to disadvantage those that are not able to travel.

The bootcamp will give each competitor the opportunity to undergo manufacturer specific training relevant to the national final's competition for their chosen discipline (Fire or Security competition). The training will be built around the requirements set out in the specification that will be distributed to all relevant competitors and training providers following the national qualifiers at IFSEC/FIREX.

This one-day training will cover manufacture training specific to the competition as well as a run through of WSUK rules and requirements.

- Competition brief
- WSUK Rules
- H&S

Fire Detection and Alarm Systems:

- C-Tec/Advanced/Apollo Training
- CSL Training

Judges Top Tips

- **Preparation and Practice**
  A successful competitor you need to be confident, calm and self-assured when competing.
  Prepare by practicing your skills and techniques to ensure you get the required standard/results you want without any surprises.
- **Time Management**
  Learn to manage your time effectively when completing tasks by working smart not fast!
  The tasks have allocated times, so practice working to time and under pressure to perfect your timing. If you run out of time in the competition you will lose marks.
- **Planning**
  Make your own plans for how to complete each task, work methodically and even write it down to help you prepare.
- **Organisation**
  Make sure you are organised, make sure all stages of a task are completed. Organise all of your equipment and materials for the task.
- **Health & Safely**
  Health & Safety is very important in any environment, make sure you use the appropriate PPE for the task and work safely.
- **Clean and Tidy**
  Keep your working area tidy as you can be more efficient in a tidy work area. Make sure that when you present your work to the judges it is clean and ready for final judging.
- **Understanding**
  Read the task brief thoroughly and make sure you understand what you need to do.
  Do not be afraid to ask questions, remember there is only one silly question……the one you don't ask!
- **Don't Worry**

If a part of a task hasn't gone as well as you might have wanted don't worry or dwell on it, just draw a line under that and get on with the next task. Always focus on the marks you can gain not what you might have lost.

- **Enjoy**
To get to the WorldSkills UK National Qualifiers or the WorldSkills UK Live National Finals is in its self a massive achievement that you should be extremely proud of! Make the most of the whole WorldSkills UK Skills Competitions process and enjoy it!

Competition Rules:

Conduct for competitors during live competitions:

- It is the competitor's responsibility to arrive on time at the event each day, late arrivals may be excluded from the competition.
- Skills for Security will provide accommodation for each competitor for the **National Finals**, any accommodation requirements and travel needs throughout the rest of the competition cycle is the responsibility of the competitor to arrange through employer and training provider.
- Competitors will start and finish tasks as instructed by the judges or Competition team.

- Equipment, tools and specific safety equipment will be supplied; however, competitors are required to wear their company's uniforms. Please bring own safety shoes. (Without your safety shoes you may not be able to take part in the competition due to health and safety regulations).
- Any competitor who wishes to leave the area during the competition must seek the permission of the competition organisers or lead judge.
- If there is a power stoppage, expected fault with any of the equipment, or an accident the competitors must act according to the instructions of the competition organisers.
- Competitors are expected to comply with the host venue rules and regulations.
- During the competition, if any competitor has a suspected issue of question, they should seek out the competition organisers.

Useful training links:

https://www.worldskillsuk.org/

Contact Information:

For equipment and tech support requirements please contact;

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