



Higher National Unit specification

General information

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Unit code: H6X4 33

Superclass: XJ

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Version: 01

Unit purpose

The Unit is aimed at learners working within the Electronic Fire and Security Systems Industry or those with an interest in gaining employment within this sector.

The Unit is designed to enable the learner to develop a general knowledge, understanding and practical skills in maintaining electronic fire and security systems. This will include preventative, fault finding and corrective techniques for intruder, fire, access and CCTV systems.

This Unit forms part of the PDA in Providing Electronic Fire and Security Systems. This PDA provides underpinning knowledge and skills for the SVQ level 3 in Providing Electronic Fire and Security Systems at SCQF level 6. The SVQ forms part of the Modern Apprenticeship in Electronic Security Systems.

Outcomes

On successful completion of the Unit the learner will be able to:

- 1 Explain common preventative, fault finding and corrective maintenance techniques.
- 2 Demonstrate the specific processes relating to preventative techniques.
- 3 Demonstrate the specific processes relating to fault finding and corrective techniques.

Credit points and level

1 Higher National Unit credit at SCQF level 6: (8 SCQF credit points at SCQF level 6)

Higher National Unit specification: General information (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Recommended entry to the Unit

While entry is at the discretion of the centre, learners would normally be expected to have attained the following:

F3GF 11 *Numeracy* (Core Skill Unit), SCQF level 5

or

C100 11 *Mathematics: Mathematics 1, 2 and 3* (Intermediate 2), SCQF level 5

or

C101 11 *Mathematics: Mathematics 1, 2 and Applications* (Intermediate 2), SCQF level 5

or

2500 Standard Grade *Maths* (Credit), SCQF level 5

together with:

F3GB 11 *Communication* (Core Skills Unit), SCQF level 5

or

C270 11 *English* (Intermediate 2), SCQF level 5

or

0860 Standard Grade *English* (Credit), SCQF level 5

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the Support Notes for this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Equality and inclusion

This Unit specification has been designed to ensure that there are no unnecessary barriers to learning or assessment. The individual needs of learners should be taken into account when planning learning experiences, selecting assessment methods or considering alternative evidence.

Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

Higher National Unit specification: Statement of standards

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Acceptable performance in this Unit will be the satisfactory achievement of the standards set out in this part of the Unit specification. All sections of the statement of standards are mandatory and cannot be altered without reference to SQA.

Outcome 1

Explain common preventative, fault finding and corrective maintenance techniques.

Knowledge and/or Skills

- ◆ Process used for finding faults in electronic fire and security systems
- ◆ Current codes of practice/standards/guidelines for maintenance of electronic fire and security systems, including BS 5839, DD263, BS EN50131, BS EN50133 and BS EN50132
- ◆ Documentation used during preventative and corrective maintenance visits
- ◆ Environmental conditions that influence electronic fire and security systems
- ◆ Customer care during maintenance visits

Evidence Requirements

The learner should provide oral and/or written evidence to satisfy the Evidence Requirements.

There is no sampling in this Outcome. All aspects of Knowledge and Skills must be assessed.

The standard and quality of the evidence produced by the learner should be reflective of SCQF level 6 and demonstrate a detailed knowledge and understanding of all items in the Knowledge and Skills Section.

For this Outcome, each learner will:

- ◆ explain correctly the processes used for identifying faults in electronic fire and security systems.
- ◆ explain correctly codes of practice/standards/guidelines relevant to the maintenance of security systems, including BS 5839, DD263, BS EN50131, BS EN50133 and BS EN50132.
- ◆ explain correctly the documentation used during preventative and corrective maintenance visits.
- ◆ explain correctly environmental conditions influencing electronic fire and security systems.
- ◆ explain correctly the importance of customer care during maintenance visits.

The summative assessment tasks for Outcome 1 will be undertaken in closed-book, timed and supervised conditions. All summative tasks must be unseen. Learners are not allowed to use reference sources. Approximately one hour should be allocated to the summative assessment of Outcome 1.

Higher National Unit specification: Statement of standards (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Outcome 2

Demonstrate the specific processes relating to preventative techniques.

Knowledge and/or Skills

- ◆ Operational techniques used during maintenance visits, including the use of test equipment
- ◆ The reasons for carrying out operational checks
- ◆ Completion of relevant documentation and its importance

Evidence Requirements

The learner should provide oral and/or written evidence to satisfy the Evidence Requirements.

There is no sampling in this Outcome. All aspects of Knowledge and Skills must be assessed.

The standard and quality of the evidence produced by the learner should be reflective of SCQF level 6 and demonstrate a detailed knowledge and understanding of all of the items of Knowledge and Skills.

For this Outcome, each learner will:

- ◆ demonstrate correctly the operational techniques used during maintenance visits, including the use of test equipment.
- ◆ explain correctly the reasons for carrying out operational checks.
- ◆ complete accurately the appropriate documentation used during a maintenance visit. This should include drawings, specifications, operational checklist and recording results.

The summative assessment tasks for Outcome 2 will be undertaken in closed-book, timed and supervised conditions. All summative tasks must be unseen. Learners are not allowed to use reference sources. Approximately one hour should be allocated to the summative assessment of Outcome 2.

Higher National Unit specification: Statement of standards (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Outcome 3

Demonstrate the specific processes relating to fault finding and corrective techniques.

Knowledge and/or Skills

- ◆ Fault finding techniques used during maintenance visits
- ◆ Operational checks
- ◆ Completion of relevant documentation and its importance
- ◆ Faulty parts, including recording, label and disposal of parts
- ◆ Maintenance log book
- ◆ Corrective techniques

Evidence Requirements

The learner should provide oral and/or written evidence to satisfy the Evidence Requirements.

There is no sampling in this Outcome. All aspects of Knowledge and Skills must be assessed.

The standard and quality of the evidence produced by the learner should be reflective of SCQF level 6 and demonstrate a detailed knowledge and understanding of all of the items of Knowledge and Skills.

For this Outcome, each learner will:

- ◆ demonstrate correctly the techniques used to find faults, including dealing with faulty parts (recording, labelling and disposing).
- ◆ carry out correctly operational checks.
- ◆ complete accurately the documentation used during a maintenance visit.
- ◆ log correctly the required information in the correct format.
- ◆ demonstrate correctly corrective techniques.

Assessment is closed-book and will be carried out in timed and supervised conditions. Assessment tasks must be unseen. As this is a closed-book assessment, the use of reference sources is not allowed.

Higher National Unit specification: Statement of standards (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

For all Outcomes

Centres should devise Instruments of Assessment that will allow the learner to meet the Evidence Requirements for the Outcome to the required standard (See *Guide to Assessment*). It is recommended that centre devised Instruments of Assessment are prior verified by SQA.

Assessment for this Unit can be carried out at the discretion of the centre in the following ways:

- ◆ Outcome by Outcome
- ◆ Combining Outcomes
- ◆ One holistic assessment of the Unit

Suggestions for approaches to assessment can be found in the Support Notes of this Unit.

As this is a 40 hour Unit, no more than four hours should be dedicated to summative assessment for the entire Unit.



Higher National Unit Support Notes

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Unit Support Notes are offered as guidance and are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 40 hours.

Guidance on the content and context for this Unit

This Unit forms part of the PDA in Providing Electronic Fire and Security Systems. This PDA provides underpinning knowledge and skills for the SVQ level 3 in Providing Electronic Fire and Security Systems at SCQF level 6. The SVQ forms part of the Modern Apprenticeship in Electronic Security Systems.

Although not directly awarded, completion of the Modern Apprenticeship Award gives opportunities to apply for professional recognition through the Institute of Engineering Technology and successful recognition will result in the EngTech qualification being awarded.

It may be possible to progress from the Modern Apprenticeship Award to other qualifications.

Centres should ensure that learners are presented with sufficient theoretical information to succeed in the assessment of this Unit.

All Outcomes

This Unit covers the necessary underpinning knowledge and skills relating to the common and unique procedures used during preventative and corrective maintenance visits.

Learners will be shown common faults that are found on electronic fire and security systems. They should be told how to identify a problem, how to resolve it and record the detail, whilst, at all times, complying with the manufacturer's instructions. Some examples of common faults would be false alarms, low battery and no mains voltage.

The learner should be able to interpret circuits and diagrams and therefore be able to provide information regarding an installed system. This information would include electrical readings and should be collated for the benefit of both the customer and maintenance engineer. The importance of this information and how it is used for preventative and corrective maintenance purposes should be explained to the learner.

Learners should be able to identify relevant components in the circuit. These should include power supplies, detection devices, input/output modules.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

By using circuit diagrams and block diagrams learners should be able to identify faulty components and therefore explain the fault condition. This should include low power to devices from the main panel or auxiliary power supplies, device fault, short and open circuits.

Where a fault condition is established the learner should be able to explain the effect that the fault will have on the equipment and system. For example, this would include over/under sensitive devices, power fluctuation, signalling equipment. Once a faulty component has been identified learners must remove and log the component to comply with company policy

Learners should have an understanding of the relevant test equipment available for use during preventative and corrective maintenance visits. For example:

CCTV

- ◆ Digital volt meters
- ◆ Oscilloscope
- ◆ Signal level meters
- ◆ Video monitor

Fire

- ◆ Digital volt meters
- ◆ Sound level meters
- ◆ Smoke poles

Intruder

- ◆ Digital volt meters
- ◆ Battery testers

Access Control

- ◆ Digital volt meter

Learners should understand the most up to date standards, codes of practice and guidelines for carrying out preventative and corrective maintenance on electronic fire and security systems. Learners should be aware of the number of visits that should be completed annually, the operational checks that should be completed and the documentation that should be used for recording maintenance visits for each discipline. It should also be explained why these checks are undertaken and the importance of completing relevant documentation to ensure that the system remains fully operational.

In order to provide clients with good customer service, learners must understand the procedure for contacting the maintenance company for assistance. Learners are required to have an understanding of the procedures when arriving at a customer's premises and the importance of presenting themselves in a professional manner at all times.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Finally learners should gain an understanding of the environmental conditions that influence electronic fire and security systems, for example:

- ◆ Weather
- ◆ Design flaws (PIR pointing towards window, or installed above heater)
- ◆ Site changes

Learners should be made aware that electronic fire and security systems may be installed for one purpose; however over time that purpose may change. During maintenance visits to premises, engineers must use their knowledge and skills gained in this Unit to identify systems that are no longer fit for purpose.

Guidance on approaches to delivery of this Unit

This Unit can be delivered as a free-standing Unit or as part of a Group Award. This Unit is mandatory in the PDA in Providing Fire and Electronic Security Systems and is designed to give learners the underpinning knowledge and skills to support the SVQ level 3 in Providing Electronic Fire and Security Systems. The SVQ forms part of the Modern Apprenticeship in Electronic Security Systems.

A variety of delivery approaches could be adopted in this Unit and, although there is no preferred order of teaching, a systematic approach is recommended. Practitioners should use their professional judgement in designing and delivering the Unit so that it is appropriate, relevant and motivating for individual learners. Approaches should be learner-centred, participative and practical, for example, group activities, one-to-one tutorials, differentiated learning materials, visual aids. Home study activities should also be designed.

Links in this Unit should be made to the National Occupational Standards (NOS) for the Security Sector and in particular:

SfS 4	Communicate effectively with others
SfS 5	Give a positive image of yourself
SfS SYS 7	Audit electronic fire and security systems
SfS SYS 13	Maintain the performance of electronic security systems

Learners could use information or resources acquired during this Unit to help with the completion of the above NOS Units.

It is recommended that use of a wiki or similar might be encouraged to allow learners to share knowledge and research findings.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Where resources permit, centres should use technology as much as possible to support learning, teaching and assessment. This could include, for example:

- ◆ Compiling and maintaining e-portfolios
- ◆ Web-based research
- ◆ Game based learning
- ◆ Using chat rooms for discussion
- ◆ Using virtual learning environments
- ◆ Submission of assessed work through VLE, e-mail

The learning and teaching approaches used should encourage learners to be aware of the knowledge and skills gained, to retain these and use in other contexts.

Guidance on approaches to assessment of this Unit

Evidence can be generated using different types of assessment. The following are suggestions only. There may be other methods that would be more suitable to learners.

Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that should be transferable to work or further and higher education.

Centres should create formative assessments that are both appropriate to the individual's needs and which also prepare the learner for summative assessment. Summative assessment should only take place when the learner has developed the knowledge and skills at the required level for the Unit.

Lecturers should provide adequate opportunities for informal assessment to take place prior to learners undertaking summative assessments. Lecturers may give learners advice and support during any informal assessment in order to prepare them for summative assessment.

Centres may use the Instruments of Assessment which are considered by lecturers to be most appropriate. Centres are reminded that prior verification of centre-devised assessments would help to ensure that the national standard is being met. Where learners experience a range of assessment methods, this helps them to develop different skills that could be transferable to work or further and higher education.

A range of different assessment methods could be used. Suggested examples can be found in SQA's Guide to Assessment. www.sqa.org.uk

Records of all assessment instruments used and evidence produced by each learner for summative assessment purposes — oral/written/practical — must be retained for internal and external verification purposes.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Practical evidence can be either:

- ◆ Assessor checklist with oral questioning
- or
- ◆ Photographic/video evidence

All learner evidence must be signed and dated by the assessor thus ensuring authentication.

Opportunities for e-assessment

E-assessment may be appropriate for some assessments in this Unit. By e-assessment we mean assessment which is supported by Information and Communication Technology (ICT), such as e-testing or the use of e-portfolios or social software. Centres which wish to use e-assessment must ensure that the national standard is applied to all learner evidence and that conditions of assessment as specified in the Evidence Requirements are met, regardless of the mode of gathering evidence. The most up-to-date guidance on the use of e-assessment to support SQA's qualifications is available at www.sqa.org.uk/e-assessment.

Opportunities for developing Core and other essential skills

There is no automatic certification of Core Skills in this Unit. However, there are opportunities to develop aspects of Core Skills in *Communication* (Written and/or Oral), *Problem Solving* (Critical Thinking and Planning and Organising), *Information and Communication Technology (ICT)* (Accessing Information) *Working with Others* (Working Co-operatively with Others) and *Numeracy* (Using Number).

Communication: Oral Communication

The Core Skill component Oral Communication at SCQF level 6 could be developed in this Unit. The general skill for this component is — *Produce and respond to oral communication on a complex topic*. Learners could fulfil this component through participating in discussions, one-to-one dialogues and group work for both formative and summative assessment purposes. Tasks involving group activities and joint feedback sessions would offer the learner opportunities to make a contribution to a discussion on a complex topic.

Communication: Written Communication

The Core Skill component Written Communication (Writing) at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Produce well-structured written communication*. Learners could fulfil this component through research activities and the production of reports, essays or other forms of written communication. Some learners may develop this skill at SCQF level 6.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Problem Solving: Critical Thinking

The Core Skill component Critical Thinking at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Analyse a situation or issue*. This component could be developed where a situation or issue has arisen in the course of the learner's work or study. You would need to analyse and evaluate the situation or issue and devise a strategy to deal with it. You should reflect on and evaluate the success of the strategy. Different practical situations could be created where you will need to assess the likelihood of an accident occurring. For example, in Outcome 3 the learner has to fault find on live systems. Alternatively, the tutor could provide a case study.

Problem Solving: Planning and Organising

The Core Skill component Planning and Organising at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Plan, organise and complete a task*. This component could be developed through planning, organising and completing a task. You would need to develop a plan, identify and obtain the required resources and then carry out the task. Resources could include, for example, time available, paper work and documentation, set procedures, people and equipment. You must decide on how the task will be managed. This could include allocation of responsibilities in a group context. Planning and organising skills could be developed through the completion of home study, research and practical tasks.

Information and Communication Technology (ICT): Accessing Information

The Core Skill component Accessing Information at SCQF level 6 could be developed in this Unit. The general skill for this component is — *Use ICT independently to carry out complex searches across a range of tasks*. This component could be developed by carrying out searches and accessing information for tasks in the Unit. This could involve some searching on complex tasks on unfamiliar information.

Working with Others: Working Co-operatively with Others

The Core Skill component Working Co-operatively with Others at SCQF level 6 could be developed in this Unit. The general skill for this component is — *In complex interactions, work with others co-operatively on an activity and/or activities*. This component could be developed by gathering evidence from the workplace or by taking part in group activities in the centre. This could include, for example, joint information and feedback sessions, group research or practical activities.

Numeracy: Using Number

The Core Skill component Using Number at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Apply a range of numerical skills in various everyday situations*. The component could be developed through the use of complex formulae that are used to identify unknown quantities in Outcomes 1, 2 and 3. For example, calculating voltage drop.

Higher National Unit Support Notes (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Other Essential Skills developed through the completion of this Unit

- ◆ Time Management: through the completion of projects and research task the learner will learn new skills in how to manage their own time to help achieve a common goal.

History of changes to Unit

Version	Description of change	Date

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General information for learners

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

This section will help you decide whether this is the Unit for you by explaining what the Unit is about, what you should know or be able to do before you start, what you will need to do during the Unit and opportunities for further learning and employment.

The Unit is aimed at those working within the Electronic Fire and Security Systems Industry or with an interest in gaining employment within this sector.

This Unit is designed to enable you to develop a general knowledge and understanding of the maintenance process, including specific knowledge and practical skills related to preventative, fault finding and corrective techniques for intruder, access, CCTV and fire systems.

This Unit forms part of the PDA in Providing Electronic Fire and Security Systems. This PDA provides underpinning knowledge and understanding for the SVQ level 3 in Providing Electronic Fire and Security Systems at SCQF level 6. The SVQ forms part of the Modern Apprenticeship in Electronic Security Systems.

On completion of this Unit you will be able to:

- 1 Explain common preventative, fault finding and corrective maintenance techniques.
- 2 Demonstrate the specific processes relating to preventative techniques.
- 3 Demonstrate the specific processes relating to fault finding and corrective techniques.

You will participate in class lectures, group activities and home study.

There are different ways in which you can be assessed. Questions will be generated to test your knowledge and understanding. Practical exercises will be used to assess your skills.

There is no automatic certification of Core Skills in this Unit. However, there are opportunities to develop aspects of Core Skills in *Communication* (Written and/or Oral), *Problem Solving* (Critical Thinking and Planning and Organising), *Information and Communication Technology (ICT)* (Accessing Information) and *Numeracy* (Using Number).

Communication: Oral Communication

The Core Skill component Oral Communication at SCQF level 6 could be developed in this Unit. The general skill for this component is — *Produce and respond to oral communication on a complex topic*. This component could be developed through participating in discussions, one-to-one dialogues and group work for both formative and summative assessment purposes. Tasks involving group activities and joint feedback sessions would offer you opportunities to make a contribution to a discussion on a complex topic.

Communication: Written Communication

The Core Skill component Written Communication (Writing) at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Produce well-structured written communication*. You could fulfil this component through research activities and the production of reports, essays or other forms of written communication. You may develop this skill at SCQF level 6.

General information for learners (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Problem Solving: Critical Thinking

The Core Skill component Critical Thinking at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Analyse a situation or issue*. This component could be developed where a situation or issue has arisen in the course of your work or study. You would need to analyse and evaluate the situation or issue and devise a strategy to deal with it. You should reflect on and evaluate the success of the strategy. For example, in Outcome 3 you will have to fault find on live systems. Alternatively, your tutor could provide a case study.

Problem Solving: Planning and Organising

The Core Skill component Planning and Organising at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Plan, organise and complete a task*. This component could be developed through planning, organising and completing a task. You would need to develop a plan, identify and obtain the required resources and then carry out the task. Resources could include, for example, time available, paper work and documentation, set procedures, people and equipment. You must decide on how the task will be managed. This could include allocation of responsibilities in a group context. Planning and organising skills could be developed through the completion of home study, research and practical tasks.

Information and Communication Technology (ICT): Accessing Information

The Core Skill component Accessing Information at SCQF level 6 could be developed in this Unit. The general skill for this component is — *Use ICT independently to carry out complex searches across a range of tasks*. This component could be developed by carrying out searches and accessing information for tasks in the Unit. This could involve some searching on complex tasks on unfamiliar information.

Working with Others: Working Co-operatively with Others

The Core Skill component Working Co-operatively with Others at SCQF level 6 could be developed in this Unit. The general skill for this component is — *In complex interactions, work with others co-operatively on an activity and/or activities*. This component could be developed by gathering evidence from the workplace or by taking part in group activities in the centre. This could include, for example, joint information and feedback sessions, group research or practical activities.

Numeracy: Using Number

The Core Skill component Using Number at SCQF level 5 could be developed in this Unit. The general skill for this component is — *Apply a range of numerical skills in various everyday situations*. The component could be developed through the use of complex formulae that are used to identify unknown quantities in Outcomes 1, 2 and 3. For example, calculating voltage drop.

General information for learners (cont)

Unit title: Maintaining the Performance of Electronic Fire and Security Systems (SCQF level 6)

Other Essential Skills developed through the completion of this Unit

- ◆ Time Management: through the completion of projects and research task you will learn new skills in how to manage your own time to help achieve a common goal.

Although not directly awarded, completion of the Modern Apprenticeship Award gives opportunities to apply for professional recognition through the Institute of Engineering Technology and successful recognition will result in the EngTech qualification being awarded.