Qualification: Date Completed: 02 Feb ‘17
Unit: FIA AO Level 3 Fire Detection and Alarm Advanced Installer
Development Group: FD&A Development Group

Guided Learning Hours (GLH) 8 Invigilated Assessment Hours (IA) 2 Total Qualification Time (TQT) 10

Assessment Method: Multi choice and short answer

Learning Outcomes: This is the advanced unit specialising in the role of the Systems Installer for the Fire Detection and Alarm (FD&A) sector. Before starting this unit learners should already have successfully completed the FIA AO Level 2 FD&A Common Core unit.

Learners who have successfully completed this unit along with;

- FIA AO Level 2 Foundation in Fire Detection and Alarm
- FIA AO Level 2 Environmental for Field Service Technicians
- FIA AO Level 2 Health and Safety for Field Service Technicians

Will be awarded the FIA AO Level 3 in Fire Detection and Alarm Installation, Theory and Regulatory Requirements.

Learners completing this unit will have gained an advanced knowledge and understanding of the legislative requirements, Codes of Practice and Guidance for Systems Installers in the fire detection and alarm sector of the Fire Industry. They will also have gained understanding of best practice methodology, systems testing methodology, fault finding and System Documentation

Subject	Knowledge and Understanding	Performance Criteria
A. BS 5839/IS 3218 (All parts included where applicable)	Learners will have knowledge and understanding of: 1. The System Quotation a. Definition and intent of a System Quotation b. Reasons for a System Quotation c. Key information that should be included within a system quotation d. Definition and intent of a Scope of works e. Reasons for producing a Scope of Works f. Information that should be included in a Scope of Works 2. System Categories a. Life protection categories (L1 to L5 Inclusive) b. Protection categories (P1 and P2) c. Manual categories (M) d. Understanding Domestic categories (Grades A to F inclusive) 3. Types of system a. Non-addressable b. Addressable c. 2-wire d. Self-contained alarms e. Radial vs loop circuits f. Monitored and un-monitored circuits 4. System Components a. Component types b. Device compatibility c. Device positioning/spacing's/mounting heights d. Dealing with obstructions, pitched roofs, voids and vertical zones (risers lift shafts and stairs) e. Interfacing to Ancillary systems	Learners will be able to: 1. Define a system quotation giving the intent and the responsibilities for producing one 2. State what should be included in a system quotation 3. Define a scope of works, what information should be included within a scope of works and who is responsible for producing one 4. Explain what is meant by system category and explain the specific levels of coverage provided by each 5. Explain the difference in approach between life safety systems and property protection systems 6. Compare and contrast categories for commercial and domestic buildings summarising levels of coverage provided by each. 7. Describe the main types of fire alarm system giving advantages and disadvantages of each type 8. Describe the limitations that should be applied to radial and loop circuits 9. Explain the risks associated with unmonitored circuits 10. Explain the difference between open and closed protocol systems and what effect this has on system specification 11. Explain the importance of ensuring system components are compatible 12. Explain how components that are not compatible may be used within the same system and what limitations should be placed on the system/components 13. State the coverage given by system components (Detectors, MCP, Audible and Visual alarms) 14. Compare and contrast the electrical requirements for the different types of system components 15. State the positioning requirements for system components with respect to structural building features,

	5. Cabling requirements a. Types of cables b. Cable colour c. Fixing methods d. Cable protection (Fire and Physical) e. Containment systems f. Fire Stopping g. Lightning protection systems to EN 62305 6. The System Design a. Responsibilities for providing a system design b. Understanding a system design c. Recognising where a system design does not relate to a live space d. Querying a system design and requesting/recommending a review	furnishings and equipment, illumination levels and system categories 16. Define ancillary equipment and provide examples 17. Describe the different types of system interfaces, why they differ and when the different types should be used 18. State special requirements for cables used in a fire detection system. 19. Describe types of cable containment systems 20. State the fixing methods for fire system cables 21. Describe why cable separation is necessary for fire alarm system cables and the special considerations for lightning protection systems 22. Give examples of fire stopping methods and why fire stopping is necessary 23. State who is responsible for providing a system design 24. Understand a system design and interpret it with respect to a building 25. Recognise when a system design may be compromised when applied to the building 26. Understand processes for querying system design and responsibilities for review and revision
	Explanatory Notes Focussing on the main part of the qualification understanding the installation requirements for the relevant standards and where applicable those referenced ensures that the system is installed to current best practice standards and will function according to the design.	

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<tr><td rowspan="3">B. The Construction Design and Management Regulations (CDM) 2015</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td>Learners will have knowledge and understanding of:
1. The reasons for and intent of CDM regulations
2. Definitions of the principle persons on a project and their role/responsibilities
a. Client
b. Principle Designer
c. Principle Contractor
3. Why it is important to install devices in accessible positions
4. What additional measures are available to aid inspection and maintenance of devices (remote indicators)
5. Competence
6. Adequate supervision</td><td>Learners will be able to:
1. State the reasons for CDM regulations and explain their intent
2. State the key roles defined in the legislation and provide an outline explanation of their responsibilities
3. Explain why it is important to forward plan when installing and to install devices with consideration to accessibility for servicing and maintenance
4. Explain what devices are available that will aid inspection and testing for devices which are located in difficult to access areas (remote indicators and remote testing)
5. Give some examples of alternative devices that could be used to simplify installation and on-going maintenance.
6. Describe what is meant by competence.
7. Give examples where increased supervision would be appropriate during a fire alarm installation.</td></tr>
<tr><td colspan="2">Explanatory Notes
It is not the intention of this section to make technicians subject matter experts in CDM regulations but to give a working understanding of the regulations, ensuring that technicians remain compliant while working on site and understand the responsibilities placed on the Client, Principle Designer and the Principle Contractor.

It will also provide the technician with awareness of the importance of consideration to the future requirements for inspection/testing, servicing and maintenance of the system and its components and where to position those components that it would allow access. Where direct positioning of a component, in accordance with the system design does not facilitate access technicians will understand what equipment and facilities are available that will help overcome the difficulties posed.</td></tr>
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<tr><td>C. Building Regulations</td><td>Knowledge and Understanding</td><td>Performance Criteria</td></tr>
<tr><td></td><td>Learners will have knowledge and understanding of:
1. Building regulations specific to fire appropriate to the country within the UK in which they will be working
a. Approved Document B England
b. Approved Document B Wales
c. Building Regulations Part E Northern Ireland
d. Building Standards, Technical Handbook – Fire Scotland
2. Awareness of Building Regulations for other UK countries outside of the country in which the learner is expecting to work
3. How Building Regulations relate to current legislation
4. How Building Regulations relate to Standards and guidance
5. Means of warning and escape
a. Section B1 Approved Document B England
b. Section B1 Approved Document B Wales
c. Section 2 Northern Ireland building regulations
d. Section 2.9 Building Standards Scotland</td><td>Learners will be able to:
1. State the title and provide an outline description of building regulations relating to their country of the UK
2. Explain and provide outline detail of variations to Building Regulations according to UK country
3. Explain how building regulations stand in law
4. Explain how building regulations relate/refer to relevant standards
5. Provide an on overview of sections relating to means of warning and escape according to the UK country in which the learner will be working
6. Give examples of how installing a fire alarm system can compromise the fire protection measures in the building
7. Describe how a fire detection and alarm system can be used to compensate for an otherwise non compliant building</td></tr>
<tr><td></td><td colspan="2">Explanatory Notes
Learners should gain an understanding of other guidance and regulations relating to the work they will be carrying out. It is important to note that while building regulations may provide the scope for an experienced designer or engineer to provide a custom engineered system it also makes frequent references to published standards and it will provide a source of explanation otherwise not found.

Learners will be required to demonstrate knowledge and understanding of the building regulations appropriate to the UK Country in which they will be working (this may include more than one country for learners working in border regions). Learners will also be required to have awareness of building regulations and where to source further information for other UK countries.</td></tr>
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D. Installation Methodology	Knowledge and Understanding	Performance Criteria
	Learners will have knowledge and understanding of: 1. Equipment a. CE marking and third party approval b. Compatibility c. Performance d. Bill of materials e. Interfaces f. Selection of tools 2. Installation a. Following a system design b. Planning c. Loops and radial circuits d. Connections e. Terminations f. Fastenings 3. Engineering good practice a. EMC compliance b. EMI avoidance c. Electrical Safety d. Separation and Segregation e. Workmanship f. Maintenance requirements 4. Avoidance of false alarms a. Sources of false alarms b. Choice of detector c. Positioning of detectors	Learners will be able to: 1. State the difference between loop and radial circuits 2. Explain how to make cabling and component connections 3. Explain terminations and the use of isolators 4. Explain special requirements for fastenings 5. Explain how to test circuits and the considerations required for components (Mega testing) 6. Explain how to test for circuit continuity, to identify and rectify faults 7. Explain how to test for, identify and rectify installation faults (e.g. bad connections, reversed polarity) 8. Explain the minimum battery requirements for a system and carry out battery calculations 9. Explain how to test earth loop impedance and carry out calculations 10. Explain how to test for loop load and carry out calculations 11. List the tools and test equipment used to install a typical fire alarm system and describe when specific tools should and should not be used. E.g. electrical insulation resistance meter or a multimeter 12. Describe what is meant by a system design, what essential information it contains and when/how details can be questioned or changed 13. Produce installation documentation a. Install certificate as supplied in BS 5839 b. 230v AC Test Certificate c. As wired/As fitted drawings 14. Explain how to make good any damage to the building fabric following install 15. Explain any special considerations for fire stopping and limiting fire spread

	5. Testing a. Cable b. Insulation resistance c. Polarity d. Continuity e. Circuit resistance verification f. Battery calculations g. Circuit/system loading h. Testing system functionality i. Selection of test equipment 6. Fault Finding a. By substitution b. Strategies c. Use of electrical test equipment d. Recognising faults 7. Making good a. Repairing passive protection/fire stopping measures following installation b. Recognising fire compartments	16. Describe where fire stopping should be used and how to recognise those places on site 17. Describe the requirements for separation and segregation and what the difference is between the two 18. Explain what makes a fire alarm system different from other electrical installations and what things must be done differently 19. Explain the importance of terminating cable screens correctly 20. Describe structured wiring systems. giving advantages and disadvantages 21. Give examples of typical causes of false alarms for typical types of fire detector and explain with examples how the risk of false alarm can be reduced 22. Describe how to carry out insulation resistance testing, what tools must be used and when special considerations need to be taken (e.g. with equipment connected or when using MICC cable) 23. Describe how to check polarity on alarm lines, non-addressable detection circuits and loops. Provide examples of where faults might go unnoticed. 24. Explain how to verify the resistance of radial and loop circuits. 25. Explain how to verify that the system is not overloaded and what conditions are most likely to cause an overload situation 26. Explain how to verify that the fire alarm installation has been carried out correctly with respect to a networked fire alarm. 27. Describe a number of fault-finding strategies and give examples of when they might be used.

		28. State the type of test equipment needed for fault finding and give examples of the typical measurements that they would expect to make when fault finding a typical non-addressable and an addressable fire alarm system. 29. Describe how to overcome the lack of ability of typical meters to test addressable systems and how that can be overcome
	Explanatory Notes While theory based, learners will be required to demonstrate their knowledge of installation and testing principles including the materials/equipment required methodology and calculations where stipulated.	

E. Documentation	Knowledge and Understanding	Performance Criteria
	Will have knowledge and understanding of: 1. Documentation required to facilitate installation a. Fire Risk Assessment b. System quotation c. Scope of works d. Design Plan e. Risk Assessment Policy f. Method Statement g. Work permits h. Technical sheets i. Circuit diagrams/building plans j. Manufacturer's instructions k. Project plans 2. Installation completion documentation a. Installer entries to the log book b. As Fitted Diagrams c. Zone Plans d. Test records e. Recording installation variations f. Fire System Installation certificate g. Mains Supply certificate 3. Communication a. With the designer b. With the customer c. System supplier d. Consultants e. With other trades f. With colleagues g. With the fire detection and alarm systems user	Learners will be able to: 1. State the documentation required to facilitate installation of a system and detail their purpose and the key information required for inclusion 2. State the documentation required for completion of a system installation once completed and the key information required for inclusion 3. Complete example documentation and certificates 4. State which installation documentation should be included in a Fire Safety file 5. Complete installer/installation details in a log book 6. Complete an as fitted/as wired diagram 7. Complete a zone plan with consideration to the zoning requirements detailed in current guidance 8. Complete an electrical minor works certificate 9. Complete an installation certificate 10. Complete a 230v AC test certificate 11. Complete a minor works certificate 12. Recognise when features of a building are not included in documentation and what to do about it 13. Describe the importance of good communication and give examples of where communication style may need to be adjusted to suit different circumstances 14. Give examples where verbal communication would be most appropriate 15. Give examples of where written communication might be needed

	Explanatory Notes Progressing further with the fire safety file introduced in the core module learners will be expected to know specifically what documentation is required to enable installation and what documentation the installer is required to complete and handover to the client for inclusion. It should be noted that while standard formats are available for some documentation much of it is locally produced and that the documentation used by the FIA AO may not reflect that used by the learner in the field. However the information contained will be that required/recommended for inclusion. Use of test equipment is essential in some circumstances so it is necessary that an installer not only knows how to use a particular type of test instrument but also understands the importance of calibration and how calibration should be carried out, recognises where the readings might contain errors, and when those errors are significant.