SEMMME3065

Fitting electrical and electronic components to mechanical assemblies

Overview

This standard identifies the competences you need to assemble and fit electrical and electronic components to mechanical assemblies, in accordance with approved procedures. You will be required to prepare the work area, ensuring it is safe and free from hazards, to check the specified components are available and fit for purpose, to obtain all relevant and current documentation, to obtain the tools and equipment required for the assembly operations, checking that they are in a safe and usable condition. In carrying out the assembly operations, you will be required to follow company procedures and specified assembly techniques, in order to fit electrical and electronic components to the mechanical assembly.

The assembly activities will also include making all necessary checks and adjustments, to ensure that the electrical and electronic components, when fitted to the assembly, are checked for position, security, function, safety and completeness. You must also check that any cables and wires are routed correctly and are tidy in appearance, and that connections are mechanically sound and checked for electrical continuity.

Your responsibilities will require you to comply with organisational policy and procedures for the assembly activities undertaken, and to report any problems with the assembly activities, materials or equipment that you cannot personally resolve, or are outside your permitted authority, to the relevant people. You will be expected to ensure that all tools, equipment and materials used in the assembly are correctly accounted for on completion of the activities, and to complete all necessary job/task documentation accurately and legibly. You will be expected to work with a minimum of supervision, taking personal responsibility for your own actions and for the quality and accuracy of the work that you carry out.

Your underpinning knowledge will provide a good understanding of your work, and will provide an informed approach to electrical and electronic fitting and assembly techniques and procedures. You will understand the mechanical product being assembled, and its application, and will know about the equipment, relevant components and joining techniques, in adequate depth to provide a sound basis for carrying out the activities to the required specification.

You will understand the safety precautions required when carrying out the assembly

activities. You will be required to demonstrate safe working practices throughout, and will understand the responsibility you owe to yourself and others in the workplace.

Performance criteria

You must be able to:

1. work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. follow the relevant instructions, assembly drawings and any other specifications
3. check that the specified components are available and that they are in a usable condition
4. use the appropriate methods and techniques to assemble and fit the components in their correct positions
5. secure the components using the specified connectors, terminations and securing devices
6. check the completed assembly to ensure that all operations have been completed and the finished assembly meets the required specification
7. complete the required production documentation
8. deal promptly and effectively with problems within your control and report those that cannot be solved

Knowledge and understanding

You need to know and understand:

1. how to work safely at all times, complying with health and safety and other relevant regulations, directives and guidelines
2. Regulations with regard to the substances used in the assembly process
3. the hazards associated with fitting electrical/electronic components to mechanical assemblies, and how to minimise them and reduce any risks
4. the personal protective equipment and clothing (PPE) to be worn during the assembly activities
5. what constitutes a hazardous voltage and how to recognise victims of electric shock
6. how to reduce the risks of a phase to earth shock
7. how to extract and use information from engineering drawings and related specifications (to include symbols and conventions to appropriate standards) in relation to work undertaken
8. how to interpret first and third angle drawings, imperial and metric systems of measurement, workpiece reference points and system of tolerancing
9. how to extract the necessary information in order to fit electrical and electronic components to mechanical assemblies
10. the general principles of electrical and electronic fitting techniques; the purpose and function of the components (including identification systems such as colour codes, manufacturer's specification)
11. preparations that need to be undertaken on the electrical and electronic components prior to fitting them into the assembly
12. how to identify and use the correct component handling procedures (including relevant handling equipment)
13. the assembly and securing methods and procedures to be used, and the importance of adhering to these procedures
14. how the components are to be routed, aligned, adjusted and positioned prior to securing, and the tools and equipment that are to be used
15. the importance of using the specified electrical and electronic components and securing devices for the assembly, and why you must not use substitutes
16. the quality control procedures to be followed during the assembly operations
17. how to conduct any necessary checks to ensure the accuracy, position,

security, function, completeness and electrical continuity of the assembly

18. how to detect assembly defects, and what to do to rectify them

19. how to check that the tools and equipment to be used are correctly calibrated and are in a safe and serviceable condition

20. the importance of ensuring that all tools are used correctly and within their permitted operating range

21. the importance of ensuring that all tools, equipment and components are accounted for and returned to their correct location on completion of the assembly activities

22. problems with the assembly operations, and the importance of informing appropriate people of non-conformances

23. the extent of your own responsibility and to whom you should report if you have problems that you cannot resolve

Scope/range related to performance criteria

1. Carry out all of the following during the assembly activities:
   1.1 obtain and use the appropriate documentation
   1.2 adhere to procedures or systems in place for risk assessment, personal protective equipment and other relevant safety regulations and procedures to realise a safe system of work
   1.3 follow safe practice/approved fitting and assembly techniques at all times
   1.4 check that all cables, extension leads or air supply hoses are in a serviceable condition
   1.5 check that all tools and measuring/test equipment are within current calibration/certification dates
   1.6 use lifting and slinging equipment in accordance with health and safety guidelines and procedures
   1.7 ensure that the components used are free from damage, dirt or other contamination before assembling them
   1.8 return all tools and equipment to the correct location on completion of the fitting activities
   1.9 leave the work area and assembly in a safe and appropriate condition on completion of the activities
2. Fit electrical, electronic and electromechanical components, using all of following techniques:
   2.1 routeing cables and wires
   2.2 mounting/securing components
   2.3 cable fixings and fasteners
3. Terminate and join cables/wires to components using three of the following:
   3.1 screwed connections
   3.2 clamped connections
   3.3 soldering
   3.4 crimping
   3.5 cable protection devices (such as sleeving or grommets)
   3.6 punch down/push fit connections
   3.7 plugs/sockets
4. Make connections to six of the following components on mechanical assemblies:
   4.1 cables and wires
   4.2 wiring harness
   4.3 transformers
   4.4 lamps/lighting
   4.5 electronic modules
   4.6 circuit protection devices
   4.7 switches
   4.8 junction boxes
   4.9 instrumentation
   4.10 plugs

4.11 sensors
4.12 earthing devices
4.13 relays
4.14 sockets
4.15 motors
4.16 coils
4.17 programme logic control units
4.18 pumps
4.19 chokes
4.20 other specific component

5. Carry out the required checks using the correct tools and equipment, to include eight of the following:
5.1 dimensions
5.2 completeness
5.3 electrical inputs and outputs
5.4 position
5.5 free from damage or foreign objects
5.6 function
5.7 alignment
5.8 electronic inputs and outputs
5.9 component security
5.10 cable/wire routing

6. Produce final assemblies which comply with one of the following standards:
6.1 BS, ISO or BSEN standards and procedures
6.2 customer standards and requirements
6.3 company standards and procedures
6.4 specific system requirements

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