COGPEM72
Replace components in instrument and control systems

Overview

This unit is about your competence in replacing components in Instrument and control systems. You will be required to ensure the replaced components meet the required specifications, protect them from damage, replace using the appropriate tools and techniques and making any final adjustments. You will be following your organisations safe working practices and working within the work permit procedures.

This unit deals with the following:

1. Replace components in instrument and control systems

During this work you must take account of the relevant worksite operational requirements, procedures and safe working practices AS THEY APPLY TO YOU.

Previous Version:

Adapted from Unit I3.8 of Process Engineering Maintenance NOS – version February 2004. This unit is a tailored version of an Electrical unit produced by the ECITB from the OSC Eng Engineering Competence Standards (ECS 5.04) which was originally designated MPS Inst 6.

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Performance criteria

You must be able to:

- P1 work safely at all times, complying with health and safety and other relevant regulations and guidelines
- P2 obtain all the required components and ensure that they are in a suitable condition for replacement and fit for purpose
- P3 ensure that any replacement components used meet the required specification
- P4 take adequate precautions to prevent damage to components, tools and equipment during replacement
- P5 replace the components in the correct sequence using appropriate tools and techniques
- P6 make any necessary settings or adjustments to the components to ensure they will function correctly
- P7 deal promptly and effectively with problems within your control and report those that cannot be solved
- P8 maintain documentation in accordance with organisational requirements

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Knowledge and understanding

Within the limits of your responsibility you must demonstrate that you know and understand:

You need to know and understand:

K1 you must have a working knowledge and understanding of what your responsibilities are in respect of Health, Safety and Environment. This should include the limits of your personal responsibility, your legal responsibility for your own health and safety and the health and safety of others

K2 you must have a working knowledge of the relevant regulations and the safe working practices and procedures required within your work area

K3 you must have a working knowledge and understanding of the engineering drawings and related specifications to which you will be expected to work, including technical drawings (component, assembly, general arrangements, isometrics, 1st and 3rd angle projections), method statements and product worksheets, tolerances

K4 you must have a working knowledge and understanding of the component replacement methods and techniques including the types of reconnection that have to be made, and which tools, equipment and methods can be used to replace specific components in specific systems

K5 you must have a working knowledge and understanding of Handling equipment, methods and techniques. This could be expected to include manual handling pressure and thermal methods and techniques

K6 you must have a working knowledge and understanding of what your responsibilities are for the tool and equipment care and control procedures thereby ensuring the security of tools and equipment that you use. This could be expected to include ingress protection ratings, explosion protection rating, corrosion, portable appliance testing, heating and ventilation and permit systems

K7 you must have a working knowledge and understanding of your responsibilities with regard to the reporting lines and procedures in your working environment

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Additional Information

Scope/range related to performance criteria

1 The level and extent of responsibility will involve you being responsible for ensuring the equipment and work site is safe for others or yourself to work in by following defined procedures. You will be accountable for the integrity of the work site and ensuring the work is recorded in a formal manner. Authorisation for proceeding with the work will be given by authorized signatories within the PTW system

2 The equipment to be worked on includes:
- 2.1 Rotating equipment and tools
- 2.2 Protection methods
- 2.3 Electrical distribution systems

3 The type of components to be removed may be robust or fragile. Robust components are those that are resistant to most forms of damage or disruption during their working lives. Fragile components are those that are easily disrupted or damaged. Damage or disruption could be due to physical, chemical or other forces (e.g. Electro-magnetic).
Typical robust components could be:
- 3.1 Metering devices
- 3.2 Control panels
- 3.3 Mechanical linkages
- 3.4 Components of back-up systems
- 3.5 Motors
- 3.6 Control valves/governors
- 3.7 Components of process control systems

Typical fragile components could be:
- 3.8 Components of gauges
- 3.9 Components of metering devices
- 3.10 Components of motors
- 3.11 Components of analysing devices
- 3.12 Actuators
- 3.13 Seatings
- 3.14 Components of circuit/environmental protectors
- 3.15 Safety limit protection devices
- 3.16 Seals
- 3.17 Components of control panels
- 3.18 Springs
- 3.19 Diaphragms
- 3.20 Components of impulse systems
- 3.21 Electronic components

4 There are particular problems associated with the assembly methods and techniques. This could relate to orientation, fragility and locating requirements. The methods and techniques used take account of this could include:
- 4.1 Using thread fasteners
- 4.2 Clamping
- 4.3 Connecting male/female connectors
- 4.4 Installing springs
- 4.5 Soldering
- 4.6 Sealing
- 4.7 Terminating cables/impulse lines

5 The Complexity of assembly operations may be simple or complex. Simple replacement of components refers to situations where the component is quickly and easily removed from its position. Typical examples could include lifting out of plug-in components and undoing threaded fasteners to release the component. Complex replacements refers to situations where the components can only be replaced by disrupting the surrounding areas e.g. by cutting or de- soldering and/or where replacement of one component necessitates replacements of other interacting components.

6 The quality standards and accuracy to be achieved are as set down in the work specifications.

Scope/range related to knowledge and understanding

The Knowledge and Understanding levels expressed indicate the minimum level of knowledge and understanding sufficient to perform your role in a manner that would normally be associated with the minimum acceptable performance of a competent person undertaking your role.

The expression ”working knowledge and understanding” indicates you are able to:

1 Identify and apply relevant information, procedures and practices to your usual role in your expected working environments needing only occasional recourse to reference materials

2 Describe, in your own words, the principles underlying your working methods. This does not mean the ability to quote “Chapter and verse”. Rather you must know what supporting information is available, how and where to find it and from whom to seek further guidance and information confirm any additional required detail

3 Interpret and apply the information obtained to your role, your working practice and in your expected working environment

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