

MAINTAIN AUTOMATION AND RADIO FREQUENCY SYSTEMS

UNIT CODE: SEC/OS/ET/CR/06/6/A

UNIT DESCRIPTION

This unit covers competencies required to perform automation and radio frequency systems maintenance. Competencies includes: preparing maintenance schedule, inspecting and testing automation and radio frequency system, preparing a list of tools, equipment and materials, performing maintenance activities, conducting tests on maintained system and documenting maintenance records.

ELEMENTS AND PERFORMANCE CRITERIA

ELEMENT These describe the key outcomes which make up workplace function.	PERFORMANCE CRITERIA These are assessable statements which specify the required level of performance for each of the elements. <i>(Bold and italicised terms are elaborated in the Range)</i>
1. Prepare maintenance schedule	1.1 Systems to be maintained are identified as per standard operating procedure 1.2 Scope and type of maintenance to be carried out is determined based on the system maintenance requirements 1.3 Maintenance checklist is prepared in line with standard operating procedure 1.4 Manufacturer's manuals are assembled in accordance to system components 1.5 Maintenance team is identified and assembled as per the expertise required 1.6 Maintenance work plan is developed in regard to maintenance activities to be performed.
2. Inspect and test automation and radio frequency systems	2.1 System and equipment are inspected in regard to established procedure 2.2 Main isolation points are identified as per system configuration 2.3 Components and equipment are identified and tested in line with established procedures 2.4 Automation system is tested based on its functionality 2.5 Active and passive radio frequency circuit components are identified based on standard operating procedure 2.6 Oscillators in RF Circuits are identified and

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	<p>tested in line with their functionality</p> <p>2.7 Amplifiers in RF circuits are identified and tested as per their functionality</p> <p>2.8 Modulation and demodulation of RF signals is performed in line with standard operating procedure</p> <p>2.9 Transmitters in RF circuits are identified and tested as per standard operating procedures</p> <p>2.10 Receivers in RF circuits are identified and tested in line with standard operating procedures</p> <p>2.11 Antenna in RF circuits are identified based on their functionality</p> <p>2.12 Antenna is inspected and tested in accordance to manufacturers' manuals</p> <p>2.13 Speakers in RF circuits are tested as per standard operating procedure</p> <p>2.14 Display components in RF circuits are identified and tested as per standard operating procedure</p> <p>2.15 Radio frequency system is tested as per its functionality</p> <p>2.16 Test results are recorded as per established procedure</p>
<p>3. Prepare a list of maintenance tools, equipment and materials</p>	<p>3.1 Maintenance tools and equipment are identified in regard to maintenance activities to be performed</p> <p>3.2 A list of tools, equipment and materials are prepared in line with established procedure</p> <p>3.3 Tools and equipment are checked for specifications and functionality as per operating procedures</p> <p>3.4 Tools and equipment are calibrated in line with standard operating procedure</p>
<p>4. Perform maintenance activities</p>	<p>4.1 System components to be repaired/replaced are identified in line with standard operating procedure</p> <p>4.2 Cleaning, soldering and tightening of components are performed as per standard operating procedure</p>

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	<p>4.3 Defective components/parts are repaired/replaced based on established procedures</p> <p>4.4 Repaired/replaced system components are configured in accordance to the system functionality</p> <p>4.5 Maintenance activities are carried out in adherence to OSHA standards</p> <p>4.6 Waste materials are disposed adherence to EHS regulations</p>
<p>5. Conduct system tests</p>	<p>5.1 Type of tests to be carried out are identified in line with maintenance activities</p> <p>5.2 Components to be tested are identified based on the system functionality</p> <p>5.3 Repaired/replaced components are tested in accordance to manufacturer’s manuals</p> <p>5.4 Test-running the system is performed based on the system functionality</p> <p>5.5 Test results are recorded as per standard operating procedures</p>
<p>6. Document maintenance records</p>	<p>6.1 Maintenance checklist is documented in regard to standard operating procedure</p> <p>6.2 Maintenance report is prepared as per standard operating procedure</p> <p>6.3 Maintenance report is shared among parties based on the contract</p>

RANGE

This section provides work environments and conditions to which the performance criteria apply. It allows for different work environments and situations that will affect performance.

<p>1. Automation system components may include but not limited to</p>	<ul style="list-style-type: none"> • PLCs • DCSs • SCADA • Relays • Switches • VFDs
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<p>2. Radio frequency system components may include but not limited to</p>	<ul style="list-style-type: none"> • Antenna • Oscillators • Amplifiers • Transmitters • Receiver • Tuners • Mixers • Modulators and demodulators • Filters
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REQUIRED KNOWLEDGE AND UNDERSTANDING

The individual needs to demonstrate knowledge and understanding of:

- Troubleshooting techniques
- Repair/replacing of system components techniques
- Causes of system failures
- Knowledge in electrical principles
- Electrical safety and precautions measures
- Electrical shock prevention measures
- Knowledge in engineering mathematics
- Performance monitoring techniques

FOUNDATION SKILLS

The individual needs to demonstrate the following additional skills:

- Communications (verbal and written);
- Computer literacy
- Electrical principles
- Physics
- Analytical skills
- Time management
- Faults troubleshooting
- Problem solving;
- Planning;
- Decision making;
- Report writing

EVIDENCE GUIDE

This provides advice on assessment and must be read in conjunction with the performance criteria, required skills and understanding and range.

<p>1. Critical Aspects</p>	<p>Assessment requires evidence that the candidate:</p>
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of Competency	<p>1.1 Identified systems to be maintained as per standard operating procedure</p> <p>1.2 Determined scope and type of maintenance to be carried out based on the system maintenance requirements</p> <p>1.3 Prepared maintenance checklist as per standard operating procedure</p> <p>1.4 Assembled manufacturer’s manuals in line with system to be maintained</p> <p>1.5 Identified oscillators in RF Circuits and tested based on their functionality</p> <p>1.6 Inspected system and equipment as per established procedure</p> <p>1.7 Identified main isolation points in accordance to system configuration</p> <p>1.8 Identified components and equipment and tested based on established procedures</p> <p>1.9 Identified active and passive radio frequency circuit components as per standard operating procedure</p> <p>1.10 Identified oscillators in RF Circuits and tested them as per their functionality</p> <p>1.11 Identified amplifiers in RF circuits and tested them as per their functionality</p> <p>1.12 Identified transmitters in RF circuits and tested them as per standard operating procedures</p> <p>1.13 Identified receivers in RF circuits and tested them as per standard operating procedures</p> <p>1.14 Inspected and tested antenna as per manufacturers’ manuals</p> <p>1.15 Tested radio frequency system as per its functionality</p> <p>1.16 Identified maintenance activities and recorded as per system functionality</p> <p>1.17 Identified maintenance tools and equipment as per maintenance activities to be performed</p> <p>1.18 Checked tools and equipment for specifications and functionality as per operating procedures</p> <p>1.19 Identified system components to be repaired/replaced as per standard operating procedure</p> <p>1.20 Carried out maintenance activities in line with OSHA standards</p> <p>1.21 Disposed waste materials in line with EHS regulations</p> <p>1.22 Performed cleaning, soldering and tightening of components as per standard operating procedure</p> <p>1.23 Identified components to be tested as per system functionality</p> <p>1.24 Tested repaired/replaced components as per manufacturer’s manuals</p>
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	1.25 Recorded test results as per standard operating procedures
2. Resource Implications	Resources the same as that of workplace are advised to be applied Included: 2.1 Antenna 2.2 Oscillators 2.3 Amplifiers 2.4 Transmitters 2.5 Receiver 2.6 Tuners 2.7 Mixers 2.8 Modulators 2.9 Demodulators 2.10 Filters 2.11 Radio 2.12 Television 2.13 mobile phones 2.14 set top boxes 2.15 switches, etc.
3. Methods of Assessment	Competency may be assessed through: 3.1 Oral questioning 3.2 Practical Tests 3.3 Observation 3.4 Written tests
4. Context of Assessment	Competency may be assessed 4.1 On job 4.2 Off job 4.3 During industrial attachment
5. Guidance information for assessment	Holistic assessment with other units relevant to the industry sector, workplace and job role is recommended.