

**SKILLS FRAMEWORK FOR ELECTRONICS  
TECHNICAL SKILLS & COMPETENCIES (TSC) REFERENCE DOCUMENT**

<b>TSC Category</b>	Automation Management					
<b>TSC</b>	Automation Systems Maintenance					
<b>TSC Description</b>	Maintain automation systems to meet operation requirements as well as propose strategies for the automation systems performance improvement					
<b>TSC Proficiency Description</b>	<b>Level 1</b>	<b>Level 2</b>	<b>Level 3</b>	<b>Level 4</b>	<b>Level 5</b>	<b>Level 6</b>
	<b>ELE-RAO-1004-1.1</b>	<b>ELE-RAO-2004-1.1</b>	<b>ELE-RAO-3004-1.1</b>	<b>ELE-RAO-4004-1.1</b>	<b>ELE-RAO-5004-1.1</b>	
	Carry out autonomous maintenance activities on machines and equipment	Perform inspections and plan for parts replacement needed related to wear and tear	Maintain automation systems and interpret system performance metrics for performance verification	Manage major maintenance of automation systems and troubleshoot abnormalities to ensure prompt system recovery	Formulate strategies for automation systems performance improvement through the analysis of automation systems performance metrics	
<b>Knowledge</b>	<ul style="list-style-type: none"> <li>Activities to eliminate the losses during to maintenance</li> <li>Steps in autonomous maintenance</li> <li>Equipment cleaning and inspection techniques and standards</li> <li>Common hand tools used</li> <li>Common Equipment abnormalities</li> <li>Corrective actions to eliminate abnormalities identified</li> </ul>	<ul style="list-style-type: none"> <li>Basic principles of electronics</li> <li>Basic principles of mechatronics</li> <li>Basic principles of pneumatics</li> <li>Safety procedures</li> <li>Non-destructive inspection of static components</li> <li>Proper tools handling</li> <li>Tension of timing belt and chain system</li> <li>Mechanical parts lubrication</li> </ul>	<ul style="list-style-type: none"> <li>Types of automation systems</li> <li>Functionality of system</li> <li>System safety requirements</li> <li>Automation operational requirements</li> <li>Concept and application of basic maintenance</li> <li>Automation system performance metrics</li> </ul>	<ul style="list-style-type: none"> <li>Automation and production tools interaction</li> <li>Types of alarms or faults</li> <li>Concept and application of major maintenance</li> <li>Automation systems performance metrics</li> </ul>	<ul style="list-style-type: none"> <li>Problem solving techniques</li> <li>Automation system performance metrics</li> </ul>	
<b>Abilities</b>	<ul style="list-style-type: none"> <li>Conduct equipment cleaning and inspection activities</li> <li>Carry out corrective actions against abnormalities</li> </ul>	<ul style="list-style-type: none"> <li>Troubleshoot basic robot issues</li> <li>Optimise basic robot functions</li> <li>Maintain uptime performance</li> <li>Interpret robot's performance data and maintenance schedules</li> <li>Interpret simple electrical schematic and mechanical design diagrams</li> <li>Maintain Automated Material Handling System (AMHS) equipment by dis-assembling and replacing worn parts</li> </ul>	<ul style="list-style-type: none"> <li>Identify automation systems functions in the manufacturing operations</li> <li>Prepare automation systems for maintenance</li> <li>Perform basic maintenance</li> <li>Verify automation systems performance against specifications</li> <li>Release automation systems for operation</li> </ul>	<ul style="list-style-type: none"> <li>Prepare automation systems for maintenance</li> <li>Conduct major maintenance on automation system</li> <li>Verify automation systems performance against specifications</li> <li>Troubleshoot any abnormalities detected</li> <li>Release automation systems for operation</li> </ul>	<ul style="list-style-type: none"> <li>Analyse automation systems performance metrics in accordance with specifications</li> <li>Select appropriate project that will enhance automation system performance</li> <li>Define project scope of work and the number of hours based on business requirements</li> <li>Execute project in accordance with project plan</li> <li>Evaluate project effectiveness in accordance with project objectives</li> <li>Recommend follow up actions</li> </ul>	