

**SKILLS FRAMEWORK FOR PRECISION ENGINEERING  
TECHNICAL SKILLS AND 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>PRE-RAO-1005-1.1</b>	<b>PRE-RAO-2005-1.1</b>	<b>PRE-RAO-3005-1.1</b>	<b>PRE-RAO-4005-1.1</b>	<b>PRE-RAO-5005-1.1</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 losses during 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>Principles of electronics</li> <li>Principles of mechatronics</li> <li>Principles of pneumatics</li> <li>Safety procedures</li> <li>Non-destructive inspections of static components</li> <li>Proper tools handling</li> <li>Tension of timing belts and chain systems</li> <li>Mechanical parts lubrication</li> </ul>	<ul style="list-style-type: none"> <li>Types of automation systems</li> <li>Functionality of systems</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 and/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</li> </ul>	<ul style="list-style-type: none"> <li>Identify automation systems' functions in 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 operations</li> </ul>	<ul style="list-style-type: none"> <li>Prepare automation systems for maintenance</li> <li>Conduct 'major' maintenance on automation systems</li> <li>Verify automation systems performance against specifications</li> <li>Troubleshoot any abnormalities detected</li> <li>Release automation systems for operations</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> </ul>	

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		dis-assembling and replacing worn parts			<ul style="list-style-type: none"><li>• Evaluate project effectiveness in accordance with project objectives</li><li>• Recommend follow up actions</li></ul>	
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