<table>
<thead>
<tr>
<th>TSC Category</th>
<th>Automation Management</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSC</td>
<td>Automation Process Control</td>
</tr>
<tr>
<td>TSC Description</td>
<td>Apply automation process control to monitor performance metrics and quality of manufacturing outputs to determine the optimal settings as well as productivity improvement strategies</td>
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<table>
<thead>
<tr>
<th>TSC Proficiency Description</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
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<tbody>
<tr>
<td></td>
<td>PRE-RAO-3004-1.1</td>
<td>PRE-RAO-4004-1.1</td>
<td>PRE-RAO-5004-1.1</td>
<td>PRE-RAO-6004-1.1</td>
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<tr>
<td></td>
<td>Maintain automation process control to reduce process variations, detect equipment or process deviations for product quality improvement</td>
<td>Analyse multiple process control data sources to manage the process control automation</td>
<td>Design automated control systems to support manufacturing processes</td>
<td>Define the capacity model of equipment using factory automation data as well as equipment performance variations</td>
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### Knowledge

- Types of manufacturing data sources and control requirements
- Types of process control systems and process control algorithms
- Process control concepts
- Control charts
- Process control performance metrics
- Process capability indices
- Types of manufacturing data sources and control requirements
- Types of process control systems and process control algorithms
- Communication data flow between equipment, manufacturing automation and process control automation
- Sensor systems, sensor platforms and standards
- Process control concepts
- Control charts
- Process control performance metrics
- Process capability indices
- Concept of continuous control
- Control strategy design and application
- Integration and software instrumentation maintenance and troubleshooting
- Control documentation
- Automatic controls and robotics
- Industrial data communications
- Cybersecurity on automation system
- Equipment operation and various operating statuses as time models
- Manufacturing execution systems (MES)
- Concept of overall equipment efficiency (OEE)
- Factory layout plan management
- Data mining and production capacity modelling

### Abilities

- Perform set-up of process control automation, according to standard operating procedures
- Maintain process control automation and tune process control algorithms and/or models to meet manufacturing requirements
- Monitor process control automation to detect
- Determine standard process control automation to meet manufacturing requirements
- Set up process control automation and tune process control algorithms or models to meet manufacturing requirements
- Troubleshoot process control automation
- Develop standard instrumentation and control documentation
- Tune and refine control loops
- Troubleshoot instrumentation and control systems
- Design and tune feedback and advanced regulatory control strategies
- Define equipment capacity modelling
- Define factory layout plan management
- Determine direct labour resources for operations
- Recommend productivity improvement strategies
- Perform programming work for analysis and simulation
<table>
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<tr>
<th>equipment or process deviations</th>
<th>Implement improvements to process control automation</th>
<th>Design and apply model-based control strategies</th>
<th>Integrate factory automation systems or robotics on manufacturing shop floor</th>
</tr>
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<tbody>
<tr>
<td>• Report process control performance</td>
<td>• Analyse and correlate multiple process control data sources from equipment through dynamic central database for process control and improvement</td>
<td></td>
<td>• Integrate factory automation systems or robotics on manufacturing shop floor</td>
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