<table>
<thead>
<tr>
<th>TSC Category</th>
<th>Marine Engineering</th>
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<tbody>
<tr>
<td>TSC</td>
<td>Electrical, Electronic and Control Engineering</td>
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<tr>
<td>TSC Description</td>
<td>Manage and monitor electrical, electronic and control engineering systems</td>
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<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>Description</td>
<td>STP-MEG-2001-1.1</td>
<td>STP-MEG-3001-1.1</td>
<td>STP-MEG-4001-1.1</td>
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<tr>
<td>Monitor the operation of electrical, electronic and control systems</td>
<td>Operate, maintain and repair electrical, electronic and control systems</td>
<td>Manage operation of, troubleshoot and restore electrical and electronic control equipment</td>
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**Knowledge**

- Operation of mechanical engineering systems
- Heat transmission, mechanics and hydromechanics
- Electro-technology and electrical machines theory
- Fundamentals of electronics and power elements
- Electrical power distribution boards and electrical equipment
- Fundamentals of automation, automatic control systems and technology
- Instrumentation alarm and monitoring systems
- Electrical drives
- Technology of electrical materials
- Electro-hydraulic and electro-pneumatic control systems
- Safety precautions relating to electrical equipment
- Isolation procedures
- Emergency procedures
- Basic configuration and operation principles of electrical, electronic and control equipment
- Safety requirements for working on shipboard electrical systems
- Safe isolation of electrical equipment before working on equipment
- Maintenance and repair of electrical system equipment, switchboards, electric motors, generator and DC electrical systems and equipment
- Detection of electric malfunction, location of faults and measures to prevent damage
- Construction and operation of electrical testing and measuring equipment
- Function, performance tests and configuration of monitoring systems, automatic control
- Marine electro-technology, electronics, power electronics, automatic control engineering and safety devices
- Design features and system configurations of automatic control equipment and safety devices for the main engine, generator and distributor systems and steam boiler
- Design features and system configurations of operational control equipment for electrical motors
- Design features of high-voltage installations
- Features of hydraulic and pneumatic control equipment
- Methods to troubleshoot electrical and electronic control equipment
- Function test of electrical, electronic control equipment and safety devices
| SKILLS FRAMEWORK FOR SEA TRANSPORT  
TECHNICAL SKILLS AND COMPETENCIES (TSC) REFERENCE DOCUMENT |
|----------------------------------------------------------|

<table>
<thead>
<tr>
<th>Abilities</th>
<th>Technical Skills and Competencies (TSC)</th>
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| • Different voltages onboard ships
• Causes of electric shock and precautions to be observed to prevent shock
• Coupling, load sharing and changing over generators | • Troubleshooting of monitoring systems
• Software version control |

### Abilities
- Recognise and report electrical hazards and unsafe equipment
- Observe safety precautions prior to commencing work
- Monitor performance levels to ensure adherence to technical specifications
- Conduct surveillance of main propulsion plants and auxiliary systems to ensure it is sufficient to maintain safe operation condition
- Operate generators and distribution systems
- Plan and carry out operations in accordance with operating manuals, established rules and procedures to ensure safety of operations
- Comply with safety measures when working on shipboard electrical systems
- Use appropriate hand tools, measuring instruments and testing equipment
- Dismantle, inspect, repair and reassemble equipment in accordance with manuals and good practices
- Reassemble and test performance in accordance with manuals and good practices
- Ensure operation of equipment and systems is in accordance with operating manuals
- Ensure performance levels are in accordance with technical specifications
- Plan maintenance activities in accordance with technical, legislative, safety and procedural specifications
- Inspect, test and troubleshoot equipment