Applications and Key Benefits

- Energy backup system, specifically designed for onboard backup power on rolling stock. Powers auxiliary service in case of interruption to the main overhead catenary supply
- Constant performance at -25° to +65°C / -13°F to 150°F
- No cooling required
- >3000 cycles at 80% DoD
- IP65
- 100% maintenance free in operation
- Allows remote monitoring
- Specific energy: 70% lighter and 30% smaller than conventional backup systems
- Very low total cost of ownership (TCO) compared to other backup technologies
- No outgassing and zero ambient emission
- Very long shelf life without maintenance: stores energy indefinitely when not connected

Sodium Nickel Chloride Technology

- Use of sodium and nickel as active materials, with solid ceramic electrolyte
- Active materials contained in sealed steel sheet cells
- “hot device” - internal operating temperature around 300°C / 572°F
- Made with 2.58 Volt cells with 140 Wh/kg / 310 Wh/lb and 280 Wh/liter specific density
- Proven technology for energy storage and clean powering of electric vehicles

Environment

- Zero ambient emission: can be installed in a sealed environment
- System outside temperature only few degrees above the ambient temperature
- Efficient material usage and 100% recyclable: stainless steel, nickel, iron, salt, ceramic
- RoHs compliant

Technical Features

- Steel cell case and double stainless steel device case
- Integrated system (BMS) for monitoring, diagnostics and data logging
- Ready for remote diagnostics and monitoring
- Scalable with parallel operation
- Railways approved connectors for installation below the floor of each train set
- No memory effect
- BMS diagnostics alert on anomalies and disconnect the device in case of serious failure
- Supplementary protection with an independent circuitry in the event of BMS failure
- Integrated low voltage disconnect (LVD)
- External safety shutdown input

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### 110RW80 Technical Data

#### Electrical Characteristics

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>110 VDC</td>
</tr>
<tr>
<td>Open Circuit Voltage</td>
<td>113 V</td>
</tr>
<tr>
<td>Bus Voltage Range</td>
<td>120 to 140 V</td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>80 Ah at C4 to 90 V</td>
</tr>
<tr>
<td>Nominal Energy</td>
<td>8500 Wh at C4 to 90 V</td>
</tr>
<tr>
<td>Gravimetric Energy Density</td>
<td>80 Wh / kg - 36 Wh / lb</td>
</tr>
<tr>
<td>Minimum voltage on discharge</td>
<td>80 VDC</td>
</tr>
<tr>
<td>Max Continuous Discharge Current</td>
<td>125 Amps</td>
</tr>
<tr>
<td>Faradic Charge Efficiency</td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Operating Conditions

<table>
<thead>
<tr>
<th>Condition</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature Range</td>
<td>-25°C to +65°C / -13°F to 150°F continuous</td>
</tr>
<tr>
<td>Warm-up Time</td>
<td>&lt; 14 hours</td>
</tr>
<tr>
<td>Thermal Losses</td>
<td>&lt; 120W</td>
</tr>
<tr>
<td>Nr of Cycles</td>
<td>&gt; 3000 Cycles at 80% DoD</td>
</tr>
<tr>
<td>IP Rating</td>
<td>IP65</td>
</tr>
</tbody>
</table>

#### Communication

<table>
<thead>
<tr>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Interface Protocol</td>
<td>CAN Open</td>
</tr>
<tr>
<td>Input</td>
<td>External Shut Down</td>
</tr>
<tr>
<td>Logic Input</td>
<td>Emergency Load Disconnect</td>
</tr>
</tbody>
</table>

#### Connectors

<table>
<thead>
<tr>
<th>Power</th>
<th>GlenAir ITS series</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data</td>
<td>Harting HAN series</td>
</tr>
</tbody>
</table>

#### Dimensions

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>616 mm / 24.2 in.</td>
</tr>
<tr>
<td>Depth</td>
<td>526 mm / 20.7 in.</td>
</tr>
<tr>
<td>Height</td>
<td>388 mm / 15.3 in.</td>
</tr>
<tr>
<td>Weight</td>
<td>107 kg / 236 lb</td>
</tr>
</tbody>
</table>

#### Applicable Standards

- Designed to comply with:
  - IEC 60571 / 61373 / 61571 / 61991 / 62236:3-1
  - EN 50121-1 / 5121:3-1 / 51121:3-2 / 50126 / 50128 / 50129 / 50155:2007
  - EN 60529 (IP65)
  - NFPA 130
  - UL-1973

#### FIAMM Manufacturing

- Made in Switzerland
- Over 10 years experience with sodium nickel chloride technology
- ISO 9001 Quality Management System
- ISO 14001 Environmental Management System