Applications and Key Benefits

- 48V Sodium Nickel Chloride energy backup system, specifically designed for many applications

  Ideal for:
  - Central office sites with stringent energy density requirement
  - Outdoor cabinets in locations with elevated or extreme temperatures
  - Installations with poor grid connection and frequent power outages
  - Installations in locations where regular on-site maintenance is costly or not possible

- Constant performance and 20 years design life at -20°C to +60°C / -4°F to 140°F operation

- No cooling required

- >3000 – >4500 cycles at 80% DoD

- 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

- Cells with hermetically sealed steel case, packed in double-thick mica to insulate each cell and prevent electrical shorting

- Internal operating temperature around (~270°C inside, with external surface temperature only few degrees above ambient

- Made with 2.58 Volt cells with 140 Wh/kg or 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

- User interface on front panel

- Ready for remote diagnostics and monitoring

- Compatible with any DC power supply and standard telecom rectifiers

- Scalable with parallel operation

- 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)

- 48TL-H models: optimized insulation to guarantee lowest thermal loss and maximize the system energy efficiency ideal for applications that require medium to very long discharge
General Characteristic

<table>
<thead>
<tr>
<th>Nominal Voltage</th>
<th>48 VDC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Circuit Voltage</td>
<td>51.6V</td>
</tr>
<tr>
<td>Bus Voltage Range</td>
<td>53 to 59 V</td>
</tr>
<tr>
<td>Faradic Charge Efficiency</td>
<td>100%</td>
</tr>
<tr>
<td>Cycles</td>
<td>&gt; 3000 - &gt;4500 Cycles at 80% DoD</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-20°C / + 60°C - -4°F / 140°F continuous</td>
</tr>
</tbody>
</table>

### Model Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Nominal Capacity</th>
<th>Gravimetric Energy Density</th>
<th>Volumetric Energy Density</th>
<th>Max Continuous Discharge Current</th>
<th>Warm-up Time to be Operational</th>
<th>Interface</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>at C4 to 42V</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>48TL80</td>
<td>80 Ah</td>
<td>81 Wh/Kg 37 Wh/lb</td>
<td>80 Wh/liter</td>
<td>50 Amps</td>
<td>&lt;20 hours</td>
<td>RS 232 (option RS 485)</td>
</tr>
<tr>
<td>48TL120</td>
<td>120 Ah</td>
<td>74 Wh/Kg 34 Wh/lb</td>
<td>64 Wh/liter</td>
<td>90 Amps</td>
<td>&lt;14 hours</td>
<td>RS 485/USB Ethernet / CAN-bus</td>
</tr>
<tr>
<td>48TL160</td>
<td>160 Ah</td>
<td>85 Wh/Kg 38 Wh/lb</td>
<td>86 Wh/liter</td>
<td>120 Amps</td>
<td>&lt;14 hours</td>
<td>RS 485/USB Ethernet / CAN-bus</td>
</tr>
<tr>
<td>48TL200</td>
<td>200 Ah</td>
<td>91 Wh/Kg 42 Wh/lb</td>
<td>108 Wh/liter</td>
<td>150 Amps</td>
<td>&lt;14 hours</td>
<td>RS 485/USB Ethernet / CAN-bus</td>
</tr>
</tbody>
</table>

48TL range - application with stable or unstable grid connection

48TL-H range - optimized for hybrid application with renewable energy and/or gen-set

<table>
<thead>
<tr>
<th>Model</th>
<th>Front Depth</th>
<th>Height</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>48TL80</td>
<td>260 mm / 10.24 in.</td>
<td>320 mm / 12.60 in.</td>
<td>45 kg / 99 lb</td>
</tr>
<tr>
<td>48TL120</td>
<td>496 mm / 19.53 in.</td>
<td>320 mm / 12.60 in.</td>
<td>77 kg / 170 lb</td>
</tr>
<tr>
<td>48TL160</td>
<td>496 mm / 19.53 in.</td>
<td>320 mm / 12.60 in.</td>
<td>91 kg / 201 lb</td>
</tr>
<tr>
<td>48TL160H</td>
<td>496 mm / 19.53 in.</td>
<td>325 mm / 12.80 in.</td>
<td>90 kg / 198 lb</td>
</tr>
<tr>
<td>48TL200</td>
<td>496 mm / 19.53 in.</td>
<td>320 mm / 12.60 in.</td>
<td>104 kg / 229 lb</td>
</tr>
</tbody>
</table>

### Applicable Standards

- EN 61000-6-1
- CE
- NEBS DA1976 Level 1 and Level 3

### FIAMM Manufacturing

- Made in Switzerland
- ISO 9001 - Quality Management System
- ISO 14001 - Environmental Management System
- Over 10 years experience with Sodium Nickel Chloride technology