FIAMM ESS/ Solution Portfolio

- Rack Battery
- Energy Storage Systems
- ST Modules
- Sodium Nickel Chloride Battery Modules
- Spring Bulk Battery
- Energy Storage Solutions
- Cabinet Battery
- Spring Bulk AC
- Energy Storage Solutions
- Spring Bulk Battery
- Energy Storage Solutions
FIAMM ESS/ A tailored Solution

On-Grid

Micro-Grid

Off-Grid

Customer Targets

Requested Performance

Tailored Solution
Installations
FIAMM ESS/ From north to south

- Designline Abu Dhabi +50° C
- Tecnobus Canada -30° C
Innovia 300 Monorail
- 110V 80Ah per unit
- Powering auxiliaries off-catenary
- Projects in Saudi Arabia, Brazil
- Turn key battery and mounting designed by FIAMM
FIAMM ESS/ Elcos (Italy): Hybrid genset power station

- Able to be adapt at any Value of Load
- Capex reduction
- Opex reduction
- Double output
- AC power single phase
- DC power 48VDC
- Constant performance up to 60° C
- Battery cycle Sodium Nickel Chloride with more than 5000 cycles at 40% DOD
- 48V batteries cicle 100% recyclable
- Compart design, all parts integrated in all in one unit.

**Electrical Characteristics**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal Voltage</td>
<td>48 VDC</td>
</tr>
<tr>
<td>Open Circuit Voltage</td>
<td>51.8 V</td>
</tr>
<tr>
<td>Bus Voltage Range</td>
<td>53 to 59 V</td>
</tr>
<tr>
<td>Nominal Capacity</td>
<td>200 Ah at C4 to 42V</td>
</tr>
<tr>
<td>Nominal Energy</td>
<td>9600 Wh at C4 to 42V</td>
</tr>
<tr>
<td>Gravimetric Energy Density</td>
<td>91 Wh / Kg - 41 Wh / lb</td>
</tr>
<tr>
<td>Volumetric Energy Density</td>
<td>108 Wh / liter</td>
</tr>
<tr>
<td>Max Continuous Discharge Current</td>
<td>100 Amps</td>
</tr>
<tr>
<td>Faradic Charge Efficiency</td>
<td>100%</td>
</tr>
</tbody>
</table>
Five fiberglass modules were used for the construction of the new fully technological “Bivacco Gervasutti”. It represents an off grid energy storage application of Sodium Nickel Chloride batteries. Solar energy captured by photovoltaic panels on the roof is stored in a 48TL80 FIAMM SoNick battery.

**Electrical Characteristics**

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<tbody>
<tr>
<td>Nominal Voltage</td>
<td>48 VDC</td>
</tr>
<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>Nominal Capacity</td>
<td>80 Ah at C4 to 42V</td>
</tr>
<tr>
<td>Nominal Energy</td>
<td>3650 Wh at C4 to 42V</td>
</tr>
<tr>
<td>Gravimetric Energy Density</td>
<td>81 Wh / Kg - 37 Wh / lb</td>
</tr>
<tr>
<td>Volumetric Energy Density</td>
<td>80 Wh / liter</td>
</tr>
<tr>
<td>Max Continuous Discharge Current</td>
<td>50 Amps</td>
</tr>
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<td>Faradic Charge Efficiency</td>
<td>100%</td>
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</tbody>
</table>
Energy Spring 324

Containerized Energy Storage System for outdoor applications composed by 1-24 620V 23.5kWh* ST523 SoNick batteries (tot 140kWh). The solution includes an electrical panel with disconnect switches, AC panel, air conditioning, PCS and BMS.

* Nominal 100% DoD 100% Efficiency

Energy Spring 164

Containerized Energy Storage System for outdoor applications with up to 64 ST523 SoNick batteries.
FIAMM ESS/ Energy Storage Projects

**DUKE project with S&C Sub-Station Rankin**

Location: Charlotte – USA  
**UNIT:** 1 BESS (12 Z37 620V 38Ah)  
**ENERGY:** 240 KWh  
**POWER:** 120 KW

**MALDIVES project**

Location: Gasfinolhu Island Resort – Maldives Islands  
**UNIT:** 1 BESS (64 ST523 620V 23,5kWh)  
**ENERGY:** 1.2 MWh (400 KW x 3h)  
**POWER:** 600 KW – 800 kVA
**FIAMM ESS/ Energy Storage Projects**

### CESS: Excel project

- **Location:** Denver – USA
- **UNIT:** 1 CABINET (3 Z37 620V 38Ah)
- **ENERGY:** 70 KWh
- **POWER:** 25 KW

### INES Project

- **Location:** Le Bourget du Lac – France
- **UNIT:** 1 BESS (6 ST523 620V 23,5kWh)
- **ENERGY:** 140 KWh
- **POWER:** 50 KW
Smart Polygeneration Microgrid

Location: Campus Savona, University of Genoa

UNIT: 1 SPRING 306
ENERGY: 140 KWh
POWER: 62 KW
EDF EN Gabardone project

Location: Colombiers – France

UNIT: 1 SPRING 303
ENERGY: 70 KWh
POWER: 54 KW