For a **secure and flexible network**

Microgrids are groups of Distributed Energy Resources (DERS) and interconnected loads controllable as a single electrical system. For grid-connected areas, microgrids can disconnect from the utility grid to provide microgrid functionality and back-up power. For isolated areas, microgrids can be fully autonomous, forming an AC grid from the DERS.

**Off-grid microgrids**
In remote areas, Socomec’s ESS is ideal for powering autonomous microgrids with distributed generation like solar PV, wind or diesel generation. The SUNSYS Microgrid Control Module coordinates the flow of power between the generators and the batteries and between the batteries and the load to ensure that efficiency and service life are maximized, while genset fuel consumption and harmful emissions are significantly reduced.

**Grid-tied microgrids**
In addition to the energy services provided by the energy storage system in grid-connected mode, Socomec’s ESS also enables the facility to function as an autonomous microgrid when grid power fails.

**Smart buildings**
Socomec’s ESS can be integrated with smart building functionality to maximize efficiency and reduce the cost of electricity. It can also ensure the back-up power in case of grid outage.

Typical architecture of a microgrid with SUNSYS PCS² IM.

*Image sources: Courtesy of Socomec*
The Energy Storage solution for microgrid power management

Socomec’s Energy Storage System (ESS) includes SUNSYS PCS² IM power conversion system with islanding mode & SUNSYS MCM microgrid control module. Socomec ESS is designed to excel in a variety of microgrid and smart building applications. During on-grid operation, it operates grid services such as primary reserves availability and grid stabilization. Its high levels of performance, availability and extended functionalities help to maximize ROI.

Your benefits

- Grid services
- Backup power
- Maximization of renewable energy self-consumption and production
- Optimization of diesel generators
- Demand charge management
- Hybrid system management
- Time-of-use bill management
- High quality and safety in off-grid mode

Certified Energy Storage System

- UL 1741SA
- IEEE 1547
- VDE 0126-1-1/A1
- VDE AR-N 4105
- CEI 0-21
- CEI 0-16
- G59/3

Grid codes compatibility is always upgrading, please contact us for potential upgrades.
A complete solution

SUNSYS PCS² IM
Bidirectional Power Converter

• Maximum uptime:
  - modular and independent architecture,
  - easy, fast and safe maintenance thanks to hot-swap power modules,
  - no downtime during maintenance,
  - autonomous operation.
• Islanding capability - voltage generator:
  - no interruption from grid-forming to grid-following mode,
  - automatic balancing between production and consumption,
  - high performance.
• High efficiency at low power:
  - at lower power levels, the system switches off some modules,
    so the remaining modules can run at peak efficiency,
  - high quality and stability of power supply in islanding operation,
  - black-start functionality,
  - boosted overload and short-circuit capability.

SUNSYS MCM
Microgrid Control Module

It integrates a Microgrid Management System that manages the functions of a microgrid:
• controls the charge/discharge of batteries and curtails production from renewable generation when the batteries are fully charged,
• automatically disconnects from the grid when the power fails and re-powers the microgrid from batteries and renewable generation; it automatically reconnects to the grid when grid power is restored in full transparency for the customer,
• balances the load between multiple SUNSYS PCS² IM cabinets.

The control panel with integrated webserver enables local control and monitoring, in addition to remote control and monitoring.

Battery cabinet

Various battery technologies and battery configurations are available to fulfil almost any customer’s requirements.
Distribution module

- Connects multiple SUNSYS PCS² IM in parallel and multiple battery racks in parallel to deliver the power and energy needed for almost any installation.
- Disconnects SUNSYS PCS² IM and the batteries so that maintenance may be performed safely.

A reliable parallel connection

The Source Measurement and Connection Module manages the connection of sources to the microgrid. Measurement is performed by DIRIS Digiware in order to provide all the necessary real-time data from the variety of equipment a microgrid requires to function properly. Parallel connection of the sources is achieved after source synchronization has been managed by the Microgrid Control Module.

Multi-circuit Power Monitoring devices

DIRIS Digiware system is the most effective solution for metering consumption and monitoring the quality of electrical energy. It brings a high degree of flexibility to installations and makes connection and configuration easy.
Your benefits

Grid services
DSO and TSO are responsible for the quality and stability of the electrical grid. Due to higher consumptions and decentralised production, constraints on this grid are increasing, thus creating a need for grid services. The rapid response times of the Socomec SUNSYS PCS² IM are ideal for delivering grid services such as voltage and frequency regulation. Socomec’s ESS can also export power to the grid when the utilities may require, earning Demand Response payments from the utility.

Back-up power
When the grid fails, Socomec’s ESS maintains power availability to the loads. The solution automatically disconnects from the grid and the SUNSYS PCS² IM re-powers the microgrid from batteries and renewable generation, acting as a voltage generator. Moreover the blackstart function enables to take over supply without need for oversized power due to inductive loads.

Maximization of renewable energy self-consumption and production
One of the major issue with renewable energy productions is that they are intermittent, which makes it difficult to maximize their use. The Socomec’s ESS can ensure zero-export, or smart-export for utilities that require them. Excess power generated by the solar PV array during the day can be stored in the batteries for self-consumption in the evening.

Optimization of diesel generators
Adding energy storage with renewable generation can be a cost-effective way to reduce the use of diesel generators in microgrids, thus diminishing CO₂ emissions, improving the diesel generators lifespan, duration, and increasing autonomy for a given fuel supply.

Demand Charge Management
Consumption of electricity during high peak periods have several drawbacks, they are expensive and might require an invest in the infrastructures that are not designed for them. To prevent from these costs, Socomec’s ESS can reduce demand charges by discharging power stored in the batteries during peak demand intervals.

Hybrid system management
The Socomec Microgrid Management System manages hybrid microgrids, coordinates how the SUNSYS PCS² IM charges and discharges batteries, and curtails the production from renewable generation when the batteries are fully charged.

Time-of-use bill management
One of the services provided by Socomec’s ESS is to use the energy from the network during time of low price and to use energy from the batteries during high price periods. Therefore the system enables to reduce the energy costs and the customers’ bills.

High quality and safety in off-grid mode
Socomec’s ESS has high short-circuit capabilities that enables the same protections in off-grid mode as in an grid-tied mode. Voltage, frequency and THD delivered stay within the limits defined by EN 50160.
Technical data

### INPUT (DC)

<table>
<thead>
<tr>
<th>DC battery voltage</th>
<th>SUNSYS PCS² IM 33TR</th>
<th>SUNSYS PCS² IM 66TR</th>
<th>SUNSYS PCS² IM 100TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batteries compatibility</td>
<td>Lithium-ion/Lead acid/Flow</td>
<td>Full power from 450 to 825 VDC with derating</td>
<td>350 to 850 VDC with derating</td>
</tr>
<tr>
<td>Number of independent power modules</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Maximum current</td>
<td>80 A</td>
<td>160 A</td>
<td>240 A</td>
</tr>
</tbody>
</table>

### OUTPUT (AC)

<table>
<thead>
<tr>
<th>Rated apparent power</th>
<th>SUNSYS PCS² IM 33TR</th>
<th>SUNSYS PCS² IM 66TR</th>
<th>SUNSYS PCS² IM 100TR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage (Un)</td>
<td>33,000 VA</td>
<td>66,000 VA</td>
<td>100,000 VA</td>
</tr>
<tr>
<td>Voltage range</td>
<td>400 V rms 3ph+N</td>
<td>400 V rms 3ph+N</td>
<td>400 V rms 3ph+N</td>
</tr>
<tr>
<td>Rated frequency (Fn)</td>
<td>50 Hz</td>
<td>50 Hz</td>
<td>50 Hz</td>
</tr>
<tr>
<td>Frequency range</td>
<td>47.5 - 51.5 Hz</td>
<td>47.5 - 51.5 Hz</td>
<td>47.5 - 51.5 Hz</td>
</tr>
<tr>
<td>Rated current</td>
<td>48 Arms</td>
<td>96 Arms</td>
<td>144 Arms</td>
</tr>
<tr>
<td>THD on-grid mode (%)</td>
<td>&lt; 5%</td>
<td>&lt; 5%</td>
<td>&lt; 5%</td>
</tr>
<tr>
<td>Symmetrical overload</td>
<td>110% for 30 min - 125% for 10 min - 150% for 30 s</td>
<td>190% for 30 min - 215% for 10 min - 250% for 30 s</td>
<td></td>
</tr>
<tr>
<td>Asymmetrical overload</td>
<td>90 Arms for 40 ms + 75 Arms for 60 ms</td>
<td>180 Arms for 40 ms + 150 Arms for 60 ms</td>
<td>270 Arms for 40 ms + 225 Arms for 60 ms</td>
</tr>
<tr>
<td>Symmetrical short circuit</td>
<td>145 Arms for 40 ms + 115 Arms for 60 ms</td>
<td>290 Arms for 40 ms + 230 Arms for 60 ms</td>
<td>435 Arms for 40 ms + 345 Arms for 60 ms</td>
</tr>
<tr>
<td>Asymmetrical short circuit</td>
<td>145 Arms for 40 ms + 115 Arms for 60 ms</td>
<td>290 Arms for 40 ms + 230 Arms for 60 ms</td>
<td>435 Arms for 40 ms + 345 Arms for 60 ms</td>
</tr>
</tbody>
</table>

### EFFICIENCY

| Maximum efficiency | < 96.3% |
| Environmental category | Non-air-conditioned indoor space |
| Degree of protection | IP20 |
| Operating ambient temperature | -5 to +50 °C (+40 to +50 °C with derating) |
| Relative humidity | 5% - 95% without condensation |
| Acoustic level at 1 m | < 64 dB |
| Altitude | 0 - 1000 m without derating |

### ENVIRONMENT

| Safety | EN 60950-1/A2; EN 62477-1 |
| EMC | EN 61000-3-12; EN 61000-6-2; EN 61000-3-11 |

### Dimensions & weights(1)

<table>
<thead>
<tr>
<th>Dimensions (L x D x H) (mm)</th>
<th>SUNSYS PCS² IM 33TR</th>
<th>SUNSYS PCS² IM 66TR</th>
<th>SUNSYS PCS² IM 100TR</th>
<th>MCM - MICROGRID CONTROL MODULE</th>
<th>DISTRIBUTION CABINET</th>
<th>BATTERY CABINET</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight (kg)</td>
<td>330</td>
<td>525</td>
<td>770</td>
<td>200</td>
<td>300</td>
<td>The weight depends on the configuration. For more detailed information, please contact us.</td>
</tr>
</tbody>
</table>

(1) All dimensions and weights are indicative only. For more detailed information, please contact us.

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### The manufacturer’s guarantee

We offer a comprehensive support service package: commissioning, on-site testing, preventive maintenance visits, 24-hour call out and rapid on-site repairs, genuine spare parts, etc.

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### Socomec, your best asset

**European manufacturing group**
- Created in 1922.
- A workforce of almost 3000.
- Located on all five continents.

**A culture of independence**
- Family shareholding.
- Control of the decision-making process.
- Respect of human values.

**The spirit of innovation**
- Almost 10% of turnover is invested in R&D.

**A flexible manufacturing structure**
- Competitive production sites.
- Lean Management.
- Lead times, quality and cost guaranteed.

**The vision of a specialist**
- Expertise in core technologies.
- Product adaptations as per customer requirements.

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**A focus on service**
- Advice, technical assistance and call-out, training, etc.
- Teams located across the globe.

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**SOCOMEC - Energy Storage Solution for microgrids**
Socomec: our innovations supporting your energy performance

1 independent manufacturer
3,200 employees worldwide
10% of sales revenue dedicated to R&D
400 experts dedicated to service provision

Your power management expert

POWER SWITCHING
POWER MONITORING
POWER CONVERSION
EXPERT SERVICES

The specialist for critical applications
• Control, command of LV facilities
• Safety of persons and assets
• Measurement of electrical parameters
• Energy management
• Energy quality
• Energy availability
• Energy storage
• Prevention and repairs
• Measurement and analysis
• Optimisation
• Consultancy, commissioning and training

A worldwide presence
8 production sites
• France (x3)
• Italy
• Tunisia
• India
• China (x2)

27 subsidiaries
• Australia • Belgium • China • France • Germany • India • Italy • Netherlands • Poland • Romania • Singapore • Slovenia • Spain • Switzerland • Thailand • Tunisia • Turkey • UK • USA

80 countries where our brand is distributed

HEAD OFFICE
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