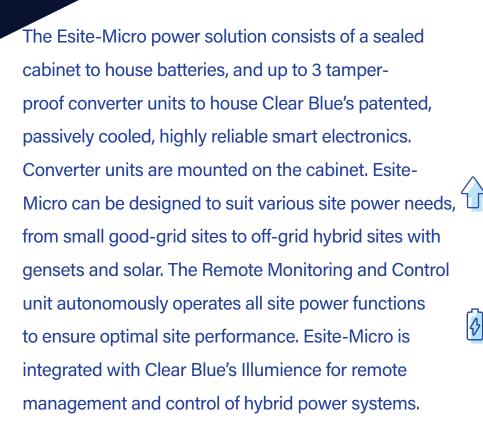# CLEARBLUE
TECHNOLOGIES

Esite-Micro

Hybrid Smart Power solution delivering reliable power for telecom

Esite-Micro is the world's first hybrid power solution purpose-built for telecom sites. It delivers highly reliable, cost-effective, and long lasting hybrid power for telecom systems especially in off-grid and bad-grid regions. Esite-Micro is a modular solution, meaning it can support a variety of site needs, all while being remotely managed and controlled through Clear Blue's Illumience platform.

The Esite-Micro power solution consists of a sealed cabinet to house batteries, and up to 3 tamper-proof converter units to house Clear Blue's patented, passively cooled, highly reliable smart electronics. Converter units are mounted on the cabinet. Esite-Micro can be designed to suit various site power needs, from small good-grid sites to off-grid hybrid sites with gensets and solar. The Remote Monitoring and Control unit autonomously operates all site power functions to ensure optimal site performance. Esite-Micro is integrated with Clear Blue's Illumience for remote management and control of hybrid power systems.

Easy Installation & Maintenance

Esite-Micro power systems are delivered in fully-sealed converter units making for simple installations. With installations remotely supported by Clear Blue's expert service team, get it right the first time, every time. More than 80% of all issues are managed and eliminated through Clear Blue's remote management. service.

Maximum Uptime

Through Clear Blue's predictive analytics, energy forecasting and full hybrid power system control, maximum uptime is ensured at the lowest operational cost.

Long Life

Our dynamic charging algorithm uniquely focusses on battery charging to ensure optimal battery management for the longest system life and maximum reliability.

Smart Off-Grid & Hybrid Power
www.clearbluetechnologies.com

Modularity

Esite-Micro is a highly modular solution able to deliver rectification power between 10.5 and 31.5 Kw. Esite-Micro can serve a variety of sites, while being upgraded easily.

Outdoor Converter Units

The Esite-Micro converter units are built for harsh outdoor environments. They use passive convection cooling to protect the system from overheating, and ensure long life.

Power Source Switching

Esite Micro's Built-in Power Source Switching automatically switches between power inputs to ensure power uptime, with solar always being prioritized, thereby minimizing genset use.

RMC
Remote Monitoring Control

Converter Unit

RSE
Rectifier Solar External
RE
Rectifier External
SE
Solar External

PCU
Power Combiner Uniit

34 U 19"
battery space

Free Air cooling filters and inlet

Site Control Functions

Esite-Micro controls numerous site functions, including battery charging algorithms, Solar MPPT and predictive solar energy control. The control functionality of Esite-Micro helps maximize solar, minimize genset run hours, and maximize uptime.

Remote Management

Esite-Micro is integrated with Clear Blue's cloud-based remote management platform, Illumience. Through Illumience, users can monitor and control power generation, load consumption and battery charging to ensure reliabilty and optimal site performance.

Grid Power Harvesting

Esite-Micro is able to harvest grid power even at lower voltages. Grid Power Harvesting reduces use of genset, thereby optimizing site performance.
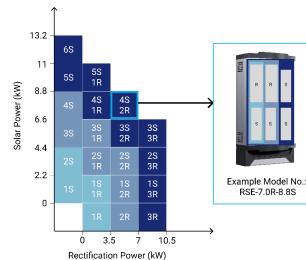
Esite-Micro's modularity makes it simple to build multi-tenant power solutions for large telecom sites. With Esite-Micro, depending on your power requirements and sources, combine rectifiers and solar controllers to manage multiple power inputs with maximum efficiency. Esite-Micro makes it easy to install a modular system designed specifically to support the site's power needs. Rectifier-only systems deliver up to **31.5 kW** of rectification power. Solar-only systems deliver up to **39.2 kW** of solar power, and hybrid systems deliver a combination of rectification and solar.

Esite-Micro Converter Sizing

Step 1:
Determine how much solar and rectification power is needed. Example, you need 8.8kW of solar and 7kW of rectification.

Step 2:
Find the combination of solar and rectification you need on the table.

Example Model No.:
RSE-7.0R-8.8S

Esite-Micro System Modularity

A) Each solar charger can have 6-8 solar panels per charger, depending on the solar panel size.

B) Each converter has three channels. Each channel can either fit two rectifiers, one solar and one rectifier or one SE or one RE.

C) Not enough power in one converter? No problem, you can have up too three converters per system

Smart Off-Grid & Hybrid Power
www.clearbluetechnologies.com

Converter Unit

Available in multiple configurations, the converter unit converts grid, generator, and/or solar power into -48 VDC. Each converter unit has 6 slots which can hold up to 6 power units:
▪ Quantity 0-3 rectifier units which support grid and generator and include a built in automatic transfer switch.
▪ Quantity 0-6 solar charges with input of 165V and 22A, able to support x6 580W solar panels each, as an example.
The majority of all possible site configurations can be supported by combining the units and a complete system can be formed by up to three units of any type. The converter units are easily installed on the sides of the cabinet with the pre-installed frames and cable ducts.

Power Combiner Unit (PCU)

The Power Combiner Unit hosts all DC distribution, load disconnect contactors and MCB's. The main function is to act as an electrical connection interface for the batteries, the site load, and the Converter units. The standard version of the PCU supports up to 8 strings of Li-Ion batteries and has optional high and low priority load disconnect contactors.

Remote Monitoring Control (RMC)

The Remote Monitoring and Control unit (RMC) controls up to three converter units and operates all site-related power functions. It acts as a gateway for storage and configuration of all site data and makes sure that this data is available to the integrated Illumience remote management platform, either via local site connection or server-to-server connection.

Solar Panels

Clear Blue's Esite-Micro solution can support solar, grid, and generator power sources for large telecom sites. As the system is highly modular, the type, size, and number of panels required for each system may vary. The Clear Blue team will ensure the systems' solar panel configuration is built to fit the needs ot the system with future upgrade capabilities possible as power requirements grow.

Batteries

Esite-Micro is capable of supporting multiple battery types including Lead Acid and Lithium-Ion. The standard Esite-Micro system includes Clear Blue's 200 Ah x 48VDC batteries, sized for the amount of energy that can be generated in that geographic location, & the percentage of uptime required for the load.

Esite-Micro

Illumience Intelligent Remote Management Service

Remote Monitoring & Reporting

The Illumience platform has a variety of reporting options to ensure you have the information you need when you need it.

Monthly, daily and hourly real-time monitoring and reports

Global performance data analytics

Easy to use dashboard map with location tracking for all systems

Advanced forward-looking system performance with weather & energy forecasting

3 years of Clear Blue's Illumience Remote Management platform and ongoing service team support is included with every Esite-Micro system.

Energy Forecasting

Advanced analysis of energy capabilities for better energy managment and reduction of downtime.
- Historical and site system data (including aging, degradation, dust).
- Multi-day weather forecast.
- Yields energy forecast for uptime management with customized scheduled service windows.

Potential Energy Analysis

Greater uptime through advanced analysis of current and future energy requirements forward planning and growth.
- Measurements of the potential energy against the actual energy generated/consumed.
- System degradation analysis (dust, shading).

Battery Life Cycle Management

Variety of battery managment features to maximize battery life and performance.
- Patented dynamic charging algorithms.
- Scalable battery pack.
- Support of multiple battery types.
- Lifecycle forecaster.
- Remote battery maintenance & revitalizer.

Smart Management & Control

More advanced power management and uptime.
- Fully integrated power distribution unit (PDU) for power and control restarts of individual loads remotely.
- Array of remote troubleshooting tools (solar panel test, cabling and connectivity integrity, remote short circuit reset, and user-defined and configured alarms) for maintenance cost reductions.
- Industry leading platform security and encryption to ensure your power is secure.