



Semiconductor secure power solutions

Guaranteed availability for critical applications in high-tech and end-user facilities

se.com/industrial-business-continuity

Life Is On

Schneider
Electric

Secure power for sensitive semiconductor processes

Imagine life without computers, mobile phones, sophisticated medical devices, and even video game consoles. We've grown accustomed to these technologies to manage our day-to-day lives, communicate with each other, keep us healthy, and entertain ourselves. The truth is: semiconductors allow us to take advantage of these modern conveniences.

For companies in the high-tech and manufacturing industries involved in processes to transform bare silicon into ingots, wafers, chips, and ultimately circuits used in electronics and electrical devices, power availability of critical systems is paramount for precision-intensive physical and chemical processes. In addition, reliability, maintainability, safety, and efficiency of sensitive equipment and clean room applications are required at the highest levels to ensure productive and profitable manufacturing environments.

Every step in the process matters

Wafer fabrication requires a large investment: \$3 billion – \$5 billion. In other words, your enterprise needs to ensure uptime. Minimizing anomalies, such as voltage fluctuations, can help to improve the performance of process tools and increase production efficiency. And reliable power availability and security can optimize operations and your bottom line.

With anywhere from 250 to 300 separate operations required to make a single chip, uptime is essential to ensure optimized workflow. Reducing power outage risks translates into efficient chip-making processes and predictable cost of materials. Restarting operations after a power outage can take hours to weeks. But secure power helps to keep processes online, resulting in higher productivity rates. What's more, semiconductor industries are seeking ways to optimize energy costs.

Introducing proven solutions for semiconductor environments

The opportunity to save millions of dollars has made keeping assets online a high priority for high-tech and end-user facilities. A unique way to ensure a proper return on investment (ROI) is through optimization of overall equipment efficiency.

Integrated Schneider Electric™ solutions offer a complete electrical system including power monitoring and a resilient architecture to improve subfunction operation, enable optimum use of energy, and save up to 30 percent* on operating energy costs. Plus, our unique and complete secure power solutions, from 1 kVA to 1 MVA, and associated services can maximize power availability for efficient, safe, and reliable clean room and utilities applications.

*Based on previous data, 2012. This is not a guarantee of future performance or performance in your particular circumstances.



Ensure power availability for the most sensitive applications

As new technologies requiring even more powerful chips continue to proliferate there is a growing sense of urgency to:

- Increase system availability
- Satisfy increasing requirements yield
- Ensure 100 percent reliable supply of key utility to production room
- Lower environmental impact of fab operations
- Reduce energy consumption

Schneider Electric™ is uniquely positioned to help you meet the distinct challenges only found in semiconductor environments. We offer a wide range of products and systems to enhance the availability of utility power for other aspects of manufacturing processes, such as adaptable and reliable uninterruptible power supply (UPS) solutions.

In addition to our overall offering and expertise, Schneider Electric is a trusted advisor. Our capabilities include designing and delivering high-quality, end-to-end solutions for excellent power quality and energy efficiency, continuous availability of equipment and utilities, increased power availability of tools and utilities, and environmental compliance. With Schneider Electric as your secure power partner, you can avoid financial losses, optimize operating costs, increase efficiency, and lower total cost of ownership with proven integrated solutions designed for sensitive semiconductor manufacturing environments wherever you operate.

5 reasons to optimize utility power:

Schneider Electric products and systems enhance availability of utility power for manufacturing processes to:

1. Improve uptime
2. Optimize CapEx and OpEx
3. Deliver up to 30 percent savings on operating/energy costs
4. Ensure regulatory compliance (SEMI F47 power quality standard)
5. Maximize energy efficiency

What are the most critical semiconductor applications ?

1 Basement

All utilities (electrical distribution, TGBT), emergency lighting/smoke extraction

- Three-phase; 10 – 500 kVA UPS

2 Fan tower, fan, engine

- Three-phase; 10 – 120 kVA UPS

3 Make-up air, fan, engine

- Three-phase; 10 – 120 kVA UPS

4 Process supply systems, SCADA, monitoring

- Single-phase and three-phase; 1 – 40 kVA UPS

5 Water pump, engine

- Three-phase; 10 – 120 kVA UPS

6 Chemical supply systems, control system, valves

- Single-phase and three-phase; 1 – 200 kVA

7 Pure water treatment, valves, pumps

- Three-phase; 20 – 500 kVA UPS

8 Gas cabinet

Gas inspection systems, valves

- Single-phase and three-phase; 1 – 200 kVA UPS

9 Cooling coil/return air

Compressor, engine, gas control valve, flame sensor, air handling, air exhaust

- Three-phase; 10 – 120 kVA UPS

10 Control room

Industrial computer, control system and measurement system, monitoring

- Single-phase and three-phase; 1 – 120 kVA UPS

11 Clean room with process tools

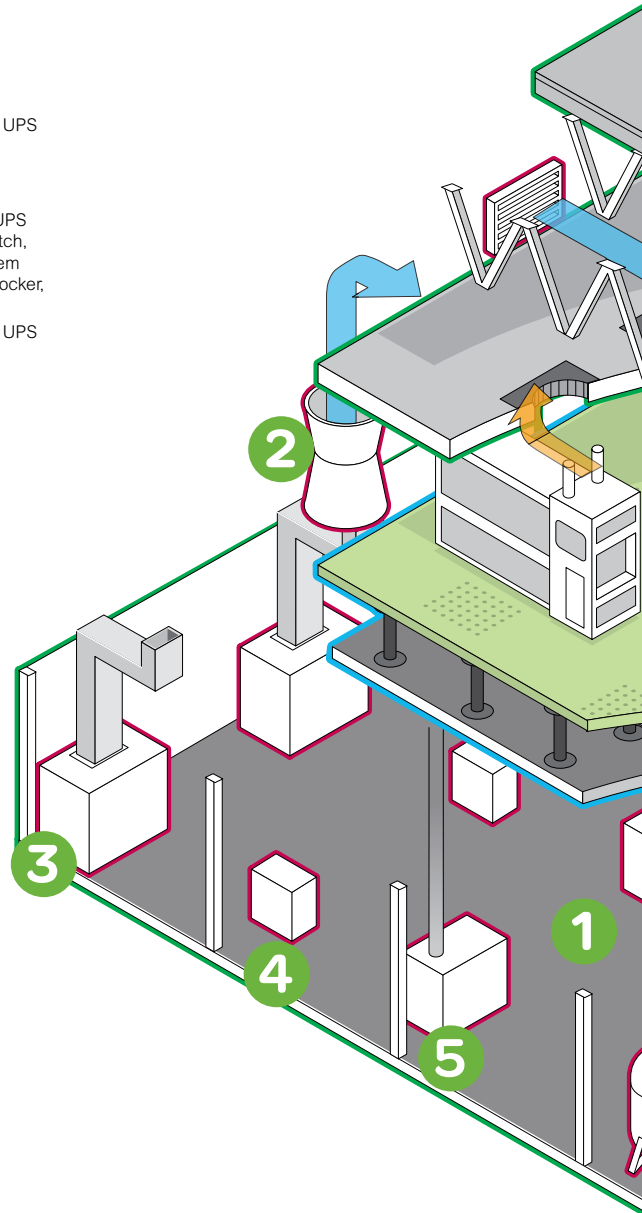
Sensitive applications that are protected by UPS most of the time: grinder, photolithography, etch, cleaning, furnace, wafer dicing, transfer system control, process equipment utility unit, bay stocker, host terminal

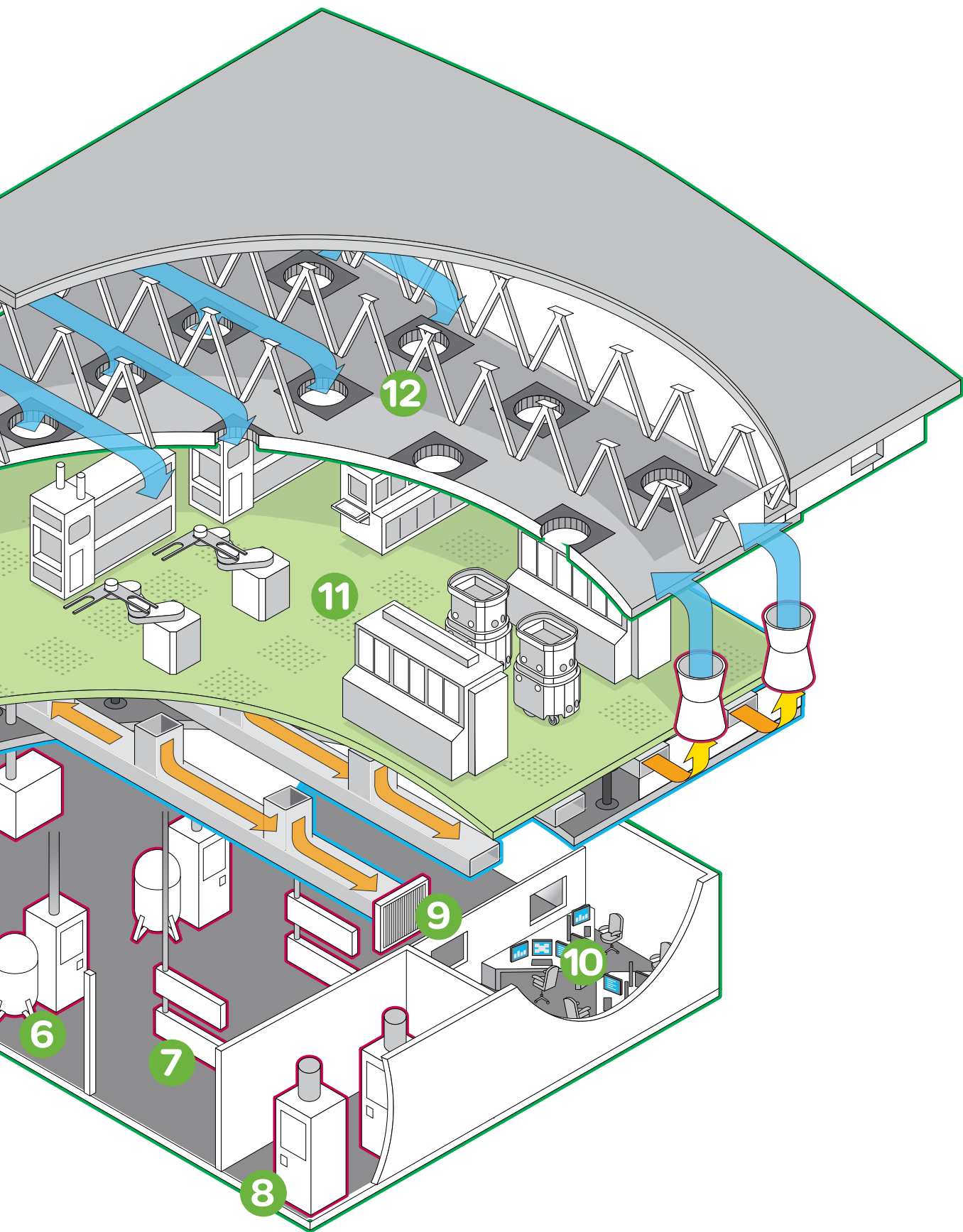
- Single-phase and three-phase; 1 – 500 kVA UPS

12 Pressurized plenum

Silencer, pump

- Three-phase; 10 – 200 kVA UPS







Semiconductor applications:

Smart UPS and Galaxy UPS solutions are standard and adaptable solutions

Single-phase UPS: APC Smart UPS Online, Easy BVS, DIN Rail UPS, Easy UPS SRVS

Smart UPS - RT models protect your critical hardware from damaging surges and power failures, boosting availability levels for critical applications. Units are available in both tower and standard 19" rack formats, mounted in just 2U of space.



- Available from 0.5 to 20kVA, 50 and 60Hz (lower rating also available)
- Designed to be installed in racks or cabinets
- Hot-swappable, user-replaceable batteries
- Modbus communication enabled
- IEC and UL standard
- Elevation: 1000m no-derating, above contact us

Three-phase UPS : Galaxy VM/VX, Symmetra PX, Easy UPS 3S/3L/3M

Schneider Electric UPS line is at the top of its class. The three-phase UPS units, 10 – 1100 kVA, come parallel-ready to give you the highest power availability for your most critical applications. Both models come with small footprints and flexible designs, readily adaptable and scalable to handle each power event without a break in service.



- Double conversion topology UPS for ultra-high efficiency and power protection with harmonic free input rectifier
- Comes parallel-ready, so you can pay as you grow and meet your future needs
- Designed to be compliant IP 20, IP32 on option and IP 44 (upon request)
- Backup times up to two hours
- Fault-tolerant architecture due to automatic and maintenance bypass in a compact footprint
- Full front access with a user-friendly interface
- Operating temperature: 0 to 40°C
- IEC and UL standard

Three-phase static transfer switch 30 – 2000 A, MGE Upsilon™ STS

- Supplies power to a range of equipment from two independent and redundant sources
- Automatically transfers power to a stable alternate source in less than four milliseconds
- Detection and transfer times up to 10 times faster than many other switches



AccuSine™ active harmonic conditioning

20 – 120 A capacity

- Mitigation of harmonics for more reliable operation of applications
- Small design for easy integration into new or existing installations
- Power factor correction for energy savings



For further information on products please go to se.com

Industrial edge computing

Why industrial edge computing?

Five imperatives driving computing to the edge

Industrial edge

40%

of IoT data will be stored, processed, analyzed and acted upon at the edge

Latency

- <7 ms. – or >500 ms. and more
- Consistency – or not

Interactivity

- Locally collaborative – or locally responsive
- Horizontal – or vertical



Autonomy

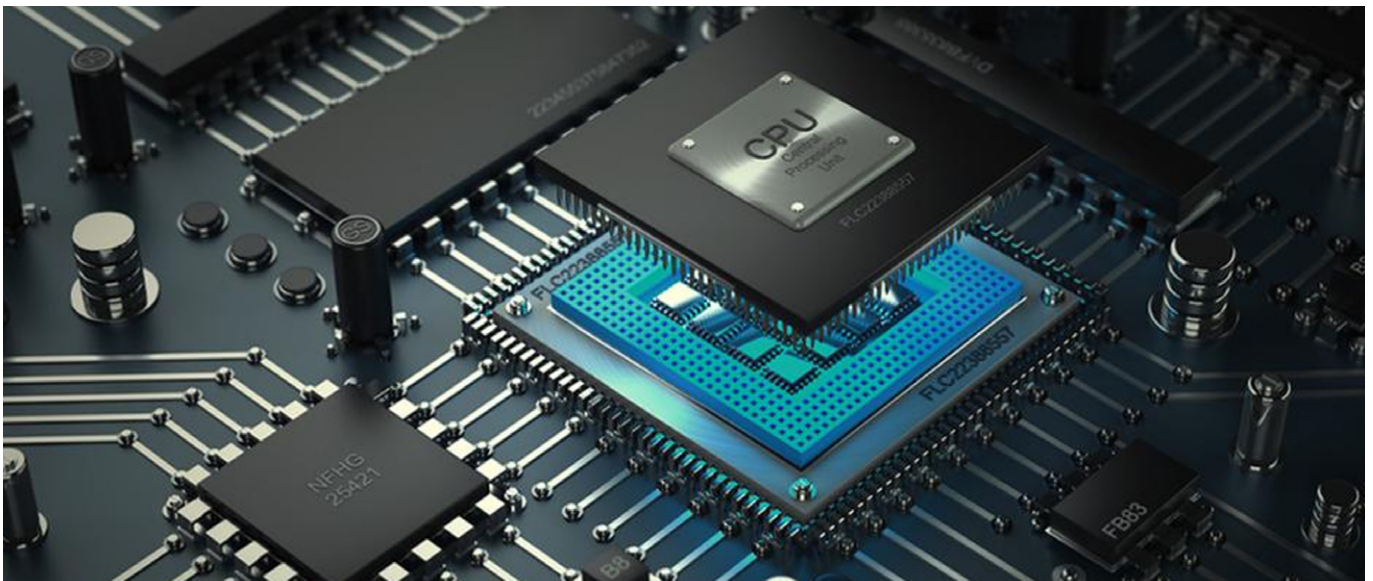
- Autonomous – or cloud-dependent
- Self-organizing and discovering – or not

Data/bandwidth

- Massive – or moderate
- Local value – or aggregated value

Privacy/security

- Private/sensitive – or public
- Regulated/geospecific – or unregulated



Industrial edge solutions – deployments made simple, reliable, and secure

Implementing effective industrial edge computing solutions requires several components all working in concert. Core hardware and software applications, physical and cyber security, and remote monitoring and maintenance solutions help come together to ensure everything stays up and running 24/7.

With over four decades of experience delivering solutions that meet IT/OT requirements, Schneider Electric provides complete, pre-integrated industrial edge computing solutions that can be quickly deployed and easily managed at customer sites. Working with our network of leading technology partners and AVEVA, we have ensured that our pre-integrated solutions are designed to run industry-standard software.

EcoStruxure™ Micro Data Center solutions

From low-profile, wall-mount to larger, floor-standing enclosures complete with cooling, EcoStruxure Micro Data Center solutions offer a fast, easy way to build and deploy edge computing infrastructure in any environment. Features include:

- Pre-assembled, pre-tested enclosed rack systems including IT equipment, physical infrastructure, and management software
- Standardized, pre-integrated designs enabling speedy, reliable deployments
- Security cameras, environmental sensors, and access controls to prevent malfunctions and provide visibility into potential security breaches



EcoStruxure IT monitoring and maintenance solutions

Managing edge computing sites is critical to ensuring business continuity, requiring around-the-clock monitoring and proactive maintenance to detect and correct issues before they occur.

EcoStruxure IT cloud-based management solutions enable users to mitigate and anticipate risk of failure of critical IT infrastructure while reducing operational expenses through an open, vendor-agnostic platform.

Schneider Electric's global footprint and domain expertise in IT infrastructure provide users visibility, insights, 24/7 expert remote monitoring, and on-site support.

EcoStruxure IT gives users peace of mind as they take advantage of everything that Industry 4.0 has to offer.



Pre-approved reference designs — reduce time to market

No one company can deliver all the components that comprise a fully functional edge computing solution. That's why Schneider Electric has cultivated relationships with the most respected global brands of IT computer, storage, and network equipment to develop a network of partners that can deliver reliable, long-term solutions.

We've also worked hard to pre-configure complete solutions that are ready to implement — so you can have peace of mind that all the components will work together as intended.

Our pre-configured reference designs can ...

- ✓ save up to **40%*** in field engineering costs
- ✓ get systems to market **20%*** faster
- ✓ reduce maintenance costs by **7%***

... meaning the customer gets a faster time to value.¹ Everybody wins.

* Based on previous data, 2019. This is not a guarantee of future performance or performance in your particular circumstances.

What are reference designs?

Reference designs are configurations of hardware, software, networking, and storage components approved by their respective manufacturers to work together. These can even be customized to a client's specific installation needs.

Schneider Electric worked with AVEVA, the market leader in industrial automation software, to understand the requirements for small, medium, and large installations. We then worked with our IT technology partners to define the best compute, network, and storage equipment to support each set of requirements.



Small installation

1 to 25,000 I/O²
per system



Medium installation

25,000 to 50,000 I/O
per system



Large installation

50,000 to 400,000 I/O
per system

The result? Comprehensive, approved reference designs that can be implemented in our EcoStruxure Micro Data Center enclosures, complete with supporting electrical and (if needed) cooling systems. The entire system can be monitored and managed by EcoStruxure IT, ensuring ongoing reliability and uptime.

Access the latest reference designs in the [Industrial Edge Computing Forum](#) on Exchange.

¹ World Wide Technology — "Your Digital Transformation is Only as Good as Your Supply Chain," June 2019

² Stands for "inputs/outputs"

Data center and dispatching center

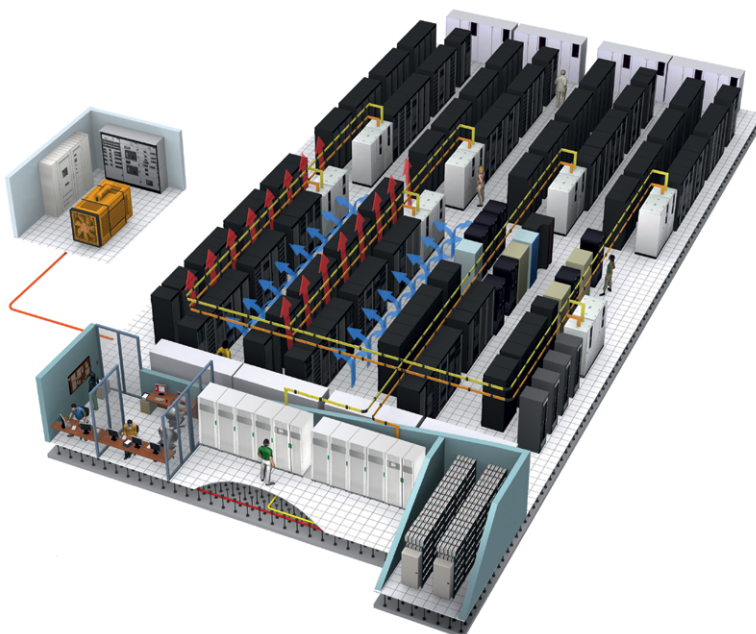
Our data center solutions protect and optimize data centers and networks for cloud architectures. Choose Schneider Electric if you want expert data center solutions that provide the following advantages:

- Simplify and speed up planning, designing and building of your data center
- Roll out and implement software defined data centers
- Protect on-premise applications operating in tough environments
- Optimize costs and performance by balancing on-premise and cloud-based applications
- Secure critical process applications independent of developments in digitized processes and applications, as needed for the future
- Monitor, automate and control your entire data center physical infrastructure with integrated DCIM.

Schneider Electric delivers legendary reliability every step of the way. Our Data Center Physical Infrastructure options provide a strong, secure framework that is able to grow and adjust with your needs, while staying in budget and optimizing network performance.

When Data Center Infrastructure Management software (DCIM) is installed and your data center is operational, you can collect and analyze data, and control power and processes system-wide or on individual devices.

And, our Data Center Life Cycle Services enable you to use as much or little of our expertise no matter where you are in the data center life cycle. We offer a complete portfolio of services to assess, plan, design, build and operate your data center.



Our data center solutions

IT equipment:

- IT racks
- Security and Monitoring
- Floor Access
- PDUs

Power solution:

- UPS single-phase or tri phase solutions

Cooling:

- Chiller
- Raised floor
- Precision cooling

Prefabricated data center module

Easy-to-deploy, prefabricated IT infrastructure packaged within a secure, weather-proof, fire-rated shipping container for remote or special applications.

SmartShelter Containers address the challenges of deploying data centers in remote sites for semiconductor environments, where a dedicated building or space does not exist. They enable real-time processing and resolve latency and bandwidth issues by locating a datacenter closer to your operations. Benefit from the simplicity of an easy-to-deploy data center for a branch office or semiconductor operation.

SmartShelter Containers contain the physical infrastructure of the entire data center, completely assembled and tested in a single ISO shipping container, providing a value option for a prefabricated data center.

- **Decrease risk** with a pre-engineered, fully managed system.
- **Increase flexibility** to modify data center growth as customer demand changes.
- **Provide physical security** to critical data.
- **Achieve revenue or launch production** sooner through quick deployment anywhere in the world.
- **Deploy facilities** in remote areas with limited construction support .
- **Repurpose valuable space** for core business needs.



Power

Power increments between 200kW-1.2MW



IT space

IT solutions from 1 rack-200 racks



Cooling

Technologies: DX-chilled water-direct air-indirect air

A safe, efficient electrical energy infrastructure

Because increased uptime can impact your business success

Continuity of energy supply is essential to seamless semiconductor manufacturing operations. Power availability depends on power substations that compose the electrical energy infrastructure. Schneider Electric UPS products and solutions provide secure power to this critical infrastructure, ensuring continuous operation of process automation and control systems.

We are the only player that can ensure power availability, equipment reliability, maintainability, safety, and efficiency all at the highest levels for the sensitive utilities, equipment, tools, and clean room applications in fab manufacturing environments. Our secure power solutions can also help optimize CapEx and OpEx, and deliver up to 30 percent* savings in operating and design costs.

Your partner for end-to-end secure power availability and reliability

Schneider Electric is:

- Your global partner capable of project coordination with local intimacy and proximity regardless of your location
- A solutions provider with proven “know-how” of semiconductor environments; wide range of solutions matching the various needs of the different types of critical applications
- A company that works in compliance with international standards
- Your trusted adviser for power availability and energy-efficient solutions, from design stage to the implementation
- A single source for solutions to optimize overall equipment operation and increase safety and security levels
- The company with energy-efficient solutions for a better global ROI
- A long-term partner with tailored services for ongoing maintenance and enhanced performance over the life cycle of your critical systems

There are significant opportunities for the semiconductor industry; from improving energy efficiency to ensuring continuous operations to meeting complex regulations. Schneider Electric is a leading global supplier of industrial automation, control, and power distribution solutions. We develop integrated products and solutions that enable high-tech and manufacturing industries to enhance circuit protection and machine control, and comply with universal standards and government regulations.

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Schneider Electric critical power and cooling services

Dedicated teams with experience you can trust.

The worldwide dedicated service team at Schneider Electric critical power and cooling services enables your semiconductor solution to operate smoothly. We can ensure an optimized facility plan and streamlined project management, as well as speedy and safe deployment of your solution. Our broad portfolio of dedicated services ensures reliable implementation and operation of the key critical applications of your facility, allowing you to fully concentrate on creating advanced chip technology.

Our certified field service engineers will safely and efficiently get your solution operating with an installation and startup service. Project services — such as project management, installation management, and site coordination — help to implement your solution on time and on budget. Our Remote Monitoring Service can act as a second set of eyes, with secure 24-hour monitoring to detect and resolve problems before they become critical.

For hassle-free maintenance that maximizes uptime and protects your investment, choose one of our Advantage Plan comprehensive service packages. Advantage Plans include technical support, preventive maintenance, quick on-site response, and remote monitoring, providing you with peace of mind in knowing your solution receives the care it needs.

Secure Power +

Schneider Electric secure power solutions for semiconductor environments can be customized to support your unique power requirements..



Cooling solutions

Cooling solutions for operational efficiency

In the semiconductor business, temperature control is essential to maintain continuous operations. HVAC (Heating, Ventilation and Air Conditioning) needs can vary enormously, from heat absorption in high temperature zones to insulation protection in extremely cold climates. In all environmental conditions, it's essential to keep components in data rooms and working areas at the right temperature levels.

The Schneider Electric Aquaflair and Uniflair portfolio of cooling systems provides semiconductor operators with flexible, reliable and cost-effective solutions.

- **Flexibility:** Adapted to specific local conditions and can be custom-engineered in a wide range of ambient temperatures (-40°C to +50°C).
- **Reliability:** continuous operation through cutting-edge solutions and redundancy on critical parts.
- **Total cost of ownership:** Closed circuit water supplies and low power consumption reduce operational and maintenance costs.
- **Manageability:** terminal displays indicating all unit settings and data points with network interface for remote monitoring and intervention servation of valuable building space.

Cooling solutions



Aquaflair Chillers



Uniflair LE

Cooling solutions for data center

Technologies: DX-chilled water-direct air-indirect air



Uniflair IX*V



InRow®

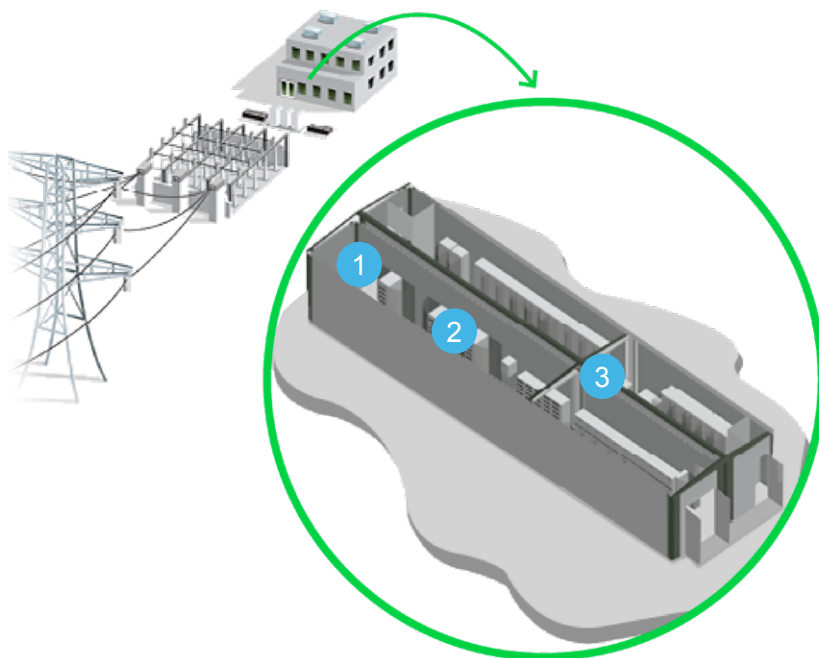


Ecoflair Air Economiser

Schneider Electric: Global specialists in energy management

A comprehensive portfolio of integrated solutions

Schneider Electric designs, realizes and implements innovative technical solutions for safe, efficient, reliable and clean energy. We support you in your energy management strategy by offering you various offers.



1 Medium voltage



2 Low voltage



3 Secure Power



EcoStruxure: A total solution

EcoStruxure is an IoT-enabled architecture that delivers Innovation at Every Level from connected products to edge control, and apps, analytics and Services delivering enhanced value around safety, reliability, operational efficiency, sustainability, and connectivity to our customers.

EcoStruxure improves efficiency, safety, customer satisfaction with the right information to the right person, anytime and anywhere.



Lower
cost of maintenance,
reduced idle time and
unscheduled downtime



Better
data analytics for
operations optimization
and efficiency



Greater
safety and security of
people and asset



Higher
recovery, productivity
and reliability

To learn more about secure power solutions,
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