



ALBERTO CARINI, GLOBAL PRODUCT MANAGER

MNS-Up: mission critical power

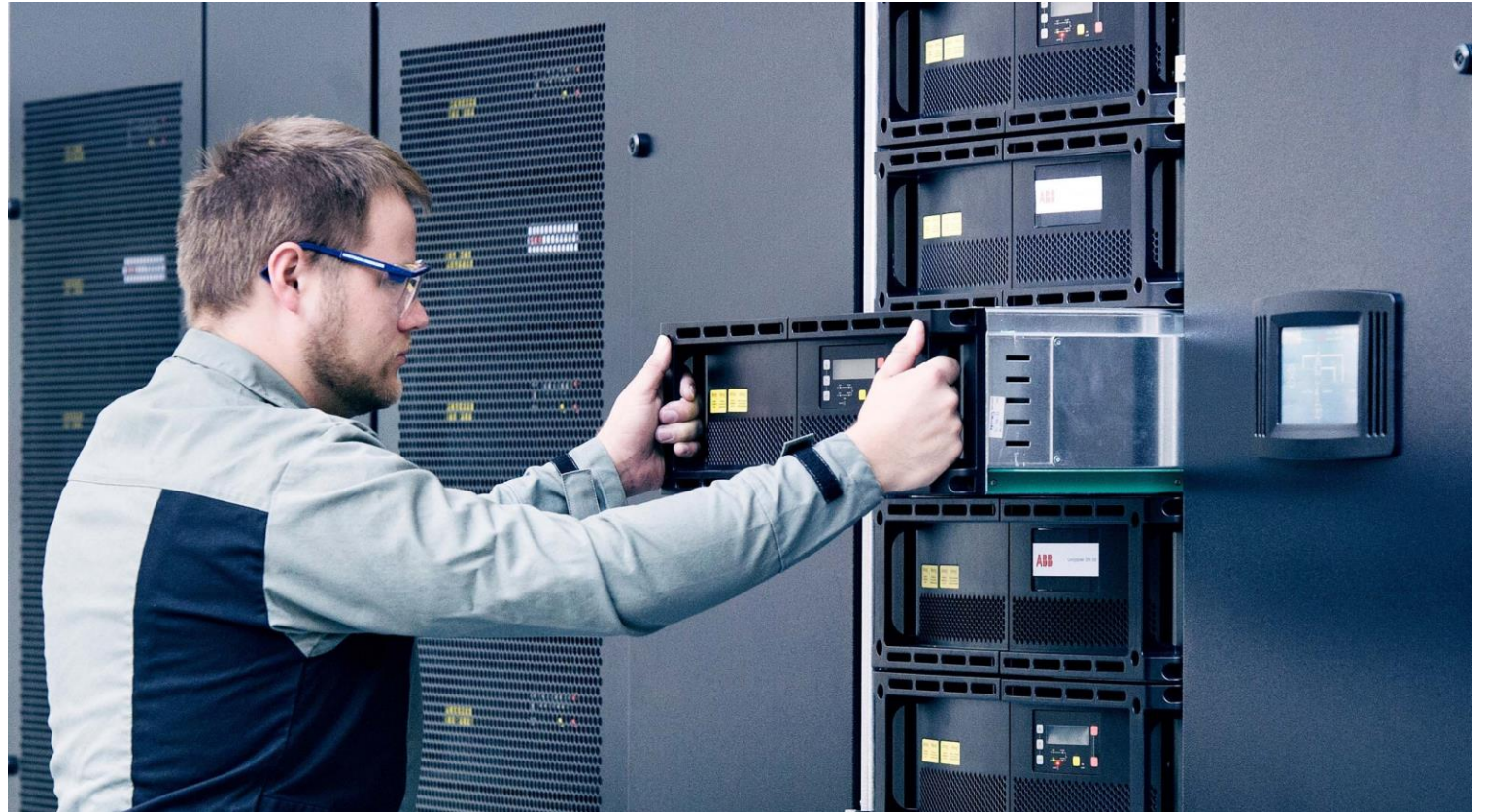
Low-voltage switchgear combined with UPS

Product presentation



Contents

- 1 Why critical power solutions?
- 2 Product features
- 3 Value for users
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Why investing on critical power applications?



Automotive Industry

Outage cost per minute up to:

22,000 USD



Data center

Outage cost per minute up to:

16,000 USD



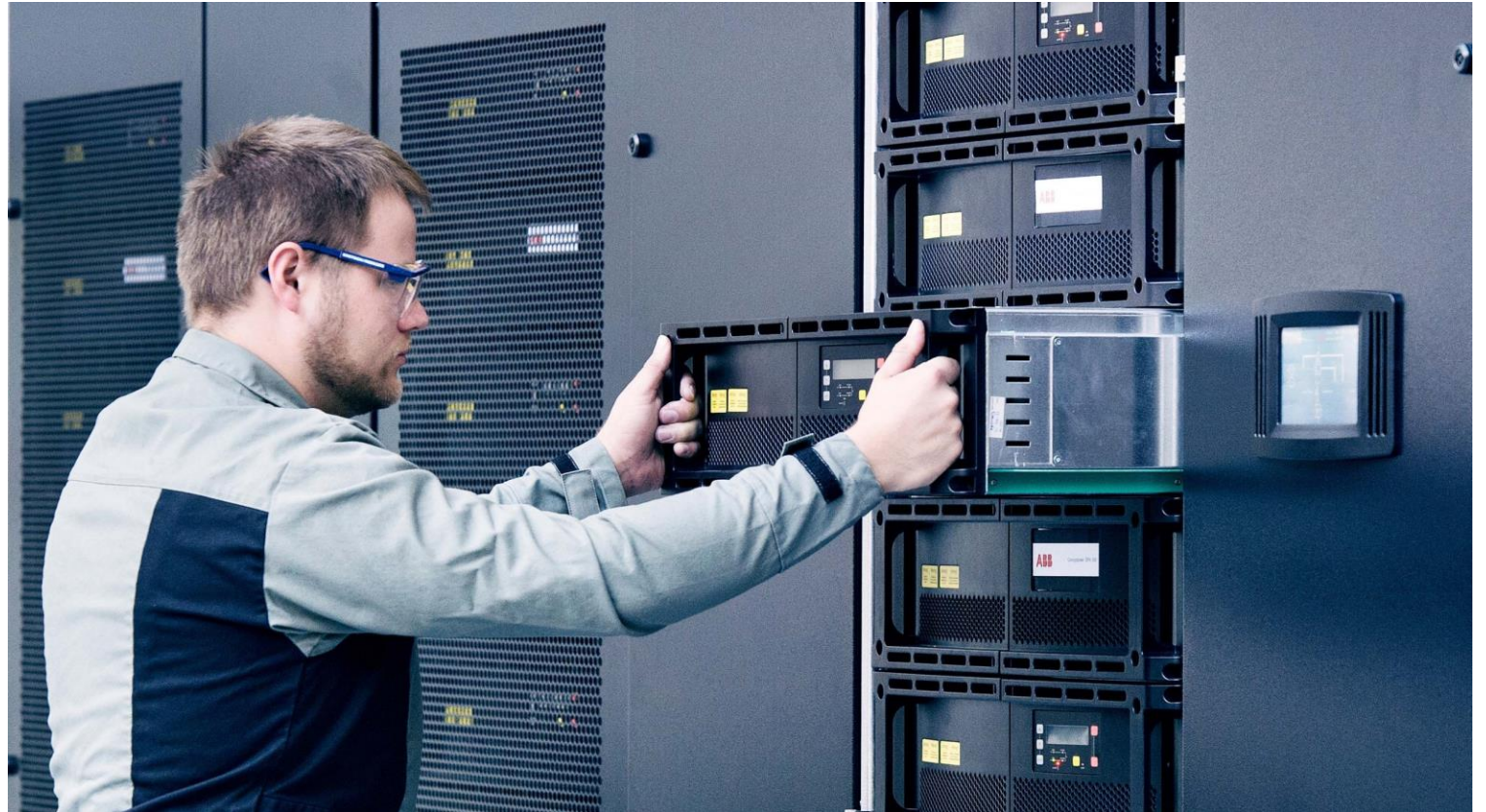
Hospital

Outage cost per minute...

Incalculable!

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Definition

MNS-Up is an innovative product offering low-voltage switchgear combined with modular UPS in a single line-up – for critical power applications such as in data centers, hospitals and light industries.



Best of both

MNS platform



Applications

Energy distribution and MCC feeders



Feeders technology

Withdrawable, plug-in and fix execution to better fit customers preference



Power quality

Fix or Plug-in capacitor banks modules with automatic insertion



DPA 500



Modules power

Only one type of 100kW



Modularity

Up to 5 modules per panel = 500KW
Up to 6 panels on parallel = 3MW



Availability

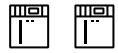
Online-swap modularity (OSM)
Serviceability – low MTTR*

Data center conventional solution

Conventional switchgear and UPS layout



Assemblies physically separated



Separate incoming / outgoing breaker sections



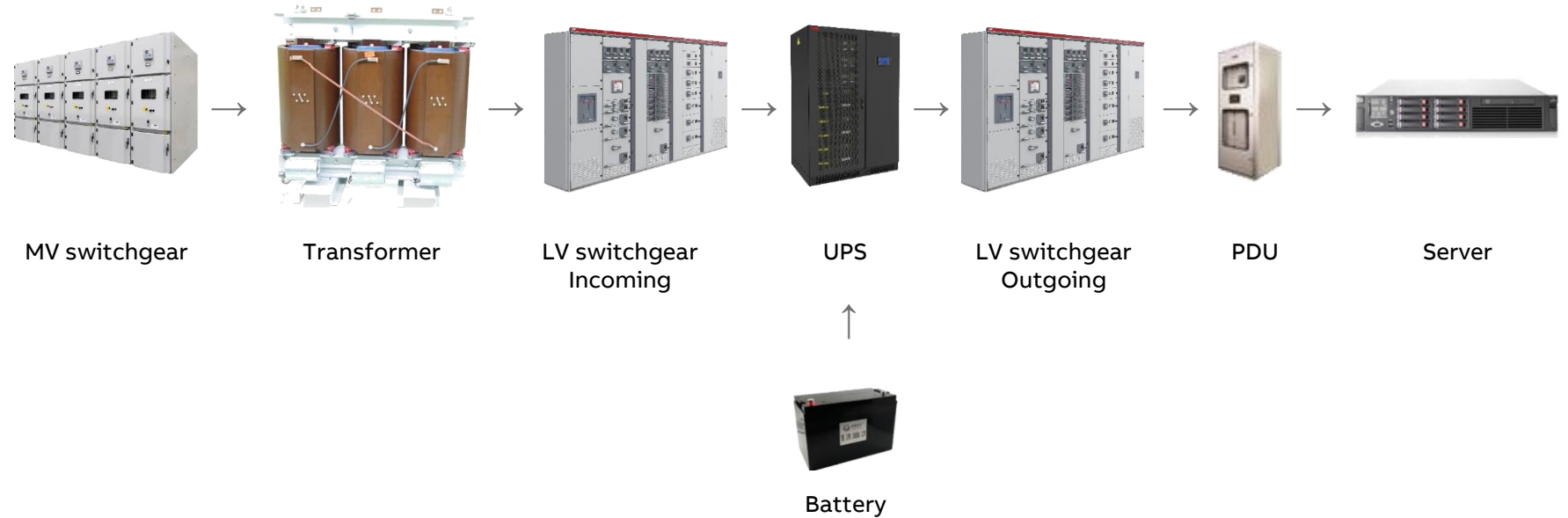
Extensive power cabling / bus duct to connect switchgear and UPS



Expensive and space-consuming topology



Complex to scale



MNS-Up... Breaking the rules

MNS-Up Layout



Compact assembly to optimize footprint



Reduced installation time and cost



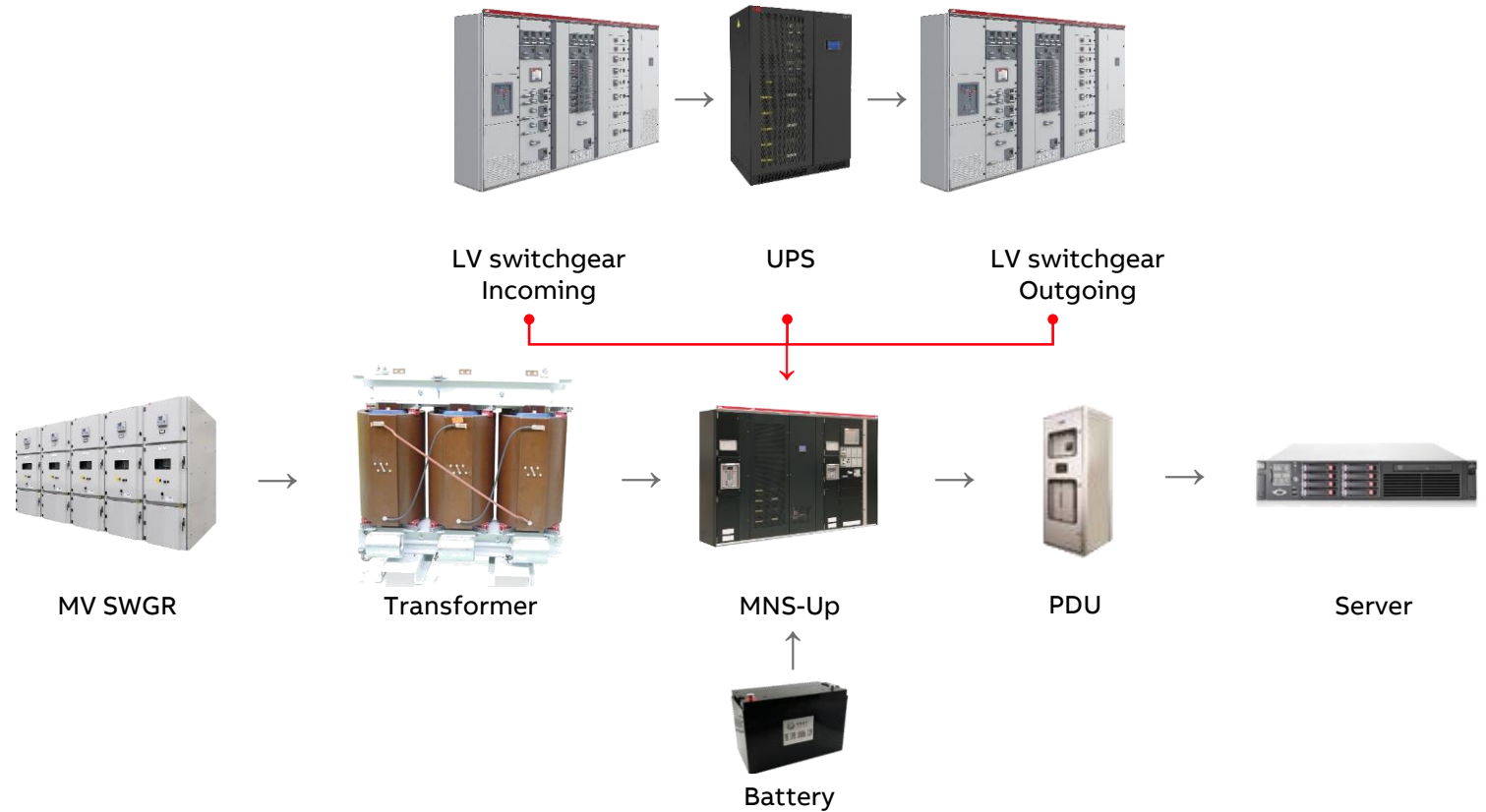
All-in-one solution without switchgear external interconnection



Lower operation and maintenance

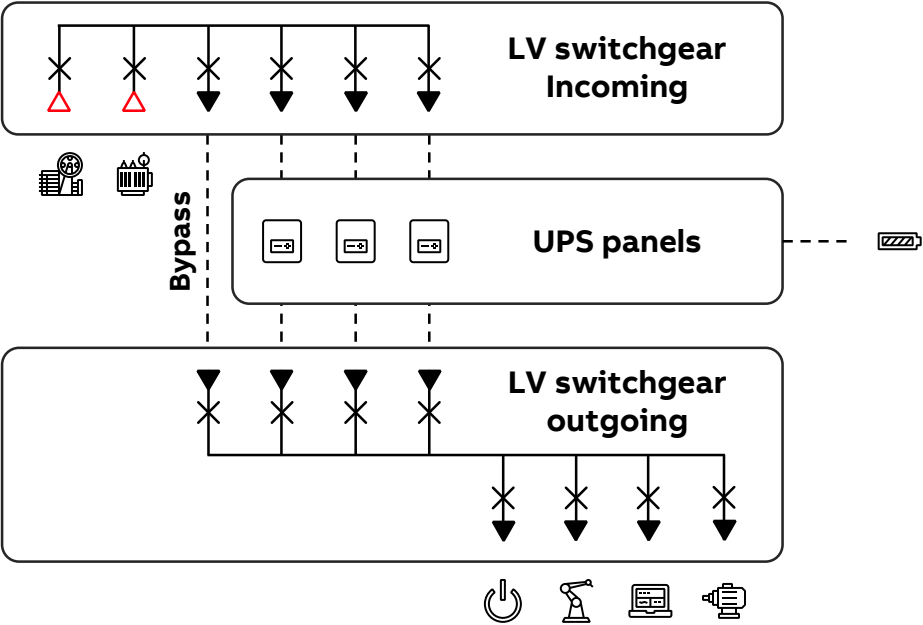


Scalable solution

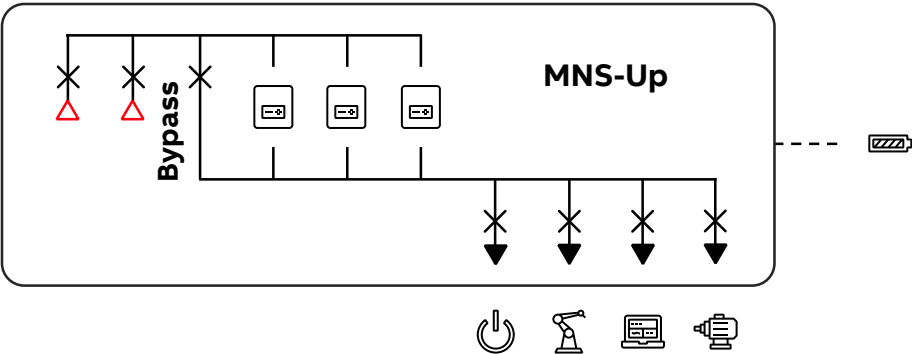


Electrical scheme

Conventional solution



MNS-Up solution combining LV switchgear and UPS



Component reduction: breakers and interconnection

How it works...



Standard conditions

- Power coming from transformer
- Central manual bypass open
- Power passing through UPS and charging batteries
- Critical loads powered by UPS double conversion



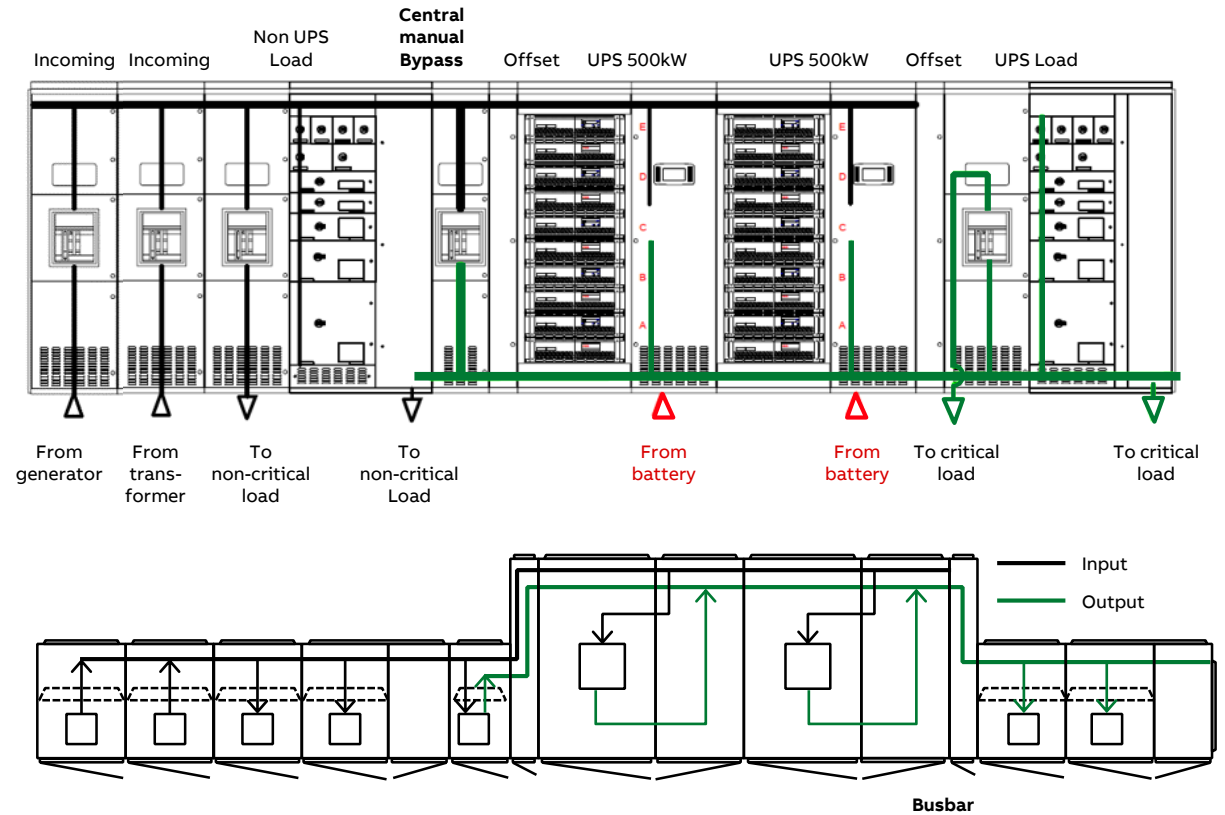
Network fault condition

- Critical loads power by batteries
- Emergency generator starting
- Incoming switch from transformer to generator feeder
- UPS back to standard condition situation charging batteries



UPS / Batteries maintenance

- Power coming from transformer
- Central manual bypass close
- Critical loads directly powered by transformer

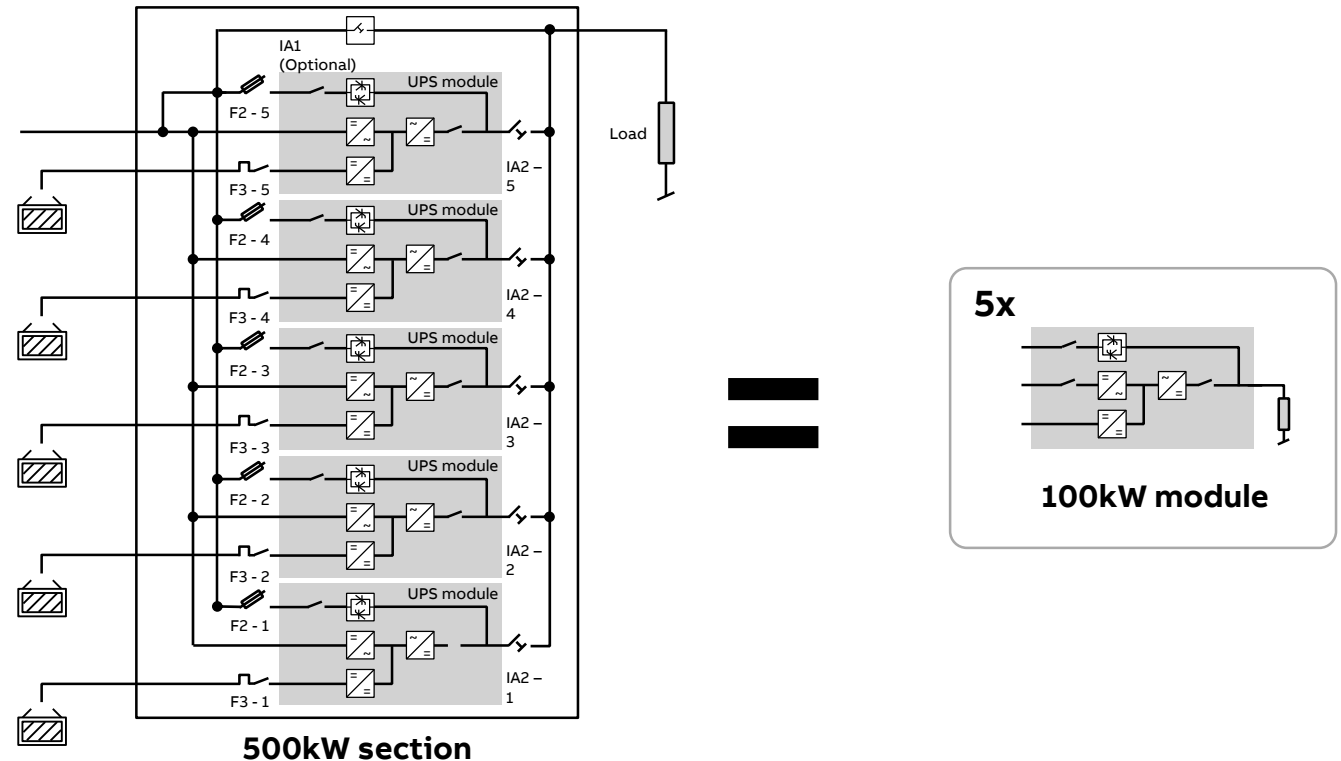


Decentralized Parallel Architecture

Decentralized parallel architecture (DPA™) distributes the entire UPS hardware and software into each module

- ✓ Individual control panel
- ✓ Individual CPU
- ✓ Individual power unit
- ✓ Individual static bypass switch
- ✓ Individual separate battery

Each module is a complete UPS with its own CPU and intelligence



No single point of failure

N+1 configuration

Conventional configuration

- n°5 Active UPS modules at full power 100%
- Section total power 500kW
- Power lost in case of module failure or maintenance



N+1 configuration during standard condition

- n°5 Active UPS modules at 80%
- Section total power 400kW



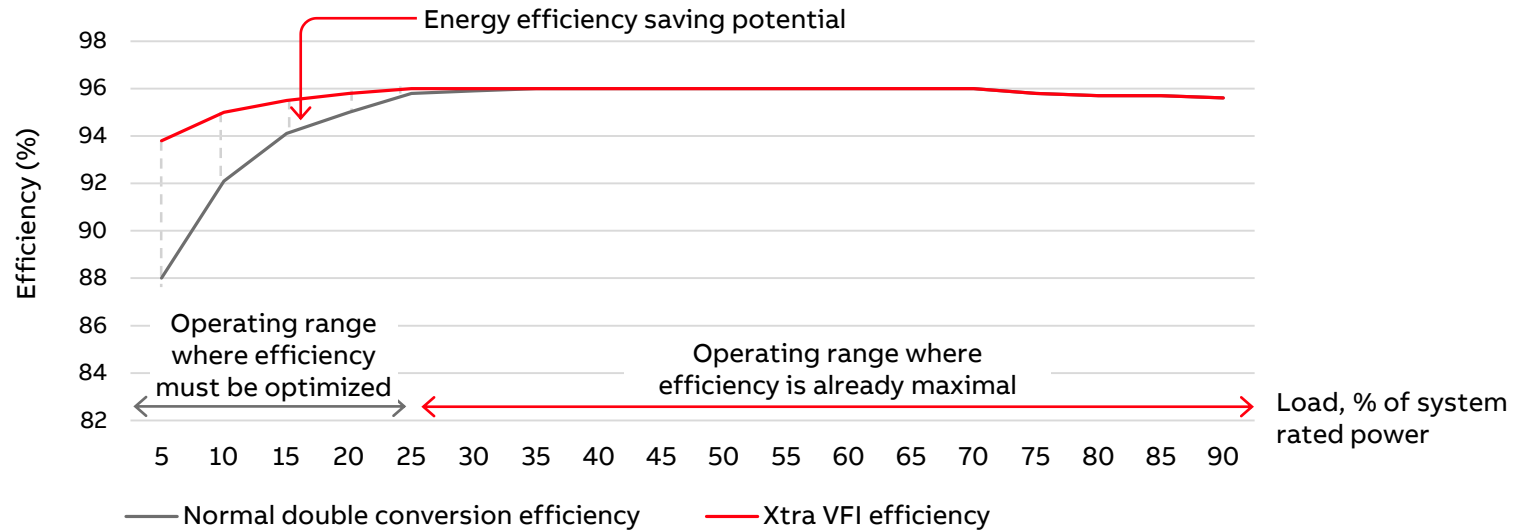
N+1 configuration during UPS Fault

- n°4 remaining UPS modules at 100%
- Section total power 400kW

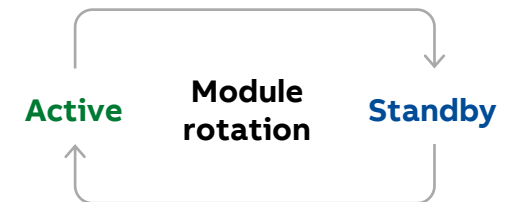


Typical availability of N+1 modular UPS is 99,9999% (six-nines)

Xtra VFI – double conversion mode



- UPS maximizes the double conversion efficiency by engaging UPS modules based on load power
- When load is very low compared to UPS system rated power, **the overcapacity is automatically switched to stand-by mode, in which modules consume much less power and thus help save energy**
- Efficiency improvement is especially significant when load is $\leq 25\%$ of full UPS system capacity



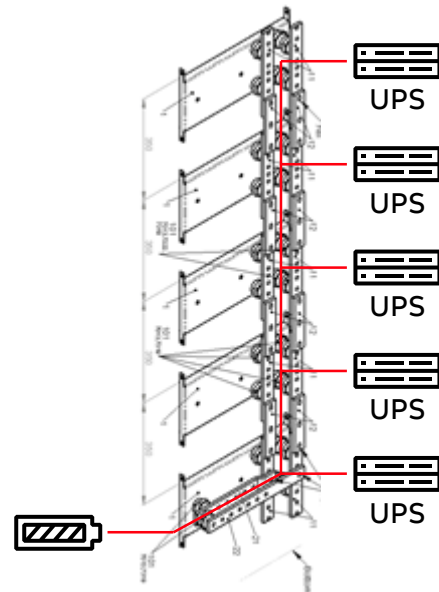
Xtra FVI introduces a secure way to increase significantly the efficiency of systems that do not run on full load from day one

Battery connection options

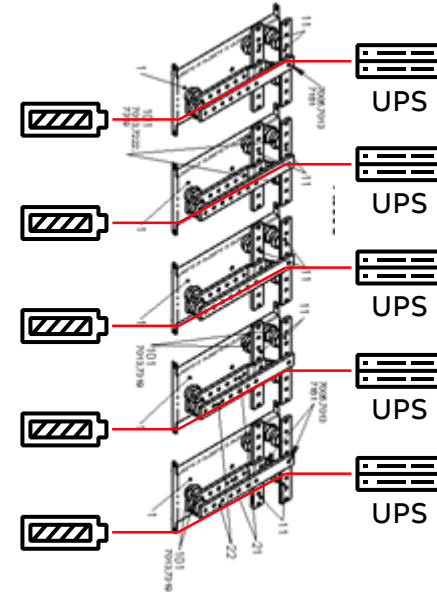
Batteries are located outside MNS-Up



Common battery
One per each section



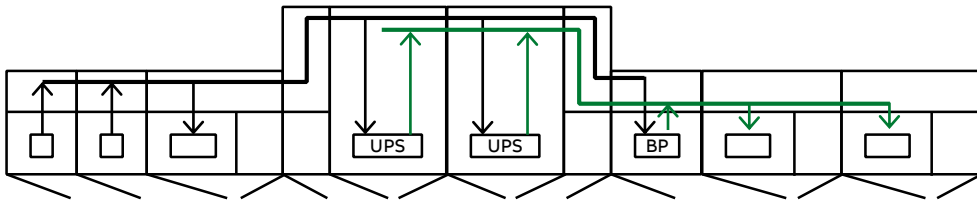
Individual batteries
...one per each UPS module



Supported batteries type
... wide choice

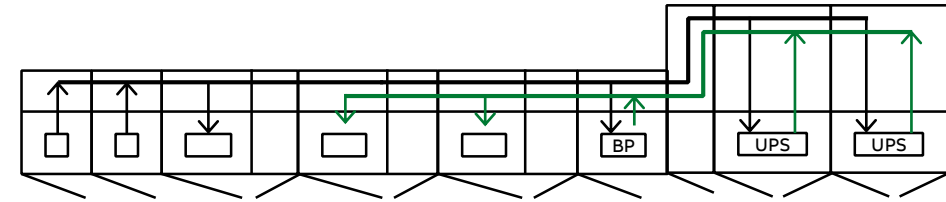
Vrla
Flooded lead acid
Nickel Cadmium
Lithium-ion chemistry
ABB choice: Samsung SDI

Flexible design



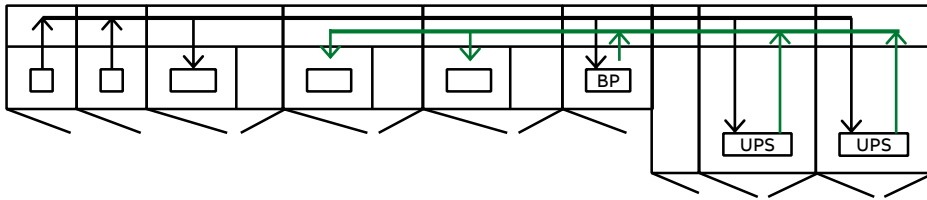
UPS central position

Possibility to separate critical and non-critical loads



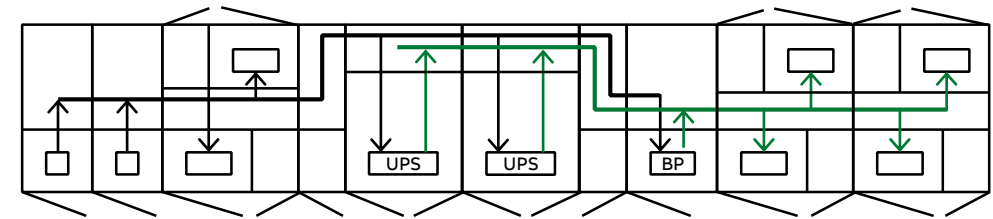
UPS side position

UPS sections all on one side of MNS-Up; can be either on the right or on the left side



Rear alignment

To maximize space available on the front of the switchgear in case of space limited in the installation room, such as in containers



Back-to-back

To reduce overall footprint with front and rear feeders accessibility

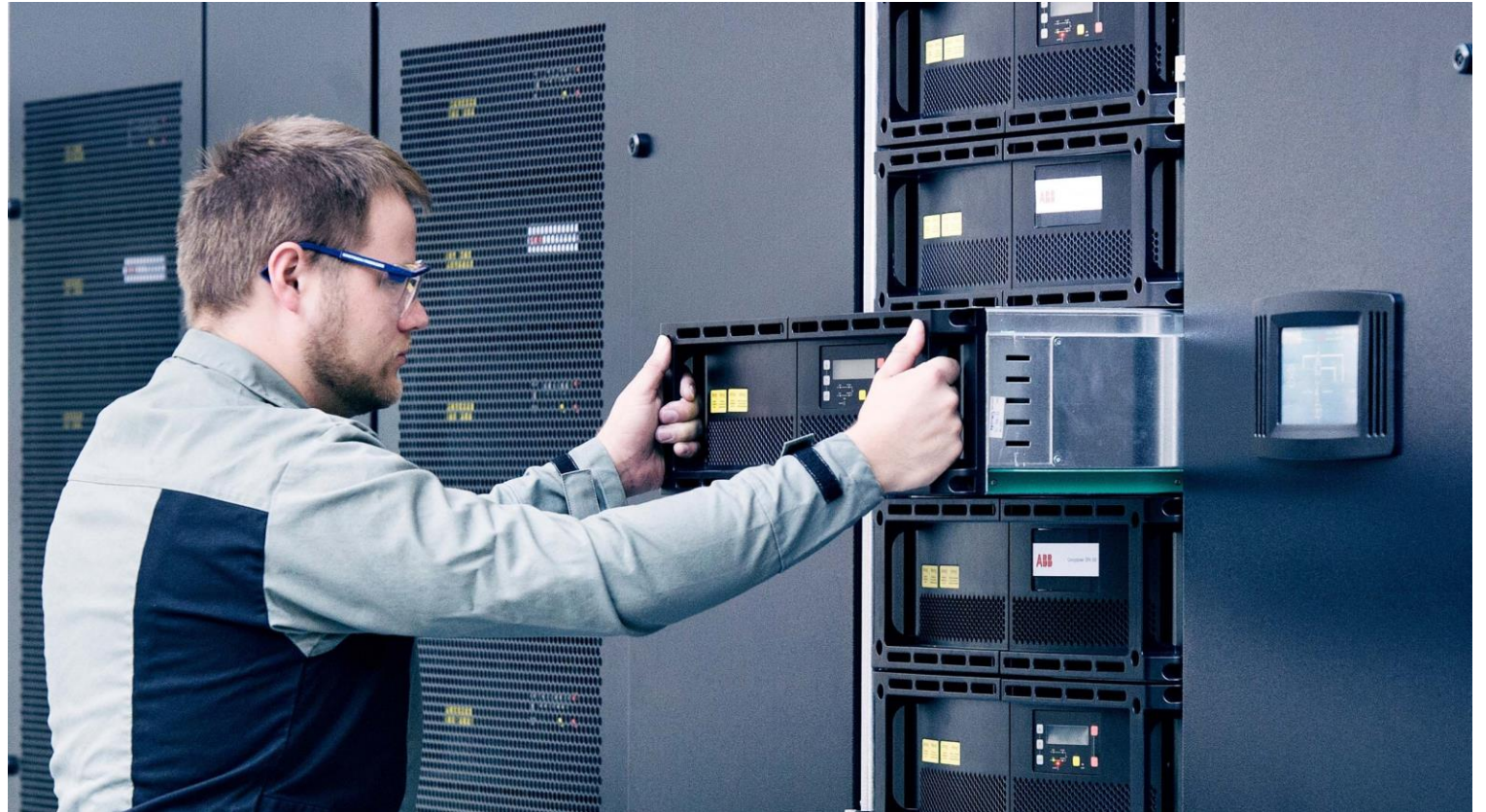
MNS-Up technical data

Input voltage	380/400/415 VAC +/- 15%, 35-70 Hz
Output voltage	380/400/415 VAC +/- 1%, 50 or 60 Hz
Battery voltage	400-650 VDC
Ambient temperature	40°C
UPS Power factor	Input: 0.99 Output: 1.0
UPS Efficiency	Up to 96% in double conversion mode >99% in eco mode
UPS Capacity	500 kW (5 × 100 kW) per frame
UPS Paralleling capability	Up to 6 frames (6 × 500 kW = 3.0 MW)
Bus bar	Up to 6300 A
IEC 61439-1/ -2	Low-voltage switchgear and control gear assemblies Part 1: General rules Part 2: Power switchgear and control gear assemblies
IEC TR 61641	Guide for testing under conditions of arcing due to internal fault(n.a to UPS sections)
IEC 60950-1	Information Technology Equipment – Safety Part 1: General requirements
IEC 62040-1/ -2/ -3	Uninterruptible Power Systems (UPS) Part 1: General and safety requirements for UPS Part 2: Electromagnetic compatibility (EMC) requirements Part 3: Method of specifying the performance and test requirements



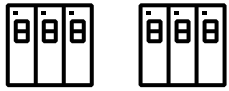
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MNS-Up vs conventional solution cost comparison

For a correct cost comparison MNS-Up must be compared with:



Incoming / Outgoing LV switchgear



Stand-alone UPS

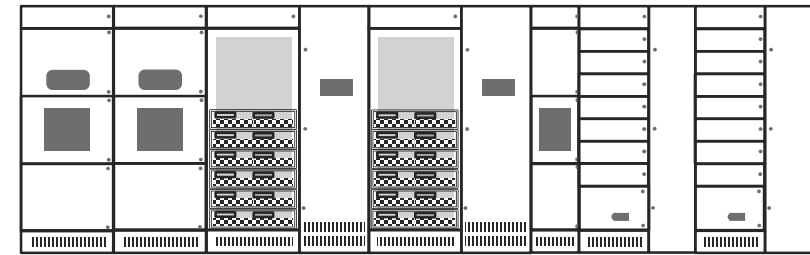


Cable / bus duct interconnection

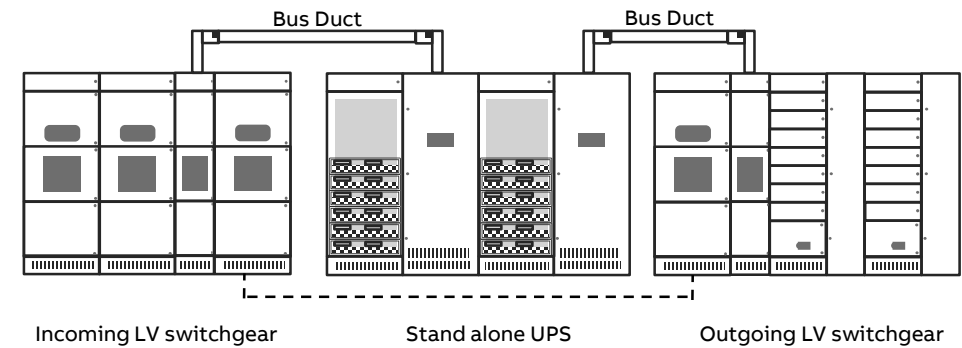


Time / Manpower required for installation and testing of the interconnections

MNS-Up



Conventional solution



What are the values for MNS-Up end user?

Cost saving



Minimize cost of electrical infrastructure



Reduction of breakers, cubicles and connection bus duct. Up to **10% cost savings**

Reduce installation time



Especially on colocation DC with electrical infrastructure growing on demand



LV system and UPS assembly pre-tested at ABB Factory
Ready for operation;
up to **20% faster**

Flexibility



Possibility to adapt the infrastructure to the customers request



UPS power modular at 100kW step
Flexible layout to adapt MNS-Up to installation room

Reduce footprint



To maximize core business equipment space; like IT servers on data centers



Footprint reduction compare to conventional solution
up to 30%

Containerized solution

Making it easier: 'Pay as you grow' philosophy with eHouses

An eHouse is a pre-fabricated switchroom product, containing electrical switchgear and control gear for control of utility or industrial plant equipment able to guarantee:



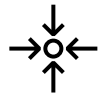
Reduced cost and resources

- Simpler bidding process
- Reduced installation and commissioning time on site



Reduced risk

- Lower number of suppliers
- Clear ownership, single project delivery plan



Reduced complexity

- Single contract with common terms and conditions
- One project manager



Containerized solution

... a real case

81m² ready to install E-house
with conventional layout including:



Dry type transformer
10.7/0.42 kV IP00 1600kVA



Low-voltage switchgear



1.5MW modular UPS



LI-ION battery cabinets



48 V DC cabinets



Fire detection systems

With MNS-Up

-14%

Footprint reduced by 14% compared to
conventional layout*

-10%

Installation and testing time reduced by
10%*

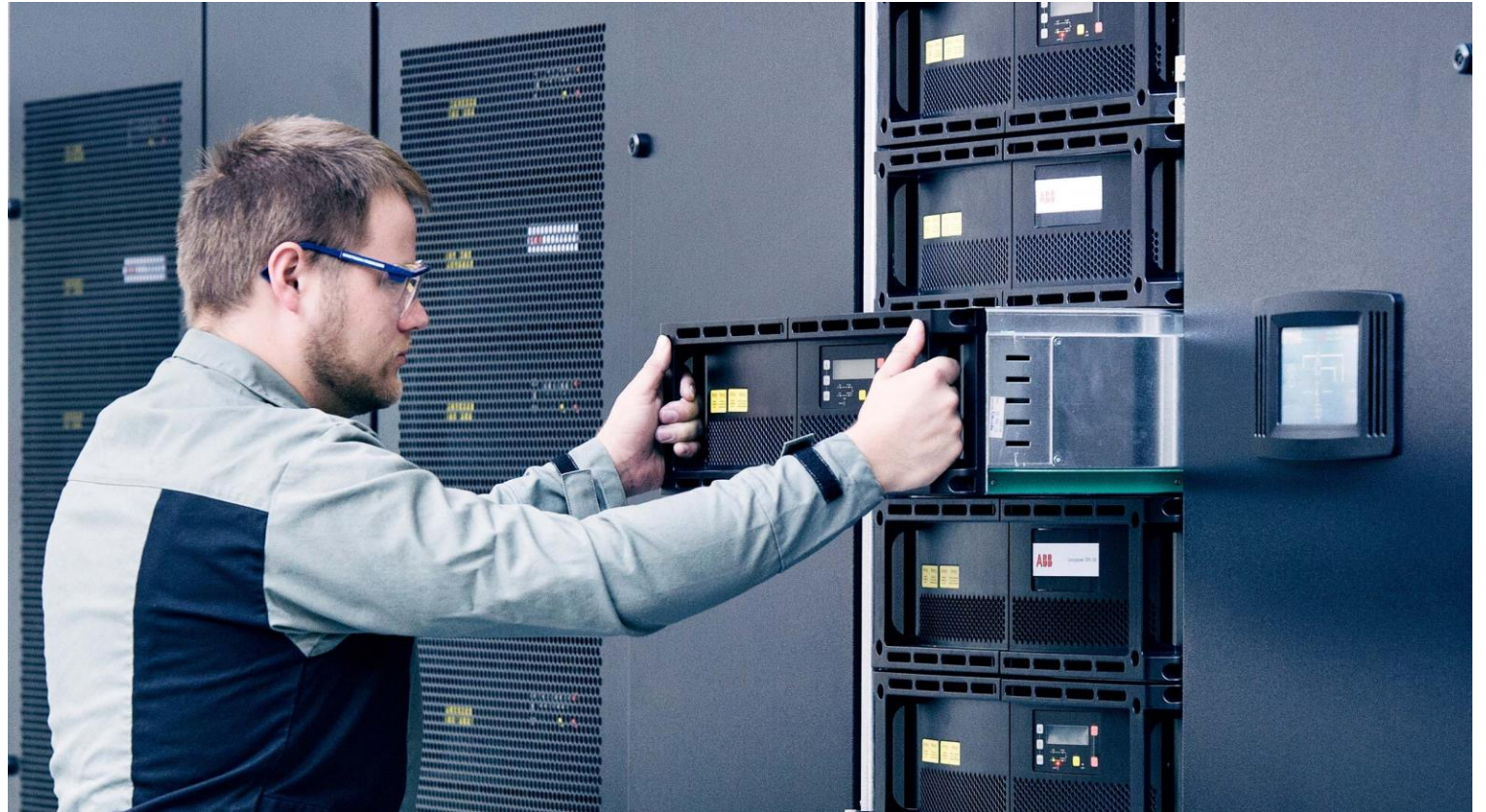
-3%

E-House project engineering time reduced
by 3%



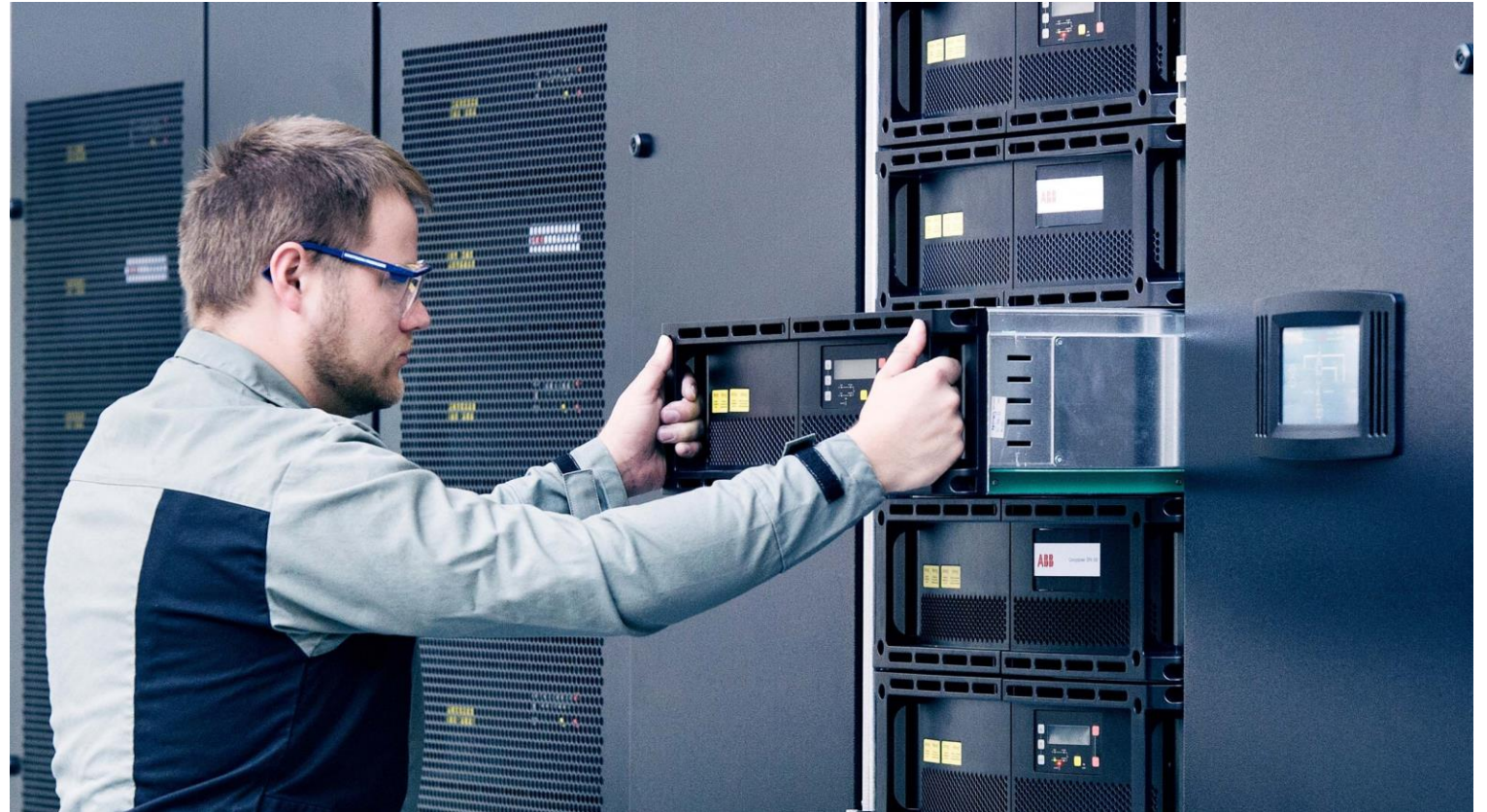
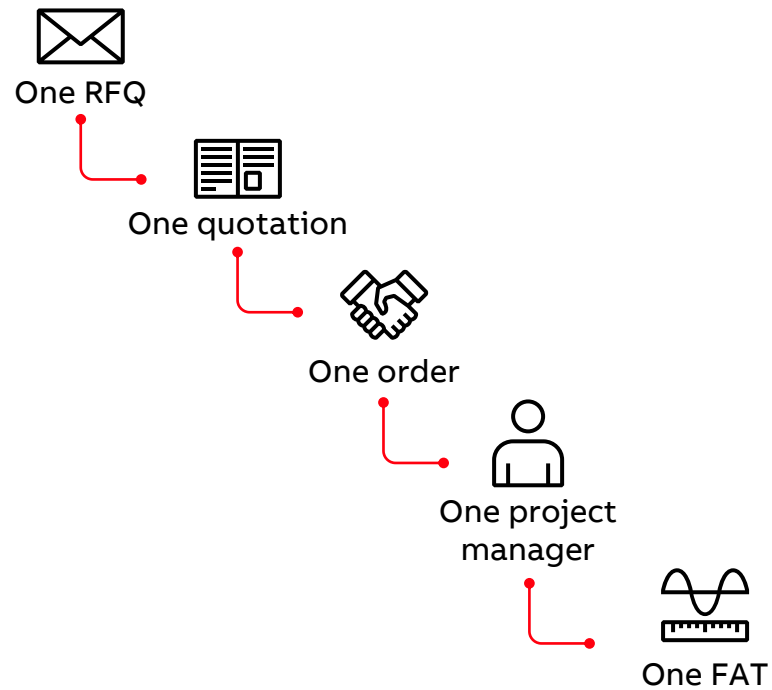
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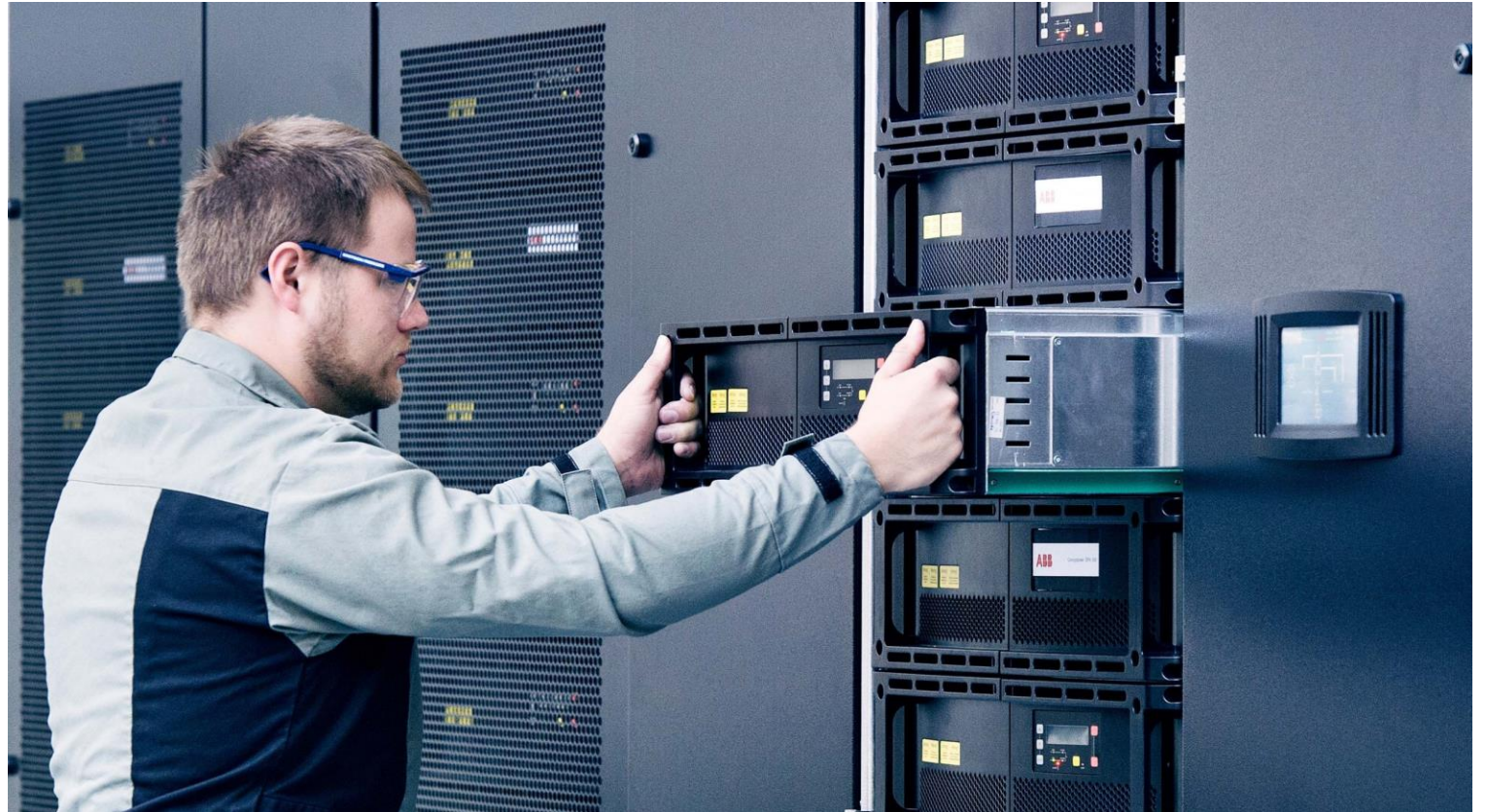
Combined Factory Acceptance Test (FAT)

MNS-Up FAT is covering both products; LV switchgear and modular UPS



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Reference



Light Industry

Region: Europe

Volume: 3 switchgear

UPS Power: 3,4MW

Layout: Single front and Back to Back

Note: N+1 Configuration



Infrastructure (Hospital)

Region: Europe

Volume: 1 switchgear

UPS Power: 0,3MW

Layout: Single front



Telecommunication

Region: Asia

Volume: 5 switchgear

UPS Power: 9MW

Layout: Back to Back



Data center

Region: Europe

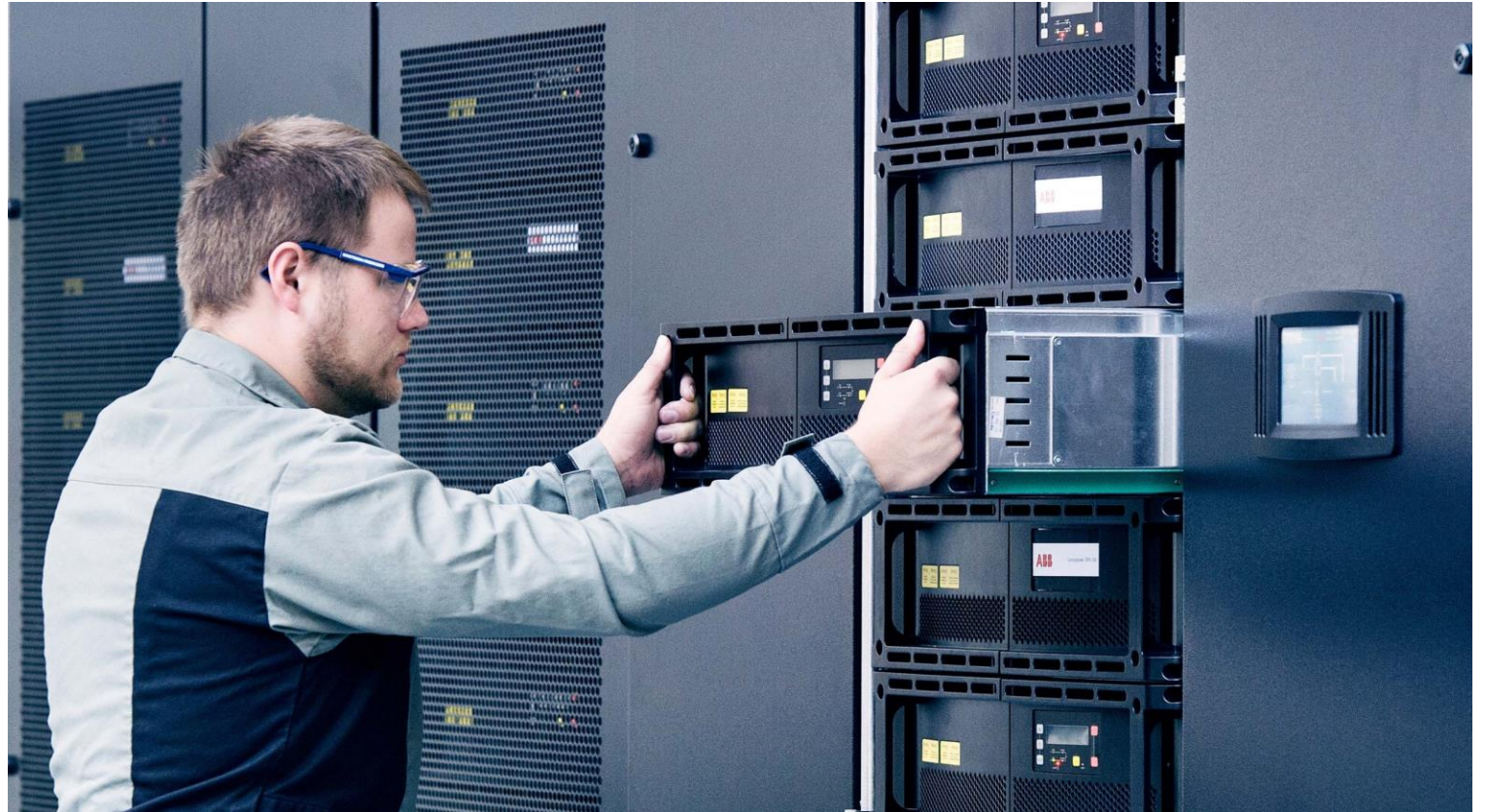
Volume: 14 switchgear

UPS Power: 12,3MW

Layout: Single front and Back to Back

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MNS-Up documentation

Click on the icon to locate the document



[Web page](#)



[Product video](#)



[Reference video](#)



[Leaflet](#)



[Brochure](#)



[Infographic](#)



[White paper
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[White paper
Data centers](#)



ABB