

# Lithium-ion Batteries



**KOHLER POWER**  
uninterruptible

Reliable, lightweight and compact UPS energy storage for critical applications such as data centres, healthcare, building infrastructures, transportation, and manufacturing.

## Lithium-ion battery solution

Outstanding performance

Higher reliability than VRLA

Single cell temperature, current, voltage and charge status are all monitored

Fast charge and discharge rate

Higher power and efficiency

Low total cost of ownership

Lower maintenance overhead

Less need for cooling

Longer battery life

Increased power density

Reduced footprint and volume

Wide operating temperature range

High safety level

Scalable

Lightweight (60-80% less than VRLA)

For additional battery capacity, cabinets can be installed in parallel to increase capacity up to 5 MW per single system.



When you want power protection for a data centre, production line or any other type of critical process, lithium-ion battery solutions provide peace of mind and the performance you need.

Housed in a tough enclosure, lithium-ion battery technology provides reliable, lightweight and compact energy storage for UPS systems.

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## Why lithium-ion batteries?

Valve-regulated lead acid (VRLA) batteries – sometimes known as sealed lead-acid batteries – have many advantages and have traditionally been the battery of choice for backup power in UPS systems. However, battery technology has progressed rapidly in recent years.

Today, lithium-ion battery technology is an attractive option – especially where high energy density and low weight are important. Advantages such as longer lifespan, smaller size and weight, shorter recharging times and falling prices only add to the appeal of lithium-ion battery solutions.

For best performance and lifetime, it is essential to keep VRLA battery rooms at a reasonably constant temperature (20–25°C). Keeping things cool can be problematic and costly, especially in hot countries. With lithium-ion batteries, this problem virtually disappears, as lithium-ion batteries are much more tolerant to changes in environmental temperature and can operate over a broader temperature range.

Lithium-ion batteries are easy to handle too – they are safe and do not contain mercury, lead, cadmium, or other hazardous materials. In most cases, traditional batteries would need to be replaced multiple times before a lithium-ion battery is replaced once. When it comes to operating expenses, lithium-ion batteries offer a lower total cost of ownership.

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## Battery management system

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### Features

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Each battery cabinet has dedicated battery management systems at single module and rack level, plus fuse, circuit breaker protection and a dedicated 24 V power supply

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A single cabinet configuration of 34.6 kWh comprises one switchgear, one switched mode power supply (SMPS) and 17 battery modules

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Switchgear collects all information about each battery cell and controls all battery module management systems calculating state of charge (SoC) and state of health (SoH). It also contains a moulded case circuit breaker and a shunt resistor

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SMPS supplies the power for BMS and communicates with UPS and other racks in parallel. It is available in two versions with or without BMS for single or multiple parallel configuration

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Battery module contains eight series-connected 67 Ah, 3.8 V cells and a dedicated battery module management system

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Accommodated in a standard 19" cabinet

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Battery cabinets can be connected in parallel to achieve the power needed

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Switchgear

Battery management system

Switched-mode power supply (SMPS)

Battery module



## Runtime and performance

### Lead acid

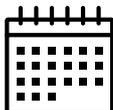
Charge 0.1C  
Discharge 2C\*



Weight 2500kg  
Volume 2 m<sup>3</sup>\*



3–7 years\*



### Lithium-ion

**Faster charge  
and higher  
discharge rate**  
Charge 0.5C  
Discharge 6C\*

**Less space  
and weight**

Weight 550kg  
Volume 0.8 m<sup>3</sup>\*

**Longer life**

15 years\*

Lithium-ion batteries can be charged much more quickly than conventional batteries, so after use they can be charged back up to full strength in a shorter time. This means full availability in less time.

Lithium-ion batteries also provide higher power density and efficiency, especially under heavy discharge rates. This means that no battery oversizing is needed.

Low weight (60–80 percent less than VRLA) means reduced civil engineering overheads and easier physical installation.

\*Example 190kW power/10 min autonomy

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