

# Optimising the daily operation of industrial trucks

Ion'Drive® Motive 24 V



Saft Ion'Drive® Motive batteries eliminate the operational and cost limitations of conventional battery technology. The result is maximum availability for industrial trucks - delivering optimised productivity and cost-efficiency.



**SAFT**

# Saft Li-ion batteries: taking industrial trucks to the next level

## Ion'Drive® Motive 24 V – developed for materials handling applications

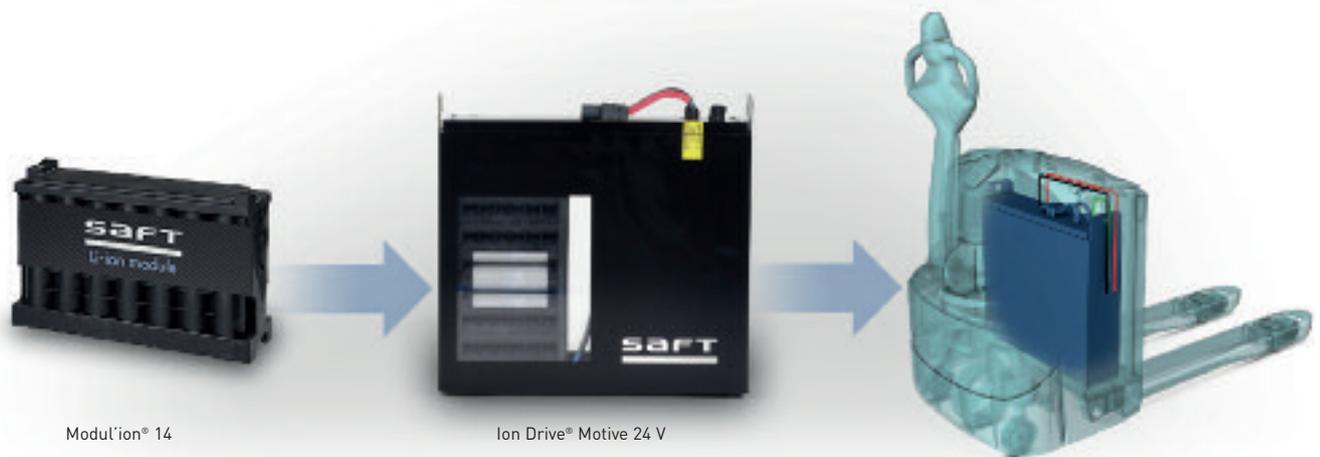
Saft has developed a Li-ion battery solution to offer the optimum combination of performance, reliability, and safety. With high cycling capability, fast charging and minimal maintenance it takes industrial truck performance to the next level.

Ion'Drive® Motive 24 V is available with capacities of 82 Ah, 164 Ah, 205 Ah and 410 Ah. The Ion'Drive® Motive 24 V range is engineered to meet industrial standards (IP rating, shock and vibrations, EMC...) and to deliver the performance required by forklift trucks. Each battery is equipped with

electronics for cell voltage monitoring and balancing, as well as temperature measurement to ensure complete safety in case of misuse or failure. CAN bus communication interfaces with the host vehicle, supplying accurate battery data that facilitates fleet management.

Numerous customer applications rely on Saft's Ion' Drive® Motive 24 V batteries. They help end-users limit maintenance, infrastructure costs and energy consumption. These all contribute to a reduced overall Total Cost of Ownership (TCO).

Saft meets every Li-ion battery need from module to system to turnkey solution



Battery System performances at + 25°C / + 77°F	82 Ah	164 Ah	205 Ah	410 Ah
Voltage window [V]	16,8 - 26,6			
Nominal Voltage [V]	23,1			
Typical Capacity [C5] [Ah]	82	164	205	410
Typical Energy [Wh]	1 894	3 788	4 736	9 471
Charging time <sup>(1)</sup>	1h30	1h30	1h30	2h30
Dimensions in mm (LxWxH)	648 x 156 x 627		718 x 210 x 624	
Weight [kg]	51	71	110	151
<b>Standards compliance</b>				
IP Protection, cell safety, shock and vibration	IP65, UL1642, UN 3480 Class 9, DIN EN 60068...			

[1] with appropriate charger

# Finding a better way to power critical materials handling equipment



## Never stop moving forward for maximum availability and lower environmental impact

Electric forklift trucks and Automated Guided Vehicles (AGVs) are vital for modern business life. Everywhere from production lines, to the food industry, distribution centres and even medical and pharmaceutical sites, they keep goods and products moving, with maximum efficiency and safety.

Industrial trucks are frequently required to operate 24/7, often in cold storage conditions. They need onboard batteries capable of delivering exceptional performance and reliability over a long service life – a challenge beyond the capability of traditional lead-acid batteries.

The biggest concerns of forklift fleet managers are the time, trouble and cost involved in the constant need for battery swapping as well as the risk of battery damage due to incorrect maintenance that can lead to premature and expensive battery replacement.

### Decrease

- Downtime
- Capital and operating costs

### Increase

- Fleet productivity
- Energy efficiency

## Li-ion batteries ensure peace of mind and save costs

Soft understands that companies using electric industrial trucks need to reduce their operating costs while increasing productivity. Minimizing their environmental impact is also a major objective.

A perfect battery fit - from the smallest pallet truck to heavy-duty lift trucks

Towing vehicle  
 Forklift truck  
 Unit load vehicle  
 Heavy burden carrier  
 Pedestrian truck  
 Rider  
 Automated Guided Vehicle  
 Low profile AGV  
 Industrial vehicle  
 Robot

# Keeping materials handling operations on the move

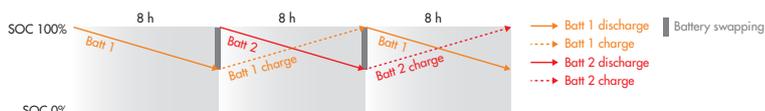


Saft Li-ion technology boosts the productivity of your industrial trucks fleet and helps you control your costs. It also reduces downtime and its associated costs and enables a cleaner and safer workplace for operator comfort.

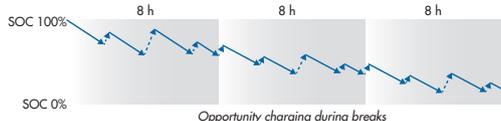
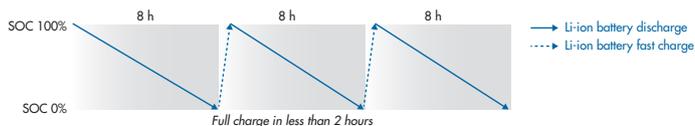
- **Maintenance-free** design eliminates downtime for topping up with water and the associated labour costs. Sealed for life, Li-ion batteries do not release gas when charging, for a safer workplace and no need for a specially ventilated charging room.
- **High charging rate capability** enables the battery to be recharged between shifts and allows opportunity charging, both eliminating downtime for battery swapping and its infrastructure. With Li-ion, there is no need for two batteries per truck for multi-shift operation.
- **High energy density** makes it possible to pack twice the energy within the same battery box - for less frequent charging and greater driving range. Lightweight and more compact, Saft Li-ion technology enables the design of more ergonomic and manoeuvrable vehicles.

## Continuous operation for two full-shifts Li-ion batteries are ideal for modern warehouse logistics

### Flooded lead-acid battery: 2 batteries for multi-shift operation



### Saft Li-ion battery: 1 battery for multi-shift operation



## Innovative Li-ion technology – step change in performance

Characteristics	Flooded lead acid battery	Saft Li-ion battery	Saft Li-ion advantages
Fast charge	Not recommended	30% SOC in 20 min <sup>(1)</sup>	Opportunity charging possible
Charging efficiency	100% SOC in 8 h-12 h	100% SOC in 1h30 <sup>(1)</sup>	Charge 4 times faster
Cycle life (at 80% DOD + 25°C)	500-700 cycles	3 000 cycles	Last 5 times longer
Periodic maintenance (water topping)	3 to 6 months	Not required	Maintenance cost savings
Emissions when charging	Gassing	No gassing	No need for ventilation in the charging room
Electronic management system	Optional external system (for optimized maintenance)	Embedded	Opportunity for data mining and optimizing workflows

[1] Based on Saft Li-ion 3,3 V and 41 Ah cell



**Lower battery and energy costs reduce environmental impact with Saft Li-ion batteries.**

- **A longer service life**

With a cycle life 3 to 5 times longer than lead-acid batteries, Saft Li-ion batteries are suitable for all duty cycles including high cycling applications. A lead-acid battery would need to be 2 to 3 times larger in capacity or limited to 50% depth of discharge (DOD) to achieve a comparable life. Saft Li-ion offers greater cycle life than can reduce or even eliminate the need for battery replacement during a truck's service life.

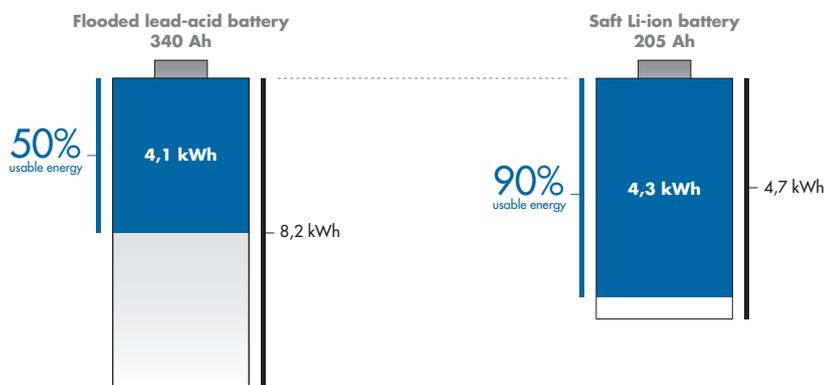
- **Greater usable energy**

Saft's Li-ion battery can be fully charged and discharged without negative impact on its cycle life and available capacity. So, for the same duty cycle, a 205 Ah Saft Li-ion battery replaces a 340 Ah lead-acid battery meaning less energy cost for the same duty cycle. Or, with an equivalent capacity, Li-ion technology allows multi-shift operation on one full battery charge.

- **Better energy efficiency**

With Saft Li-ion batteries, electrochemical conversion of electrical energy takes place with an efficiency of 95-97%, while lead-acid battery energy efficiency is only around 70%-75%, as it is an aqueous based chemistry.

Saft Li-ion battery technology delivers more usable energy than conventional chemistry



**Saft's Li-ion battery, combining longer cycle life, greater depth of discharge and improved charging efficiency, delivers energy saving and reduced CO<sub>2</sub> emissions.**

# Saft is committed to the highest standards of environmental stewardship

As part of this environmental commitment, Saft prioritises the use of recycled raw materials over virgin raw materials in all manufacturing processes. We also strive, year on year, to reduce air and water emissions from our plants, as well as minimizing water usage, reducing consumption of fossil energy consumption and associated CO<sub>2</sub> emissions, and ensuring that all our customers have access to recycling solutions for their

spent batteries. To facilitate the end-of-life collection and recycling of industrial batteries, including our nickel & lithium-based technologies, Saft has developed well-established partnerships with collection companies in most EU countries, in North America and in many other countries worldwide. This collection network receives spent batteries from our customers and dispatches them to fully approved recycling facilities, in compliance

with the laws governing trans-boundary waste shipments. This collection network is currently undergoing minor adaptations to meet the requirements of the EU batteries directive. A list of our battery collection points is available on our web site. In other countries, Saft will assist anyone using our batteries in finding environmentally sound recycling solutions. Please contact your sales representative for further information.



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