



# EFL1603-HV/EFL1803-HV

High Voltage Electric  
Counterbalanced Forklift 16-18T



Innovation Through Simplicity



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V2412.03

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# WHY HIGH VOLTAGE?

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Introducing high-voltage electric forklifts with a complete lineup from 4 to 25-ton load capacities, marking the era of high-voltage high-capacity Li-ion trucks.

This groundbreaking development adopts world-leading high-voltage Lithium-ion power combined with advanced PMSM (Permanent Magnet Synchronous Motor) technology. These high-capacity forklifts ensure triple guarantees of high performance, long running time and safety while aligning with the current trend of green and sustainable development.





# HIGH PERFORMANCE: HIGH SPEED AND HIGH GRADEABILITY

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High-voltage Li-ion batteries enable more power delivery to motors, improving acceleration and travel speeds for high-capacity trucks. PMSMs complement this with rapid response times, swiftly reaching required speeds and torques. This combination of PMSM and high voltage can provide stable and strong power output, which further gives high-capacity trucks excellent climbing capabilities ensuring that the forklift can cope with various applications with ease.

The high-voltage model offers a 1.5-2 times performance improvement over the low-voltage model. Taking the 10-ton model as an example:

## 100%

Improvement in travel speed for high voltage models in laden and unladen conditions.

## 45%

Faster lifting speed demonstrated by the high-voltage models.

## 45%

Improvement in gradeability when laden for high voltage models.

## 100%

Improvement in gradeability when unladen.





# ENERGY EFFICIENCY: EXTENDED RUNTIME AND FAST CHARGING

High-voltage Li-ion batteries have high energy density and can store more electrical energy within a compact volume. High-voltage systems consume less energy and provide longer battery running time comparing low-voltage systems. Notably, these high-voltage Li-ion batteries boast an impressive cycle life of up to 4000 cycles, ensuring long-term durability and minimizing the need for battery replacements.

The PMSMs incorporate advanced control technology to optimize motor efficiency. Unlike traditional AC motors, PMSMs have higher energy conversion efficiency and reduce energy waste. This means that high-capacity trucks can work continuously for prolonged hours at lower costs.



**4000**  
cycles for high-voltage Li-ion batteries

Equipped with fast charging capabilities, high-capacity trucks offer a remarkable charging experience. The high-voltage models are compatible with vehicle-grade charging stations and support 1C charging rating, allowing them to be fully charged in as fast as 1-1.2 hours. This minimizes downtime and maximizes productivity, making it ideal for multi-shift operations

Lithium batteries present considerably lower charging costs than fuel expenses. The integration of high-voltage and PMSM technology achieves up to 15% greater electricity savings versus traditional lithium and AC technology configurations. This significantly reduces long-term energy consumption costs.





**1C**  
Charging



**1 hour**  
Fully charged



**15%**  
Energy savings



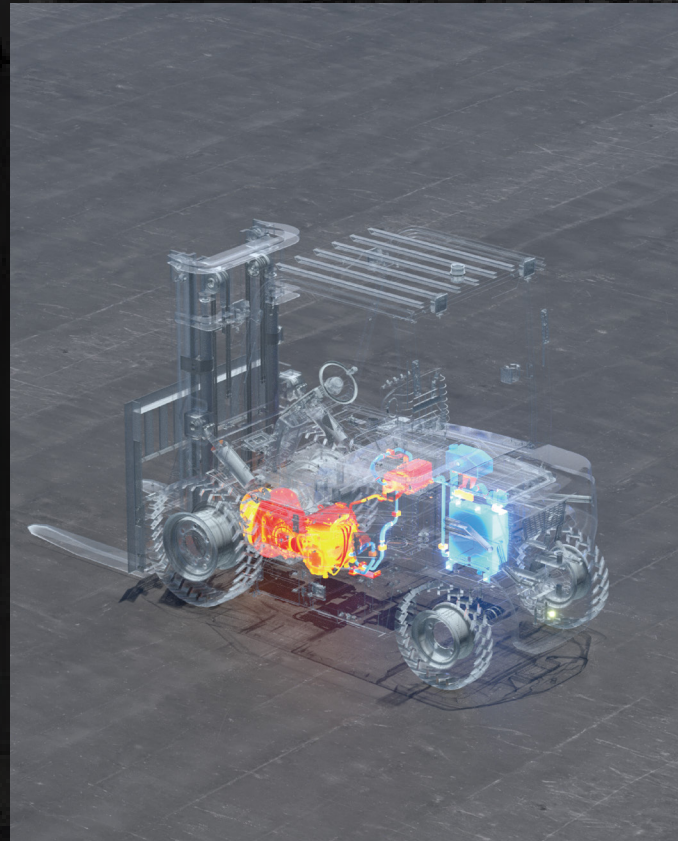
## Smart and reliable strategy for thermal management

The high-capacity trucks utilize three distinct cooling systems to ensure optimal performance and reliability. Specifically, two water cooling systems are employed for the motor and the battery, while an oil cooling system is dedicated to the hydraulics system.

The water cooling systems provide superior cooling performance, preventing the truck from overheating even under the most demanding conditions or in the heat of summer. Water's higher heat transfer capacity compared to air allows it to dissipate heat more efficiently from critical components like the motor and battery. This efficient heat dissipation helps maintain the battery temperature around 30~35°C, protecting these vital components from overheating and potential damage or failure. Consequently, this enhances the overall reliability and longevity of the high-capacity trucks.

Additionally, water cooling systems typically operate with less noise compared to air cooling systems that rely on high-speed fans. This noise reduction is particularly beneficial in applications where a quieter operation is desirable, such as in urban areas or indoor facilities.

The oil cooling system, on the other hand, is used for the hydraulics system. This system ensures that the hydraulic components remain within optimal temperature ranges, thereby maintaining their efficiency and preventing overheating. By effectively managing the temperature of the hydraulics system, the oil cooling system contributes to the smooth and reliable operation of the truck's hydraulic functions.



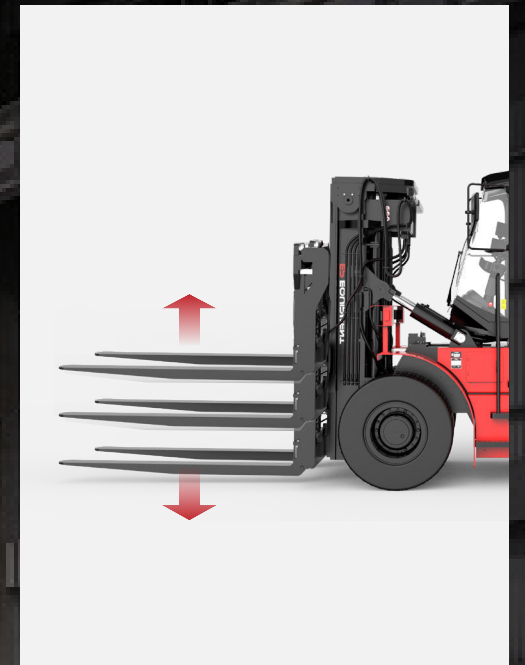
## Safety Assured: Battery, motor protection, monitoring and mast buffering

Both high-voltage lithium batteries and PMSM employ multiple protective measures to ensure safe operations including overcharge protection, over-temperature monitoring, short-circuit protection, etc. minimizing the risk of potential hazards and maximizing operational safety.

The central controlling module- VCU (Vehicle Control Unit) extends the safety of the high-voltage forklifts. VCU provides precise control and real-time monitoring of critical parameters to ensure the truck operates within safe limits.

It also features turn speed control, which adjusts the forklift's speed based on the turning angle, ensuring stability during turns. An over-speed alarm alerts the operator if the forklift exceeds the safe speed limit.\*

The high-capacity forklift mast is equipped with a hydraulic buffering system that ensures smooth lifting and lowering of loads. With controlled deceleration, the fork movement is smooth with no abrupt stops that could damage the load or cause operator discomfort. This feature enhances operational safety and prolongs the lifespan of the mast components.





## Low maintenance: Longer battery life span

Operating at a higher voltage allows the battery to be designed with fewer individual cells. With fewer components and a simpler design, the risk of battery failure is lowered.

Thanks to advanced BMS (Battery Management System) which helps to regulate and monitor high-voltage battery, these batteries tend to have a longer life than low-voltage lithium batteries, reducing the need of battery replacement.

The brushless, simple rotor design of PMSM eliminates mechanical wear from brushes and commutators. This durable, low-friction construction requires minimal periodic maintenance, reducing associated labor costs and downtime.



## Sustainability : Zero emissions for cleaner environment

As fully electric trucks powered by lithium-ion batteries, these forklifts produce zero emissions during operation, eliminating exposure to toxic fumes like carbon monoxide and nitrogen oxides.

Unlike lead-acid batteries which can leak corrosive acid, lithium-ion batteries do not risk hazardous spills. The high-capacity li-ion trucks contribute to a cleaner and safer indoor working environment without compromising handling capabilities.



## Strong adaptability adaptable to harsh outdoor weather conditions

Experience uninterrupted productivity through rain, puddles, and damp conditions with the overall IPX4 rating. Plus an exceptional IP67 rating for high-voltage components. Engineered to withstand harsh temperature, high-capacity trucks offer an ambient temperature range of -20°C~40°C allowing them to perform no matter climate.

Battery heating when charging comes as a standard function for high capacity models, which is activated when the surrounding temperature is below zero to always offer an optimal temperature range for efficient and safe charging even in cold weather conditions.

The dual front wheels is a standard configuration on several models offering a wider base of support, which greatly improves the forklift's stability. Considering the capacity loads of the high-capacity trucks, the weight of the load is more evenly distributed across a larger surface area. The increased ground contact area provided by the dual wheels enhances traction. This is particularly beneficial in environments where the floor may be slippery or uneven while operating outdoors, ensuring that the forklift can maintain a firm grip and operate safely. This not only helps in maintaining balance but also minimizes the stress on individual tires, extending the lifespan of the tires.



## Great support for clients' investment: After-sales Service



### Remote/Online Services:

Telematics technology enables remote monitoring of battery conditions, performance status, and other critical parameters for forklifts. Additionally, production, technical, and after-sales experts are available around the clock to provide prompt and comprehensive solutions for any maintenance issues through virtual support.



### Physical Services:

Comprehensive manuals and supporting documents are provided for all forklift models. In case of breakdowns or replacements, spare parts are swiftly delivered to the clients' locations by global subsidiaries or domestic inventory, minimizing operational disruptions caused by equipment downtime.



# UNDENIABLE POWER FOR CHALLENGING TASKS

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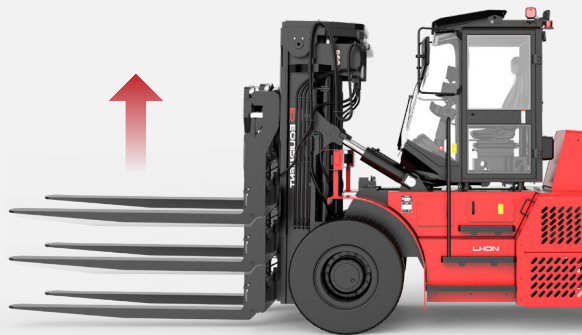
EFL1603 and EFL1803 HV are among the largest and most powerful electric forklifts, designed for industries handling exceptionally heavy and bulky loads, such as concrete industry, construction and servicing of airplanes. With optimized dimensions, the EFL1603 and EFL1803 HV offer increased maneuverability and flexibility. Additionally, the wet drive axle and dual front wheels provide stability and continuous runtime required for such demanding applications. The standard all-weather cabin with air conditioning and fingertip controls ensures operator safety and comfort during long working shifts, regardless of weather conditions. Their robust design and high gradeability allow them to navigate rough terrain and inclines with ease, making them suitable for challenging environments.





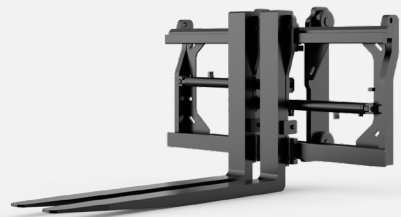
# Every detail meticulously engineered

## Mast

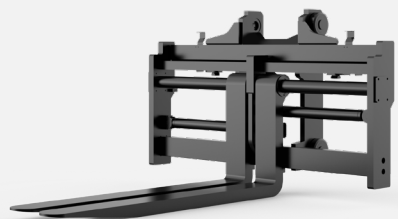


Lifting and lowering Buffer  
Max Lifting height up to 7000mm\*

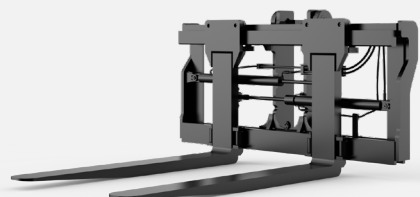
## Attachments



Fork positioner with side shift: Forks with terminal west  
The shaped fork tips aid pallet/load entry.



Forkpositioner with side shift: Roller-guided forks \*  
Allowing easier pallet/load entry



Fork positioner with side shift: Pin type forks\*  
This versatile combination allows handling different load sizes/positions.

## Operating Compartment



All weather cabin with Grammer seat



Fingertips



LED Display



AC and heater



Reversing radar and reversing camera with LCD display



## Battery



618.24V228Ah LFP battery;  
Battery heating when charging

## Lights



Front combination lights



Area warning light



Rear combination light and blue light

The configurations marked with an asterisk (\*) are optional.

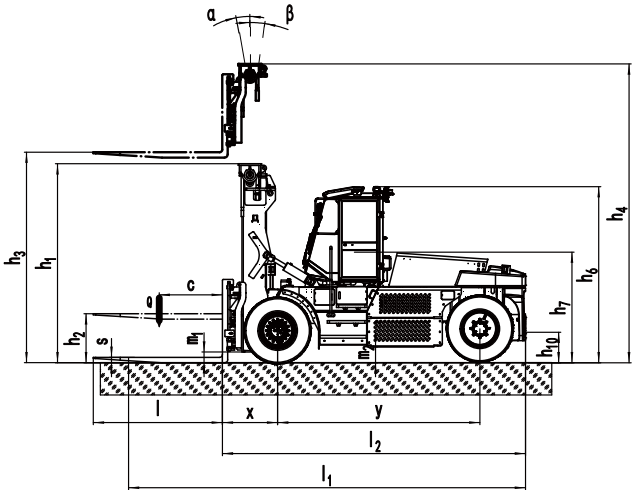


High Voltage Electric Counterbalanced Forklift 16T

EFL1603-HV/EFL1803-HV

Distinguishing mark				EP	EP	EP	EP	EP
				EFL1603-HV-6	EFL1603-HV-9	EFL1603-HV-12	EFL1803-HV-9	EFL1803-HV-12
				Electric	Electric	Electric	Electric	Electric
Service weight				Seated	Seated	Seated	Seated	Seated
				kg	kg	kg	kg	kg
				kg	kg	kg	kg	kg
Tyres/chassis				pneumatic	pneumatic	pneumatic	pneumatic	pneumatic
				12.00-20-20PR	12.00-20-20PR	12.00-20-20PR	12.00-24-24PR	12.00-24-24PR
				12.00-20-20PR	12.00-20-20PR	12.00-20-20PR	12.00-24-24PR	12.00-24-24PR
Dimensions				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
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				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
				mm	mm	mm	mm	mm
Performance data				km/h	km/h	km/h	km/h	km/h
				m/s	m/s	m/s	m/s	m/s
				m/s	m/s	m/s	m/s	m/s
				N	N	N	N	N
				N	N	N	N	N
				%	%	%	%	%
				Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
				Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
Electric-engine				kW	kW	kW	kW	kW
				kW	kW	kW	kW	kW
				V/Ah	V/Ah	V/Ah	V/Ah	V/Ah
				kg	kg	kg	kg	kg
				kWh/h	kWh/h	kWh/h	kWh/h	kWh/h
				t/h	t/h	t/h	t/h	t/h
				t/kWh	t/kWh	t/kWh	t/kWh	t/kWh
				/	/	/	/	/
Drivelfift mechanism				AC	AC	AC	AC	AC
				AC	AC	AC	AC	AC
Addition data				bar	bar	bar	bar	bar
				t/min	t/min	t/min	t/min	t/min
				Hydraulic	Hydraulic	Hydraulic	Hydraulic	Hydraulic
				dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
				A	A	A	A	A

If there are improvements of technical parameters or configurations, no further notice will be given.  
The diagram shown may contain non-standard configurations.





Mast Option

EFL1603-HV-6

Mast types	Lift height ( h3 )	Height, Mast		Height,Free lift(h2)	Mast Tilt Angle		Load Center Distance(X)		
		Height, mast lowered(h1)	Height, mast extended(h4)		Forward α	Backward β			
			No backrest				Forkpositioner with sideshift		
		16t							
mm	mm	mm	mm	Deg	Deg	mm	kg	kg	
2-Standard Mast	3500	3380	5080	100	6	12	950	6675	23215
	4000	3640	5600	100	6	12	950	6840	23380
	4200	3690	5740	100	6	12	950	6950	23490
	4500	3840	6040	100	6	12	950	7090	23755
	5000	4090	6540	100	6	12	950	7340	24130

EFL1603-HV-9

Mast types	Lift height ( h3 )	Height, Mast		Height,Free lift(h2)	Mast Tilt Angle		Load Center Distance(X)		
		Height, mast lowered(h1)	Height, mast extended(h4)		Forward α	Backward β			
			No backrest				Forkpositioner with sideshift		
		16t							
mm	mm	mm	mm	Deg	Deg	mm	kg	kg	
2-Standard Mast	3500	3380	5080	100	6	12	950	6675	23415
	4000	3640	5600	100	6	12	950	6840	23580
	4200	3690	5740	100	6	12	950	6950	23750
	4500	3840	6040	100	6	12	950	7090	23955
	5000	4090	6540	100	6	12	950	7340	24330

EFL1603-HV-12

Mast types	Lift height ( h3 )	Height, Mast		Height,Free lift(h2)	Mast Tilt Angle		Load Center Distance(X)		
		Height, mast lowered(h1)	Height, mast extended(h4)		Forward α	Backward β			
			No backrest				Forkpositioner with sideshift		
		16t							
mm	mm	mm	mm	Deg	Deg	mm	kg	kg	
2-Standard Mast	3500	3380	5080	100	6	12	950	6675	23935
	4000	3640	5600	100	6	12	950	6840	24100
	4200	3690	5740	100	6	12	950	6950	24270
	4500	3840	6040	100	6	12	950	7090	24490
	5000	4090	6540	100	6	12	950	7340	24885

EFL1803-HV-9

Mast types	Lift height ( h3 )	Height, Mast		Height,Free lift(h2)	Mast Tilt Angle		Load Center Distance(X)		
		Height, mast lowered(h1)	Height, mast extended(h4)		Forward α	Backward β			
			No backrest				Forkpositioner with sideshift		
		18t							
mm	mm	mm	mm	Deg	Deg	mm	kg	kg	
2-Standard Mast	3500	3440	5140	110	6	12	950	6675	23935
	4000	3700	5660	110	6	12	950	6840	24100
	4200	3750	5800	110	6	12	950	6950	24270
	4500	3900	6100	110	6	12	950	7090	24490
	5000	4150	6600	110	6	12	950	7340	24885

EFL1803-HV-12

Mast types	Lift height ( h3 )	Height, Mast		Height,Free lift(h2)	Mast Tilt Angle		Load Center Distance(X)		
		Height, mast lowered(h1)	Height, mast extended(h4)		Forward α	Backward β			
			No backrest				Forkpositioner with sideshift		
		18t							
	mm	mm	mm	mm	Deg	Deg	mm	kg	kg
2-Standard Mast	3500	3440	5140	110	6	12	950	6675	26635
	4000	3700	5660	110	6	12	950	6840	26800
	4200	3750	5800	110	6	12	950	6950	26910
	4500	3900	6100	110	6	12	950	7090	27050
	5000	4150	6600	110	6	12	950	7340	27300

Standard Configuration

- Fork positioner with sideshifter: Forks with terminal west
  - 2500 fork carriage
  - Forks with terminal west 1200/1800/2400mm forks
  - 618.24V228Ah LFP battery
  - Pneumatic tyres
  - All weather cabin with rubber damping frame connection, heater and air conditioner, defrost and defogging function and electro-hydraulic tilting function
  - Fingertips
  - Reversing buzzer
  - Mast lifting and lowering buffer
  - Reversing radar and reversing camera
  - USB interface 24V
- Fire extinguisher holder
  - EFL1603-HV: Grammer MSG85-722 (suspension with armrest + headrest + safety seat-belt switch + Seat heating function)
  - EFL1803-HV: Grammer MSG85-722 (suspension with armrest + safety belt switch + Seat heating function)
  - OPS system
  - Telematics
  - Heating system for lithium battery charging
  - Lighting package: strobe warning light, LED combination working light( high/low beam mast working light, turn signal light, marker light), LED rear combination light (reversing light,brake light, turn signal light, marker light)

Options

- Attachments:
    - Fork positioner with sideshifter: Roller-guided forks
    - Fork positioner with sideshifter: Pin-type forks
    - Customized attachments
      - Customized fork length
      - Customized fork carriage width
    - Chargers
      - 20kW (400V38A)
      - 40kW (400V76A)
    - Solid tyres /non-marking tyres
- Lights
    - Rotating warning light
    - Rotating buzzer warning light
    - Rear blue lamp/Front and rear blue lamp
    - Front fog light
    - Area warning lamps on both sides of cabin
  - Cigarette lighter socket 12V5A
  - Customized seat options
  - Turn speed control
  - Adjustable overspeed alarm