

A high-angle photograph of a red Hyster forklift lifting a large green container. The forklift is positioned on the right side of the frame, with its mast and forks supporting the container. The container is a large, rectangular, green metal box. The forklift has a black cab with a large window, and a large black battery pack is visible on its side. The Hyster logo is on the side of the forklift. The background is a dark, paved surface.

September 2022

Electric Range

Forklifts 18 - 33 tons
Battery-Power
Li-ion

The time is now -

GOING ELECTRIC WITH ALL YOUR FORKLIFT OPERATIONS



MEGATRENDS



Public, internal and external pressure and demands



Legislation and Standards - local, regional & global



Government, investor, finance and operator needs



Customers and public interests

1.5

DEGREE COMPANY

Cargotec is a 1.5 degree company. Reduction of **CO₂ emissions** of at least **50% by 2030**.

Kalmar promise to have **an electric offering** in every range **by 2021**.

Cargotec CO₂-emission targets by 2024:

- Cargotec reduce **1.000.000 tons** of CO₂.
- Kalmar ME reduce **550.000 tons** of CO₂.

MEGATRENDS

Customer needs and demands:



MAJOR SAVINGS

WORK ENVIRONMENT

SUSTAINABILITY

- › Operational & Performance
- › Maintenance & Service
- › Uptime vs Downtime
- › Environmental & Emissions

- › Zero exhaust emissions
- › Lower noise levels
- › Less vibrations

- › Financial benefits
- › Break-even point
- › TCO and running costs
- › Maintenance and Uptime
- › Green credentials



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Electric Forklifts Developments



1980

Kalmar presents its **first battery electric forklifts**, today > 5.500 made (FLT range 2-7 tons).



2012

Kalmar presents its latest **electrical forklift range in the G-generation** (FLT range 5-9 tons).



2016

Kalmar presents its first **medium-size battery electric forklift range**, (FLT range 9-18 tons). (ECH range 7-12 tons).



2017

Kalmar present the first **Fuel-Cell driven Forklift** in cooperation with steel producer (SSAB Sweden).



2022

Kalmar full electric Portfolio promise, now available in Lead-Acid + Li-Ion
5-9 / 9-18 / 18- 33 tons

Full range of

ELECTRIC

Heavy Forklift Portfolio



Kalmar Heavy Electric Forklifts

Capacity:

- › 18 - 25 tons
- › 28 - 33 tons

Battery Solutions:

- › Li-Ion 670V

NEW

ECG180-250



ECG280-330



Kalmar Heavy Electric Forklifts

7 lifting capacities on
three wheelbases

ECG180-220; WB 4000 mm
ECG250; WB 4250 mm

ECG280-330; WB 4750 mm



Kalmar Heavy Electric Forklifts, ECG180-330

- › 1 range with 2 families (180-250 / 280-330)
- › 7 normal capacities (same as diesel range)
- › 3 different wheelbases (no short models)
- › Full lift capacity to 7.0 m (23ft)*
- › Battery capacity 163 to 392 kWh.



Lifting capacities in tons



Models	Wheelbase (mm / in)	Capacity (tons / lbs)	Lifting equipment
ECG180-12	4.00 m (158")	18 T (40,000 lbs)	Class A
ECG200-12	4.00 m (158")	20 T (44,000 lbs)	Class A
ECG220-12	4.00 m (158")	22 T (48,000 lbs)	Class A
ECG250-12	4.25 m (167")	25 T (55,000 lbs)	Class A
ECG280-12	4.75 m (187")	28 T (62,000 lbs)	Class B
ECG300-12	4.75 m (187")	30 T (66,000 lbs)	Class B
ECG330-12	4.75 m (187")	33 T (73,000 lbs)	Class B

* Full lift capacity up to 7.0 m (23ft) with Duplex or Duplex Freelift masts with integral sideshift & fork positioning carriage (SS/FP).

** ECG180-250 use class A of Lifting Equipment (mast, carriage & forks).

*** ECG280-330 use class B of Lifting Equipment (mast, carriage & forks)

Kalmar Electric Forklifts

ECG50-330

Range Overview



OTHER ELECTRIC RANGE:

Reachstackers	(2021)
Terminal Tractors	(2018)
Straddle Carriers	(2000)



LIGHT RANGE

Capacity 5 - 9 tons (11 models)
Battery Lead-Acid & Li-Ion
Start in 1980



MEDIUM RANGE

Capacity 9 - 18 tons (20 models)
Battery Lead-Acid & Li-Ion
Start in 2017



HEAVY RANGE

Capacity 18 - 33 tons (7 models)
Battery Li-Ion
Sales start in Q3 / 2022



Ready to take on your

TOUGHEST

loads and applications



Terminals
Stevedoring



Metal
Distribution



Forestry
Intermodal



Logistics
Transports



Concrete
Precast



Energy
Wind

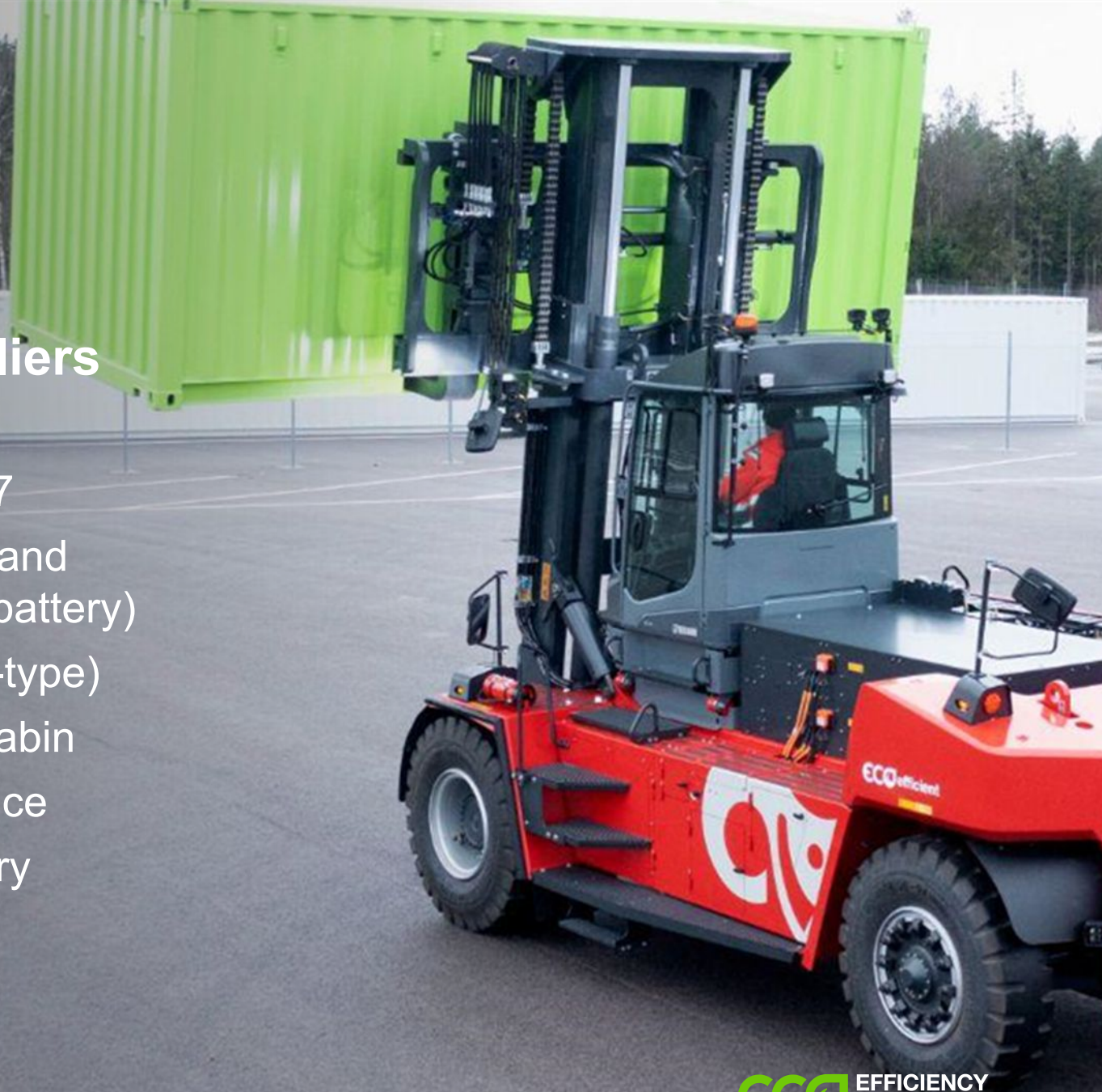


Mining
Operations

Kalmar Heavy Electric Forklifts, ECG180-330

Strong hardware from global suppliers

Powertrain:	Bosch-Rexroth AC-motors
Drive axles:	Kessler D91-NL408 / NL-487
Brakes:	Oil-cooled Wet Disc Brakes and regenerative brakes (kW to battery)
Batteries:	Li-Ion solution (670V / NMC-type)
Full TMS:	for battery, powertrain and cabin
Full BMS:	control on battery performance
Full BMS:	for optimal charging of battery

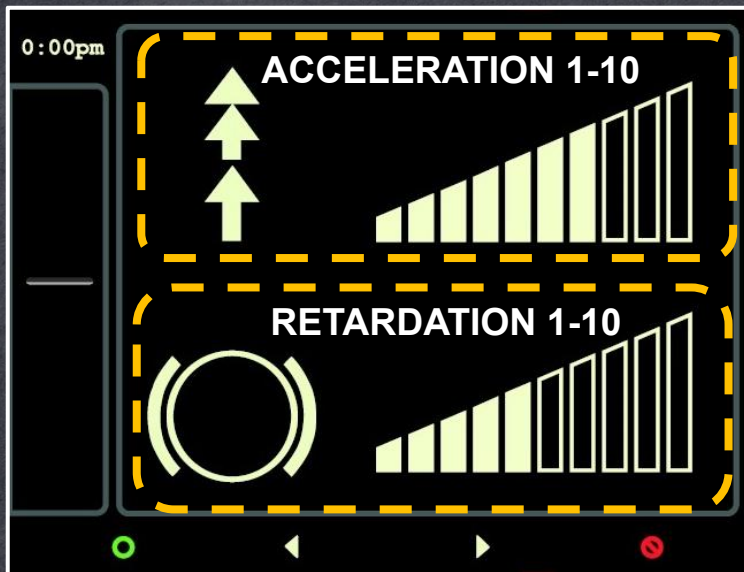


Smart Programmable

Acceleration & Retardation

The machine can easily be adapted to different drivers and driving conditions.

The driver can choose from up to 10 different steps for both **ACCELERATION** and **RETARDATION (brake force)**.



Acceleration (1-10):

- › 1 for maximum battery time
- › 10 for maximum productivity

Brake (1-10):

- › 1 for transmission machine behavior
- › 10 for hard hydrostatic machine behavior

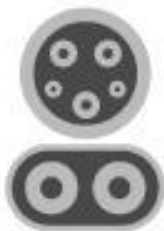
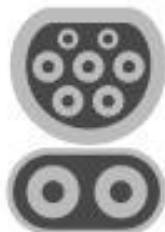
STANDARD

Complete offerings from Kalmar

- Kalmar offers the widest range of sustainable solutions, and we will find the solution that fit your operational needs the best.
- Kalmar offer the most suitable and cost efficient solution for **your operation**, based on running hours, shifts and local conditions.



Plug-in standards and regions (DC)

	North America	Japan	EU and other markets	China
Vehicle inlet				
Connector				
Standard	CCS1	CHAdeMO	CCS2	GB/T
Communication	PLC	CAN	PLC	CAN
3-phase voltage	480 / 600 V	200 V	400 / 415 V	380 V
Grid frequency	60 Hz	50 / 60 Hz	50 Hz	50 Hz

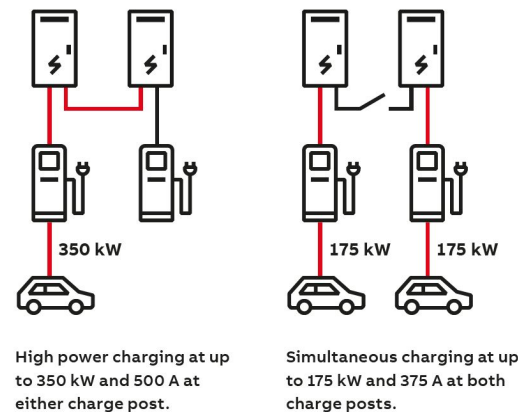
Impact of different charger sizes

CHARGER NAME	CHARGING CAPACITY (MAX)	CHARGING OPTIONS	GRID POWER (KVA)	CHARGING STANDARD (CCS1, CCS2, GB/T)	ELECTRICAL STANDARD (CE, UL)	CHARGING EQUIPMENT
Mobile 24 kW	24 kW	24 kW	29 (40 A)	CCS2	CE	Mobile charger 
Terra 94 (1x90 kW)	90 kW	90 kW	96	CCS1, CCS2	CE, UL	1 charging post incl. power modules 
Terra HP 175 (1x175 kW)	175 kW	175 kW	192	CCS1, CCS2	CE, UL	1 power cabinet 1 charging post 
Terra 184 (1x180 kW) (2x90 kW)	180 kW	2 * 90 kW or 1 * 180 kW	192	CCS1, CCS2	CE, UL	1 charging post incl. power modules and double guns 



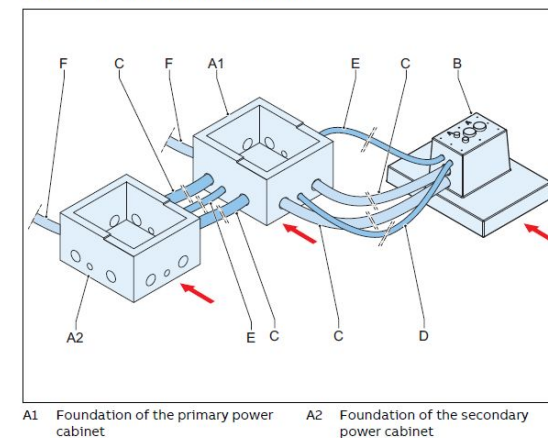
Charge post / electric central

Dynamic DC power sharing illustrated



Commissioning

Overview of the cable conduits



Foundation precast

Charger sales from the Price List

Order handling:

- › Orders handled by local Frontline.
- › Taxation reasons demand this principle.
- › Local support from ABB is included.
- › Cooperation local Frontline and ABB.
- › Other brands can be offered.

What is included in our price ?

- › Charger hardware (central + post).
- › Charger foundation (cable preparation).
- › Commissioning after ready installation.
- › Installation not included (in the prices).

SUMMARY

of key benefits

Ready for toughest loads and applications

- Sealed motors
- High IP ratings
- TMS (warm & cold)

Full performance

- Drive speed
- Lift/lower speed

TMS controlled temperatures on batteries, motors, inverters & power electronics.

Modular battery & charger approach to adapt to different customer demands

High voltage system

- Built in safety system
- Protective casing and shielded HV cabling
- High Voltage training for technicians and operators

Zero CO₂ Emissions

Zero exhaust gases

Low noise

Less vibrations

The most energy efficient and powerful solution on the market.

Driving Experience

- Fast
- Smooth
- Precise
- Quiet

Technical information

ECG vs DCG

Common Features

- 1 Lifting equipment
- 2 Drive axle, same type different ratio
- 3 Steering axle and hubs
- 4 Tires and rims
- 5 Frame (Base structure ~90%)
- 6 Cabin
- 7 Control system - CECS²



External design DCG180-330 and ECG180-330

DCG Diesel



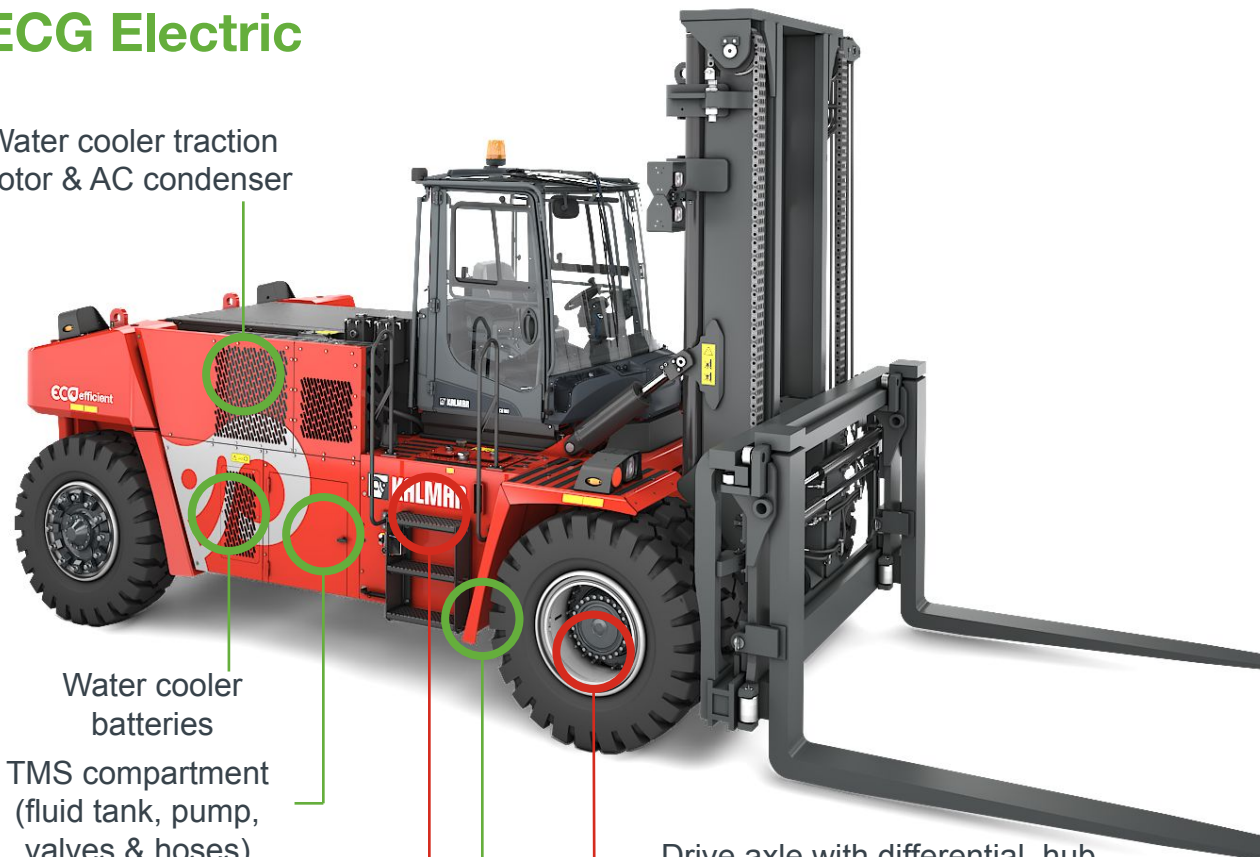
Hydraulic oil cooler

Hydraulic oil tank

Drive axle with differential, hub reduction & wet disc brakes (WDB)

ECG Electric

Water cooler traction motor & AC condenser



Water cooler batteries

TMS compartment (fluid tank, pump, valves & hoses)

Hydraulic oil tank and access stairway

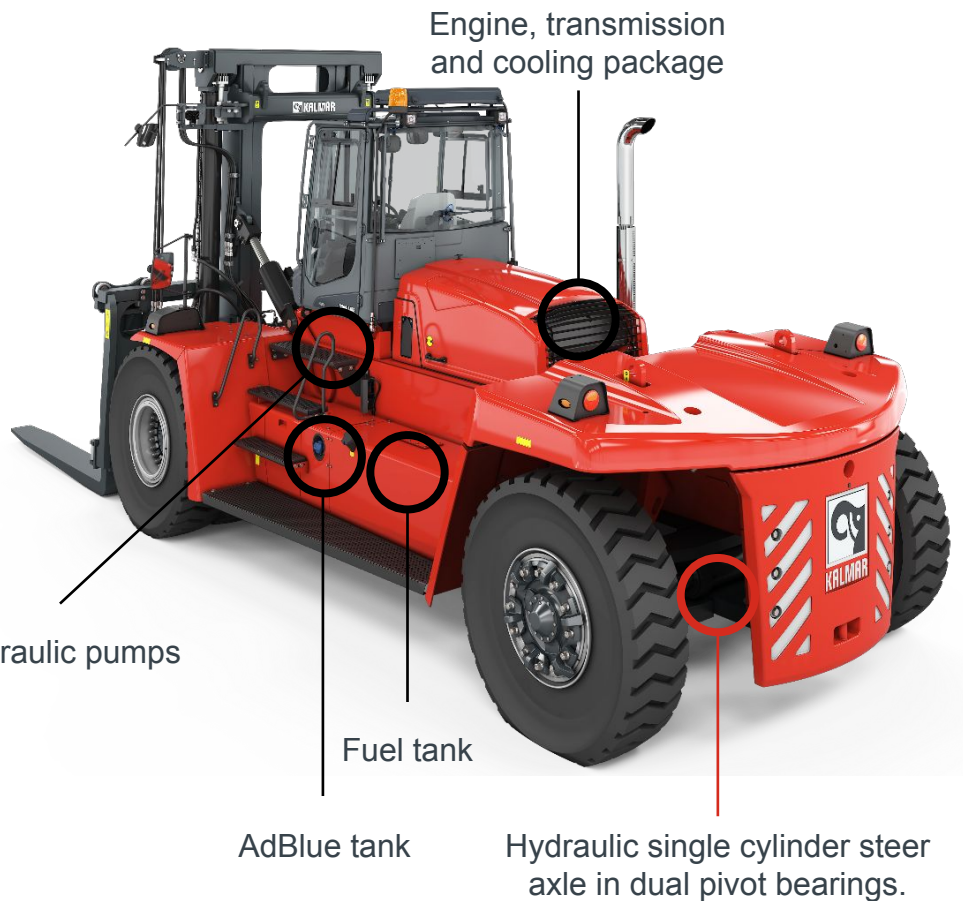
Drive axle with differential, hub reduction & wet disc brakes (WDB)

Electric drive motor with 2-speed transmission & brake regeneration.

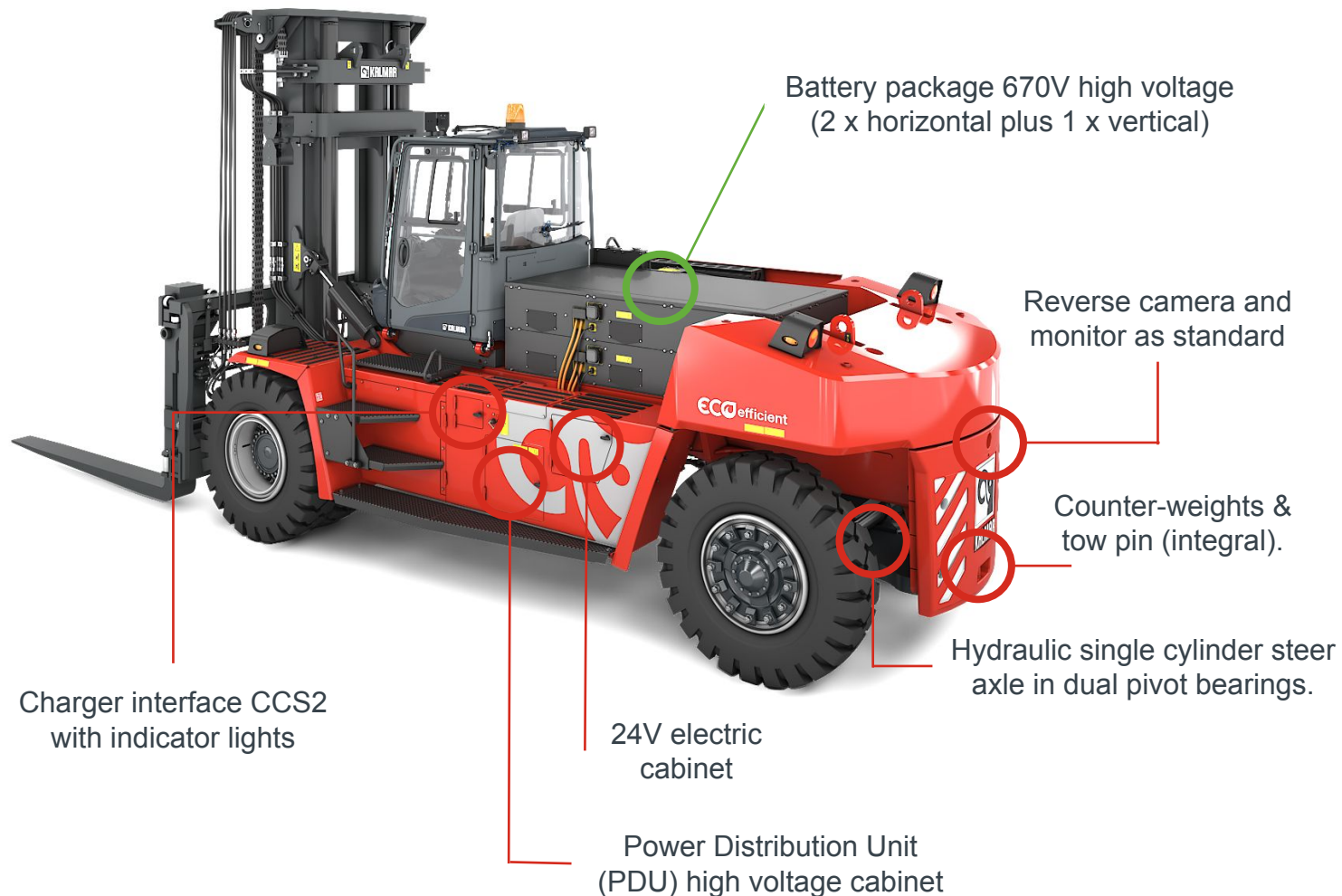
Electric hydraulic pump motor

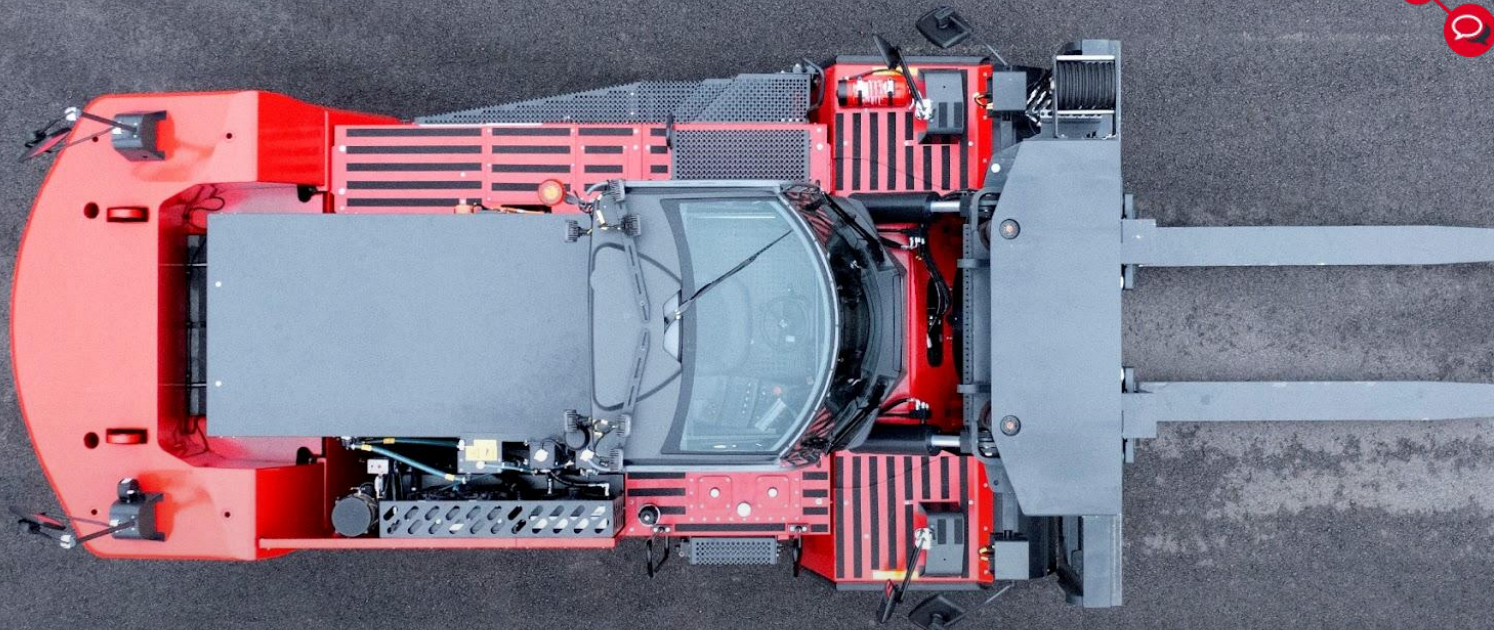
External design DCG180-330 and ECG180-330

DCG Diesel



ECG Electric





Benefits e-Powertrain vs Diesel

- 1 Sustainability & Work Environment
- 2 Energy efficiency
 - › Electric motor >90% (vs Diesel <50%)
 - › Transmission without loss from Torque Converter
 - › Regenerative braking/retardation
- 3 Instant power

The electric powertrain

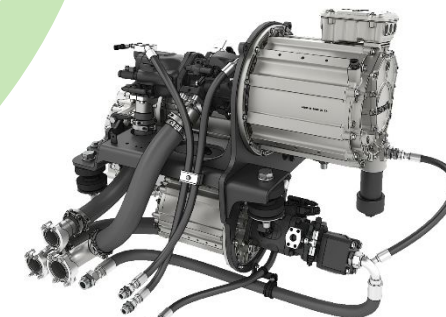


e-Power

High-Voltage solution (670 V).
Modular battery capacity.

e-Hydraulics

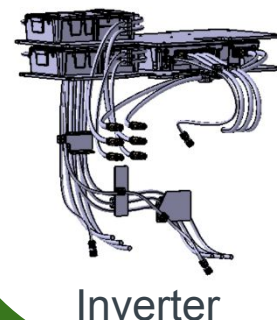
Powerful pump motor
for load handling
Separate pump motor
for auxiliaries



e-Power

e-Drive

e-Hydraulics



Inverter

e-Drive

Powerful traction motor
2-speed transmission.
Drive axle with differential,
hub reduction and wet disc
brakes (WDB).



TMS

Thermal
Management System

Power Electrics 670V

- › Strong traction motor: (Bosch-Rexroth) ECG180-250: prel. 152 kW (continuous) / max 300 kW.
ECG280-330: prel. 152 kW (continuous) / max 300 kW.
- › Strong hydraulic motors: (Bosch-Rexroth) prel. 110 kW (continuous) / max 230 kW.
- › Auxiliary motor: (Bosch-Rexroth) prel. 23 kW (continuous) / max 50 kW.
- › Full Thermal Management System for active and passive liquid cooling and/or heating.
- › Full TMS-cooling of motors, inverters and batteries.

NEW



Traction & Transmission

Bosch-Rexroth Traction motor:

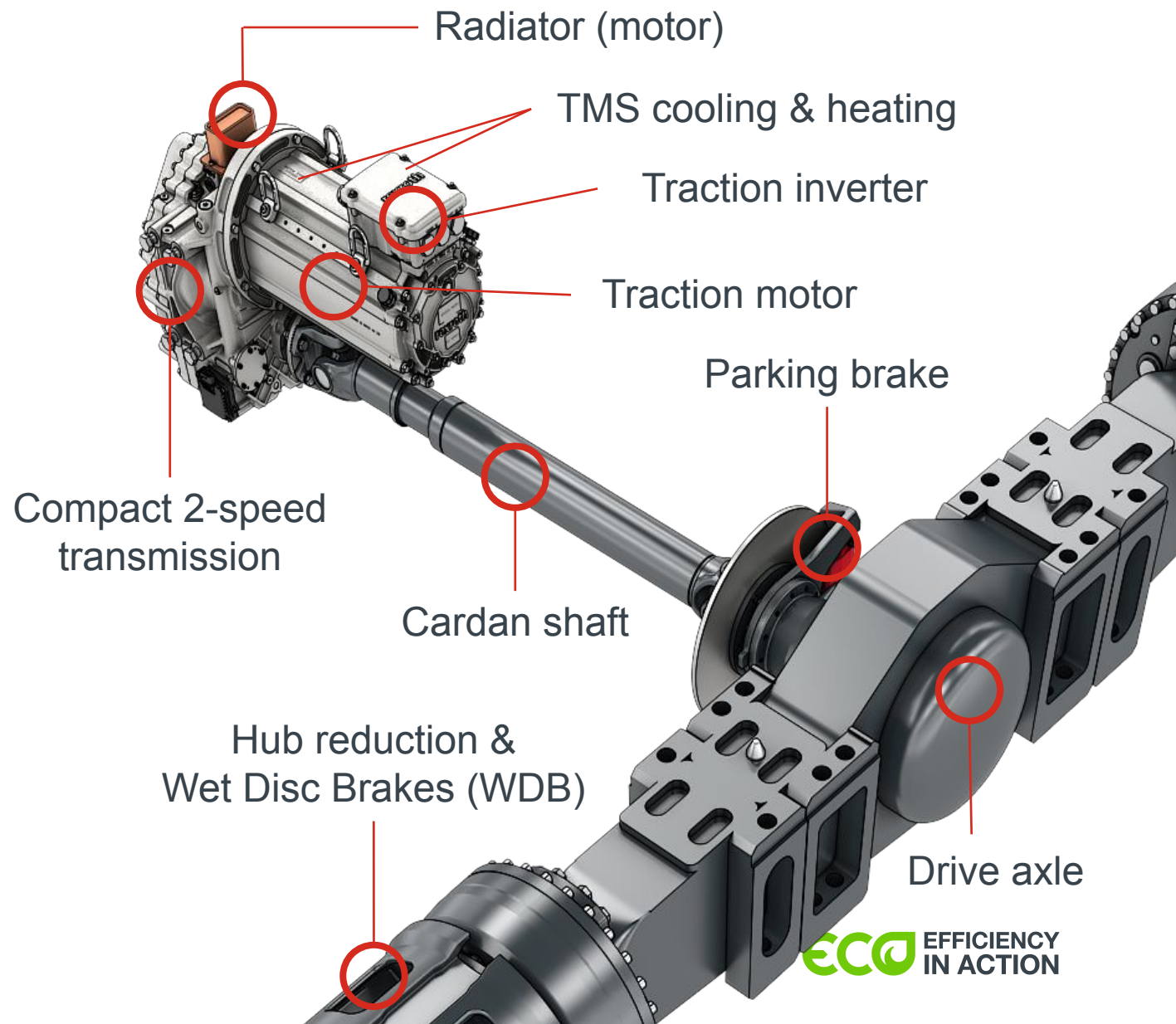
- › ECG180-250; power 152 kW
- › ECG280-330; power 152 kW
- › Motor 10.500 rpm
- › Re-generation brake function, with 60-80% energy recuperation

Bosch-Rexroth Transmission unit:

- › No power shift / high-efficient
- › 2-speeds for optimum efficiency

Kessler drive axle D91-E:

- › 1:19.8 (ECG180-250)
- › 1:26.7 (ECG280-330)
- › Differential with Wet Disc Brakes



e-Hydraulics

Load Handling System and Auxiliary

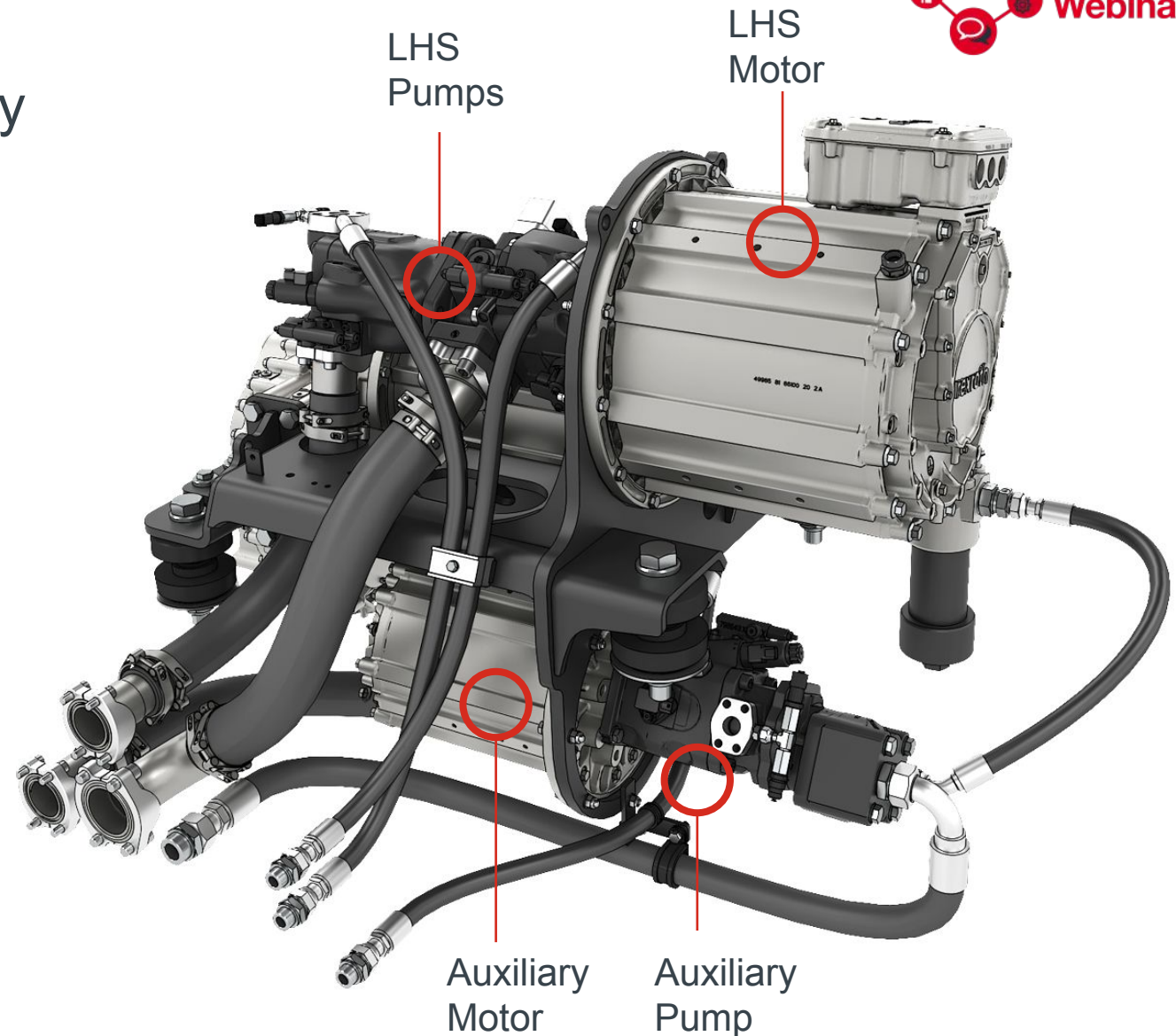
Bosch-Rexroth LHS motor:

- › Power cont. 110 kW / max 230 kW
- › 145cc + 100cc variable pumps, (100cc with el-controlled displacement)

Bosch-Rexroth Aux motor:

- › Power cont. 23 kW / max 50
- › Bosch-Rexroth 72cc variable pump (el-controlled displacement)
- › Salami 34cc fixed pump

One hydraulic tank for both the brake system and the LHS-system



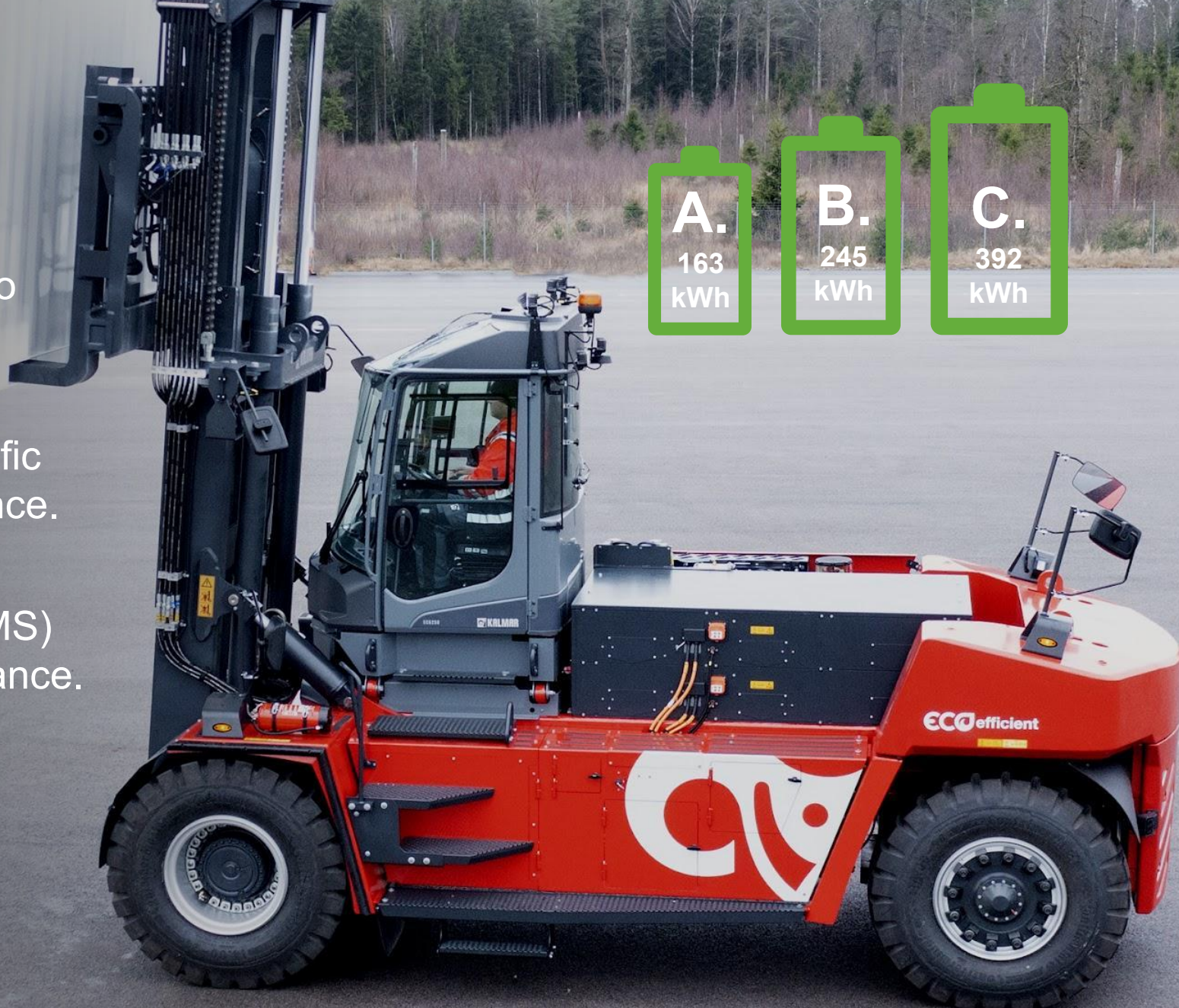
Batteries

- › Modular capacities and chargers to optimize return on investment.
- › 3 battery capacity configurations.
- › NMC (LiNiMnCoO₂) for best specific energy density & power performance.
- › Battery Monitoring System (BMS).
- › Thermal Management System (TMS) optimizes battery life and performance.
- › 5 year warranty or reached kWhs.
- › (Details to be defined - Requires Kalmar Services)
- › Expected first life >10 years @ 2500 hours/year.

A.
163
kWh

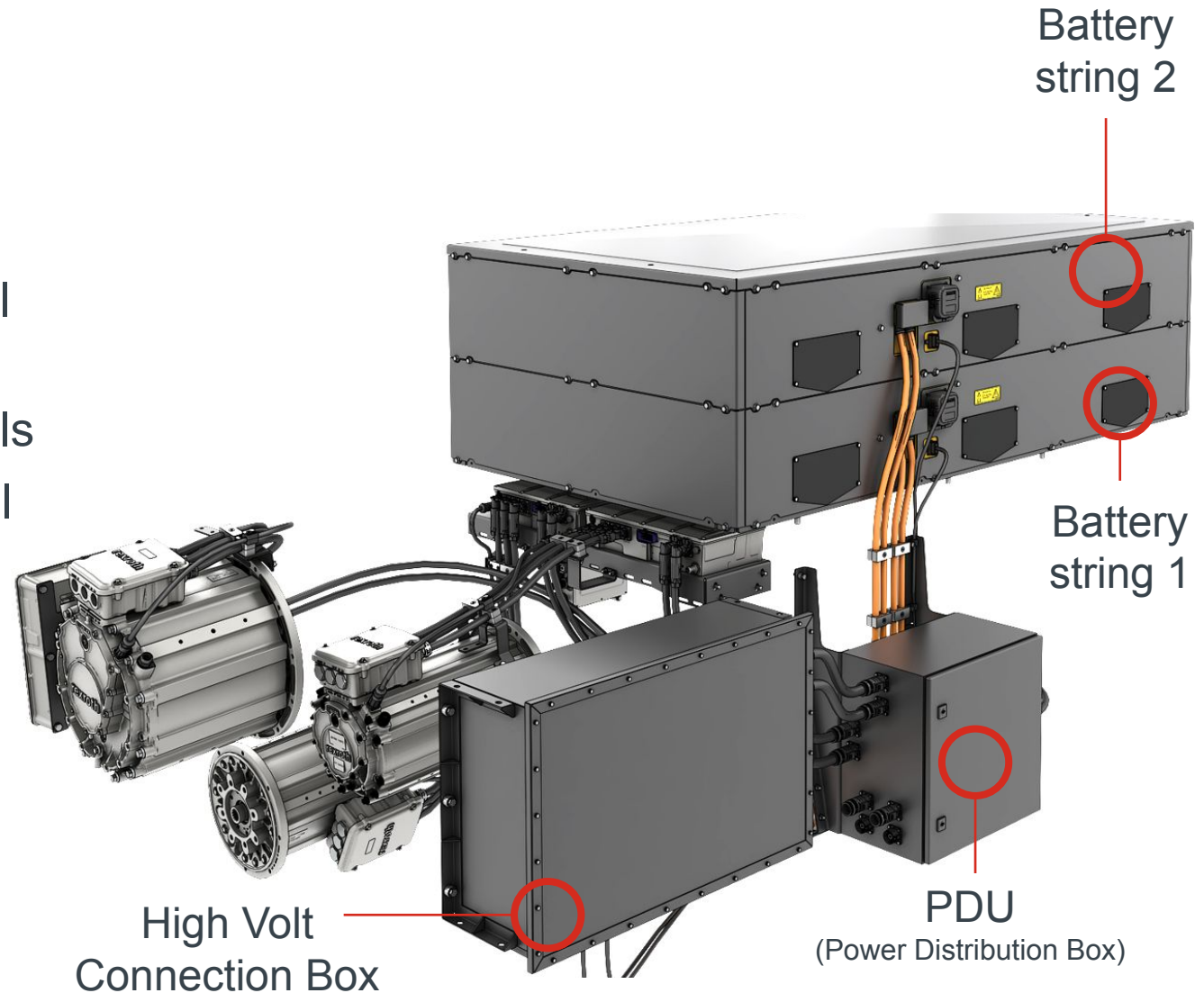
B.
245
kWh

C.
392
kWh

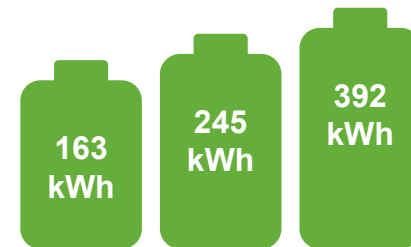


Power battery High voltage system

- › Li-ion NMC (Li NiMnCoO₂) battery technology
- › Modular battery design with multi level Battery Management System (BMS)
- › 3 battery configurations, capacity levels
- › Cooling/Heating controlled by Thermal Management System (TMS)
- › 5 year warranty or reached kWhs. (details TBD - Requires Kalmar Service Agreement)
- › Expected first life >10 years @ 2500 hours/year.



Battery capacities ECG180-330



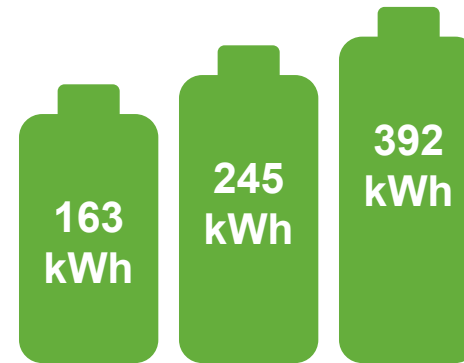
BATTERY CAPACITY:	163 kWh	245 kWh	392 kWh
ECG180 (WB 4000 mm)	Standard	Option	NA
ECG200 (WB 4000 mm)	Standard	Option	NA
ECG220 (WB 4000 mm)	Standard	Option	NA
ECG250 (WB 4250 mm)	Standard	Option	Option
ECG280 (WB 4750 mm)	NA	Standard	Option
ECG300 (WB 4750 mm)	NA	Standard	Option
ECG330 (WB 4750 mm)	NA	Standard	Option



Electric Forklift ECG180-250

Battery capacity specifications

- › Two (2) battery capacities ECG180-220
 - Est. energy consumption/hour: 32 kWh/h (average drive cycle)
- › Three (3) battery capacities ECG250
 - Est. energy consumption/hour: 35 kWh/h (average drive cycle)



ECG180-220; 163kWh
ECG250; 163- 245 kWh



ECG180-220; 245 kWh
ECG250; 392 kWh

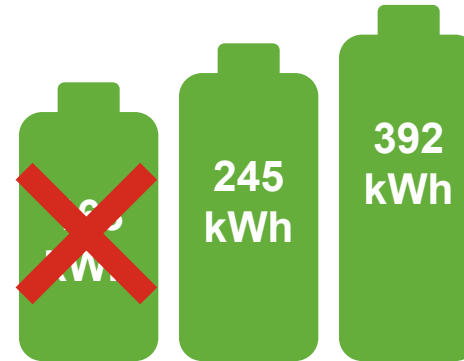


BATTERY CAPACITY:	163 kWh	245 kWh	392 kWh
ECG180 (WB 4000 mm)	Standard	Option	NA
ECG200 (WB 4000 mm)	Standard	Option	NA
ECG220 (WB 4000 mm)	Standard	Option	NA
ECG250 (WB 4250 mm)	Standard	Option	Option

Electric Forklift ECG280-330

Battery capacity specifications

- › Two (2) battery capacities ECG280-330
 - Est. energy consumption/hour: 40 kWh/h (average drive cycle)



ECG280-330; 245 kWh



ECG280-330; 392 kWh

BATTERY CAPACITY:	163 kWh	245 kWh	392 kWh
ECG280 (WB 4750 mm)	NA	Standard	Option
ECG300 (WB 4750 mm)	NA	Standard	Option
ECG330 (WB 4750 mm)	NA	Standard	Option
ECG280 (WB 4750 mm)	NA	Standard	Option

Battery solution ECG 180-330

OPTION

More battery capacity
available on all models
⇒ 163 / 245 / 392 kWh

2
horizontal
1 vertical

Horizontal battery
boxes (2-3 units)

Vertical battery
box (1 unit)

3
horizontal
1 vertical



ECG280-330
with 245 kWh (2+1)



ECG280-330
with 392 kWh (3+1)

Thermal Management System

(full TMS solution)

- › Cooling/Heating system for batteries, motors, power components, transmission & cabin
- › Ensures battery temperature for optimal performance and energy-efficiency (25-30°C in core).
- › Operational temperature conditions -30 to +40 °C (-22 to 104 °F).
- › Connected to cabin AC to ensure operator comfort (and minimize energy consumption).



THERMAL MANAGEMENT SYSTEM

External temperature

-30°C

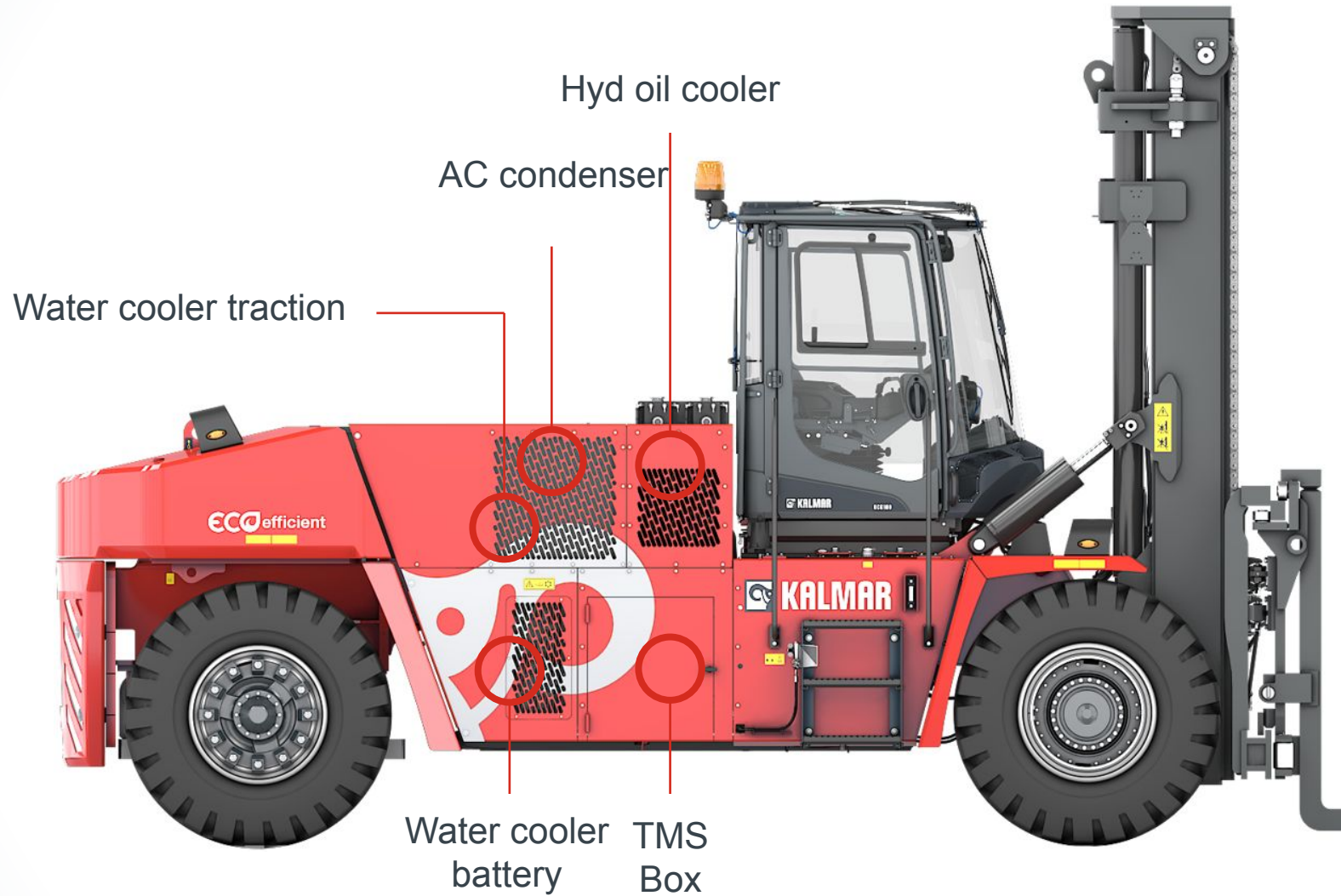
40°C

Battery core temperature

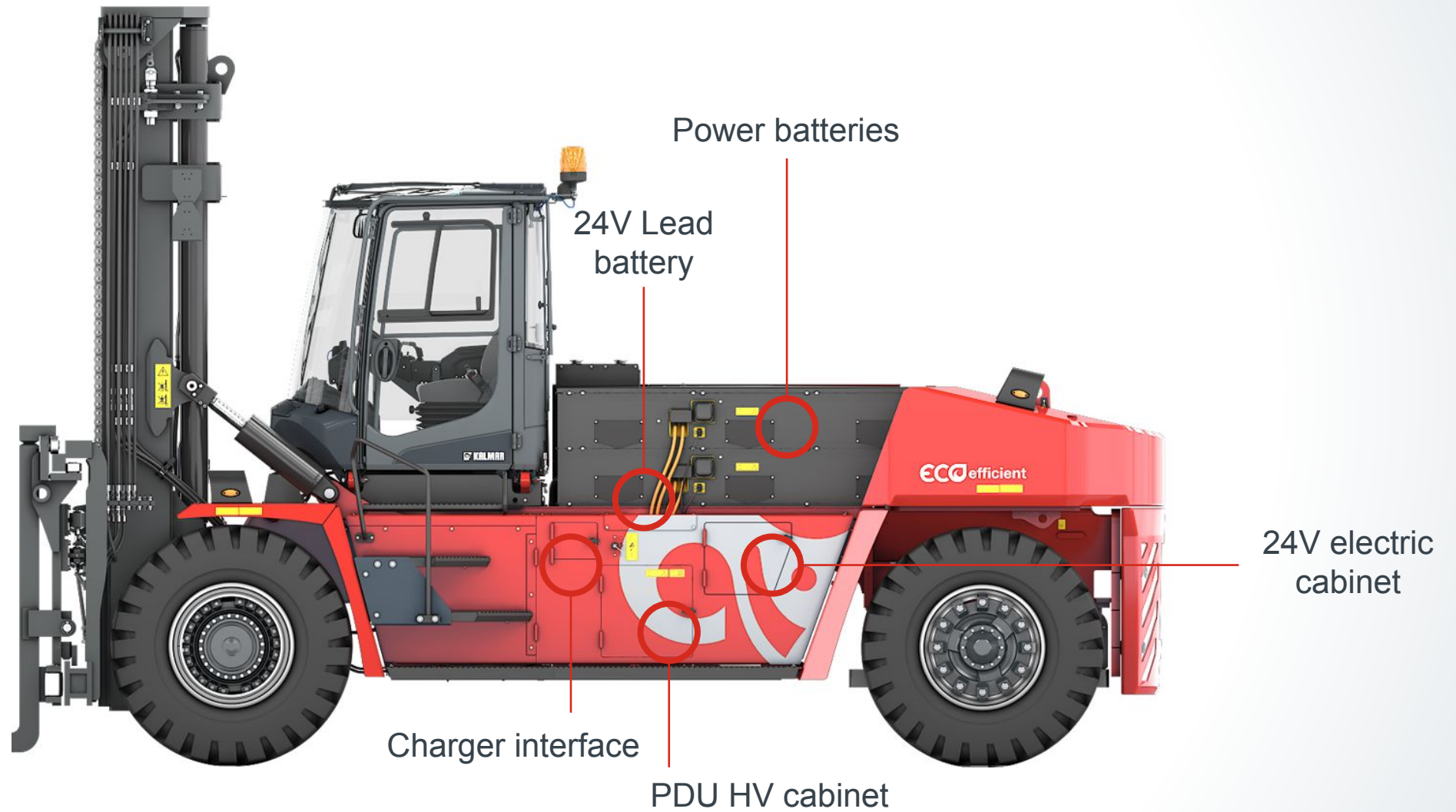


25-30°C

ECG180-330



ECG180-330



Video KAMOS products

ECG250-12 / ERG450-65S5 / T2E+



Great performances

Drive Speeds (Forward & Reverse):

- Strong drive motor: **152 kW** cont. (max 300 kW).
- Increased durability - can take more loads.
- Faster acceleration vs diesel drive (wo/w load).

High Drive Speeds - matching IC forklifts.

- ➡ **25 km/h** – without load
- ↩ **18 km/h** – at rated load

Hydraulic Speeds (lift, lower, sideshift & fork pos.):

- Hydraulic motor: **110 kW** cont. (max 230 kW).
- ↑ **Up to 0.40 m/s** – without load
- ↑ **Up to 0.35 m/s** – at 70% of rated load
- ↓ **Up to 0.32-0.34 m/s** – without load
- ↓ **Up to 0.40 m/s** – at rated load

High Speed
25-25
(km/h)

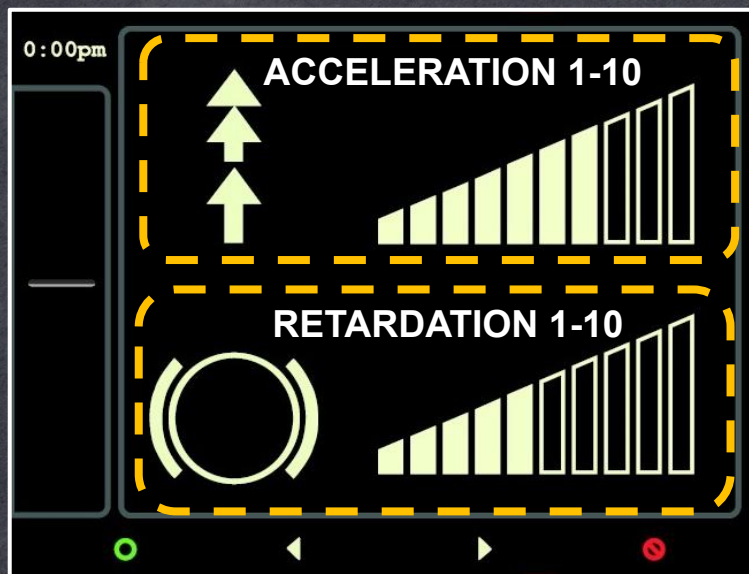
Faster
Acceleration
15-30%
better vs IC

Smart Programmable

Acceleration & Retardation

The machine can easily be adapted to different drivers and driving conditions.

The driver can choose from up to 10 different steps for both **ACCELERATION** and **RETARDATION (brake force)**.



Acceleration (1-10):

- › 1 for maximum battery time
- › 10 for maximum productivity

Brake (1-10):

- › 1 for transmission machine behavior
- › 10 for hard hydrostatic machine behavior

STANDARD

Operation time vs battery capacity

Estimated continuous operating times (excl. idling)
versus duty cycle and on-board battery capacity

Model / Duty	Lower	Medium	Higher
ECG180-220	~28 kWh/h	~32 kWh/h	~36 kWh/h
ECG250	~30 kWh/h	~35 kWh/h	~40 kWh/h
ECG280-330	~35 kWh/h	~40 kWh/h	~46 kWh/h

	ECG180-220 WB 4000 mm		ECG250 WB 4250 mm		ECG280-330 WB 4750 mm		
Nominal Capacity	163 kWh	245 kWh	163 kWh	245 kWh	392 kWh	245 kWh	392 kWh
Operating time	~ 5 h Lower Duty	~ 7h 30min Lower Duty	~ 4h 30min Lower Duty	~ 7 h Lower Duty	~ 11 h Lower Duty	~ 6 h Lower Duty	~ 9h 30min Lower Duty
Operating time	~ 4h 15min Medium Duty	~ 6h 30min Medium Duty	~ 4 h Medium Duty	~ 6 h Medium Duty	~ 9h 30min Medium Duty	~ 5h 15min Medium Duty	~ 8h 30min Medium Duty
Operating time	~ 3h 45min Higher Duty	~ 5h 45min Higher Duty	~ 3h 30min Higher Duty	~ 5h 15min Higher Duty	~ 8h 15min Higher Duty	~ 4h 30min Higher Duty	~ 7h 15min Higher Duty

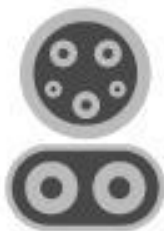
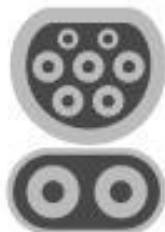
ECG180-330

Charging setup

- › Charging is done with CCS2 (EU) standard plug and protocol
- › Charger offering consist of 4 models of chargers (power 24-90-175 kW)
- › Charger with 1 or 2 charging guns (CCS2 connectors)
- › Touch-screen for easy operation
- › External heater and 400VAC grid interface (included as standard):
 - Heating batteries & cabin
 - Heating of hydraulic oil
 - Heating of transmission oil



Plug-in standards and regions (DC)

	North America	Japan	EU and other markets	China
Vehicle inlet				
Connector				
Standard	CCS1	CHAdeMO	CCS2	GB/T
Communication	PLC	CAN	PLC	CAN
3-phase voltage	480 / 600 V	200 V	400 / 415 V	380 V
Grid frequency	60 Hz	50 / 60 Hz	50 Hz	50 Hz

Charger options

CHARGER NAME	CHARGING CAPACITY (MAX)	CHARGING OPTIONS	GRID POWER (KVA)	CHARGING STANDARD (CCS1, CCS2, GB/T)	ELECTRICAL STANDARD (CE, UL)	CHARGING EQUIPMENT
Mobile 24 kW	24 kW	24 kW	29 (40 A)	CCS2	CE	Mobile charger 
Terra 94 90 kW	90 kW	90 kW	96	CCS1, CCS2	CE, UL	1 charging post incl. power modules 
Terra HP 175 175 kW	175 kW	175 kW	192	CCS1, CCS2	CE, UL	1 power cabinet 1 charging post 
Terra 184 180 kW	180 kW	2 * 90 kW or 1 * 180 kW	192	CCS1, CCS2	CE, UL	1 charging post incl. power modules and double guns 
Terra HP 350 350 kW	350 kW	2 * 175 kW or 1 * 350 kW	384	CCS1, CCS2	CE, UL	2 power cabinets 2 charging posts 
Terra HP 350 350 kW	350 kW	350 kW	384	CCS1, CCS2	CE, UL	2 power cabinets 1 charging post 

Charging time



From 80%
discharged
to fully
recharged

CHARGER SIZE	BATTERY SIZE		
	163 kWh	245 kWh	392 kWh
24 kW*	330 min*	490 min*	780 min*
90 kW	90 min	130 min	210 min
175 kW	45 min	70 min	110 min
180 kW	40 min	65 min	105 min
350 kW	NA (25 min)	40 min	60 min



Nominal Capacities, around
80% available to use

Equipment availability ECG180-330

3 prototypes
250-12 ans 330-12

2022

2023

2024



Prototypes (3x)

Field
test

Start of sales

Ramp up
production

First deliveries

Full commercialisation

Preliminary stages for Europe:

- › First wave of Customer Project: Q2 (may-june)
- › First wave of Customer Pricing: Q3 (aug-oct)
- › First wave of Customer Orders: Q4 (oct-dec)



SOS Wave 1 KAMOS

FIRST LAUNCH PLAN / WAVE

	2021	2022	2023
CCH - RST 450		North/Central Europe Sweden, Norway, Denmark*, Germany, Austria, Switzerland	
		West/South Europe Spain, Italy, France, The Netherlands, Portugal, Belgium & UK	
		Oceania	
			North America
TT - T2E+		North/Central Europe Sweden, Norway, Denmark*, Germany, Austria	
		West/South Europe Spain, Portugal, Italy, France, Belgium, Netherlands	
			North America USA, Canada
			Latin America Mexico * Pending Charger /Grid
FLT - ECG180-330		North/Central Europe Sweden, Norway, Denmark*, Germany & Austria	
		West/South Europe Spain, Italy, France, Belgium, Netherlands, UK	
			Oceania
			North America

Key points considered

- › Laws and regulations
- › Infrastructure
- › Environmental impact
(How is the energy produced)
- › Operational cost diesel vs electric
- › Maintenance & Service level
- › Sales experience for electrical products

Warranties



Base machine

Standard warranty

- › 1 year / 2000 hours

Optional warranty

Gold (complete machine)

- › On request

Silver (e-driveline)*

- › On request

Bronze (structural parts)

- › 3-10 years / 6.000-20.000 h



Batteries

5 years or:

- › 163 kWh/h: 652.640 kWh
- › 245 kWh/h: 978.960 kWh
- › 392 kWh/h: 704.892 kWh

Optional warranty

- › 1 year extra (6 years or kWh as above)
- › 2 years extra (7 years or kWh as above)
- › 3 years extra (8 years or kWh as above)
- › 4 years extra (9 years or kWh as above)
- › 5 years extra (10 years or kWh as above)



Chargers

Standard warranty

- › 2 years

Optional warranty

- › 1 year extra
- › 2 years extra
- › 3 years extra

See
example
on next
slide

Video KAMOS products

ECG250-12 / ERG450-65S5 / T2E+



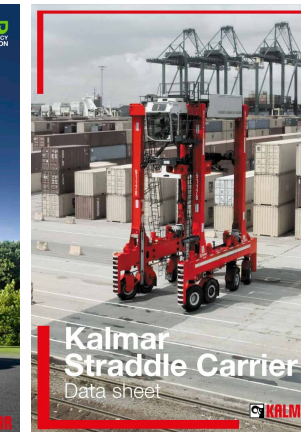
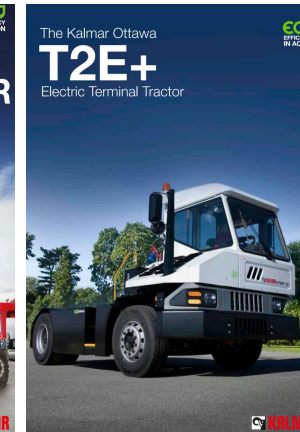
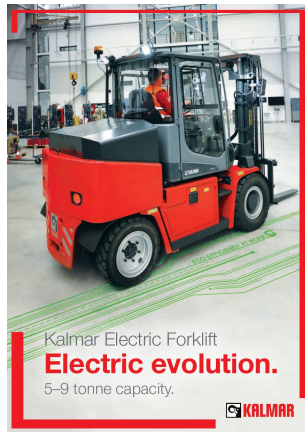


SLIDES Nedan är “ARKIV”

Kalmar Mobile Solutions

Product Portfolio 2022

(Diesel  and Electric )



LIGHT range	MEDIUM range	HEAVY range	E/FC-HANDLER	REACHSTACKER	TRACTOR range	STRADDLE range	SHUTTLE range:
• Cap 5-9 tons • No diesel • Electric 80V • Lead-acid + Lion • Since 1980 • >5.000 built	• Cap 9-18 tons • Diesel EU3 to 5 • Electric 120V • Lead-acid + Lion • Since 1950's • >20.000 built	• Cap 18-33 tons* • Cap 38-54 tons • Cap 60-85 tons • Diesel EU3 to 5 • Electric 700V* • Lion battery only • Since 1950's • >5.000 built	• Cap 7-11 tons* • Cap 40-41 tons • Diesel EU3 to 5 • Electric 120V* • Lead-acid + Lion • Since 1985 • >10.000 built	• Cap: 10-14 tons • Cap: 42-70 tons* • Cap: 45-130 tons • Diesel EU3 to 5 • Electric 700V* • Lion battery only • Since 1985 • >10.000 built	• GCW 20-100 tons • RWD / AWD • Diesel EU3 to 5 • Electric 700V* • Lion battery only • Since 1958 • >75.000 built	• Cap 40-60 tons • Diesel + Classic • Electric* + Hybrid* • Lion 700V (only)* • Since 1930 • >10.000 built	• Cap 35-50 tons • Electric* + Hybrid* • Lion 700V (only)* • Since 2014 • >500 built

Kalmar Electric Forklifts Customers

Share in Europe:

- Diesel **60-70%**
- Electric **30-40%**

Kalmar orders on Electric FLT's:

- **1980** sales start
- **75** countries
- **5.500** units

 Electric forklifts



 **ECO** EFFICIENCY
IN ACTION

Only Supplier of fully **SUSTAINABLE** Offerings

ZERO-Emission Electric Forklifts, Reachstackers, TT and SC:

- Energy source: ⇒ Lead-Acid Batteries (FLT only)
- Energy source: ⇒ Li-Ion Batteries (FLT + RST + TT + SC)

LOW-Emission Diesel Forklifts, Reachstackers, TT and SC:

- Diesel Regular: ⇒ EN590 / ASTM D975-2D (type ULSD)
- Diesel Synthetic: ⇒ EN15940 (HVO100 ⇒ minus 90% of CO₂)

Modern and efficient Transmissions:

- ZF / DANA: ⇒ Torque Converter, 3-to-5 speed + LockUp
- DRTS: ⇒ HVT (Hydraulic Variable Transmission)

Smart Controls for increased efficiency:

- Eco Drive Modes with reduced average engine / motor speeds
- Optimized performance and efficiency with smart controls



CO₂ emissions (per 1 liter diesel)



0.72kgs
Carbon

1.92kgs
Oxygen

2.64kgs
CO₂

DIESEL COMBUSTION PROCESS

Energy Consumption (diesel versus electric)

DIESEL



1.0 Liter

17.500 Liter



~3.0 kWh

BATTERY



2.5 - 3.5 kWh

~52.500 kWh

THE REAL COMPARISON

Examples:

DCG180-250
DCG280-330



ECG180-250
ECG280-330



Operation 1-shift

1.750 hours

Fuel consumption

10.0 lit/hour

Total fuel consumption

17.500 lit/year

Emission CO²

46.2 tons

Total electric power

52.500 kWh

Emission CO₂

0 tons

Operation 1-shift

1.750 hours

Fuel consumption

12.5 lit/hour

Total fuel consumption

21.900 lit/year

Emission CO²

57.8 tons

Total electric power

65.600 kWh

Emission CO₂

0 tons

Kalmar Heavy Electric Forklifts

18 - 33 tons



Model designation key

Description:

Diesel or Electric

Counter **b**alance

Generation (F, G, T)

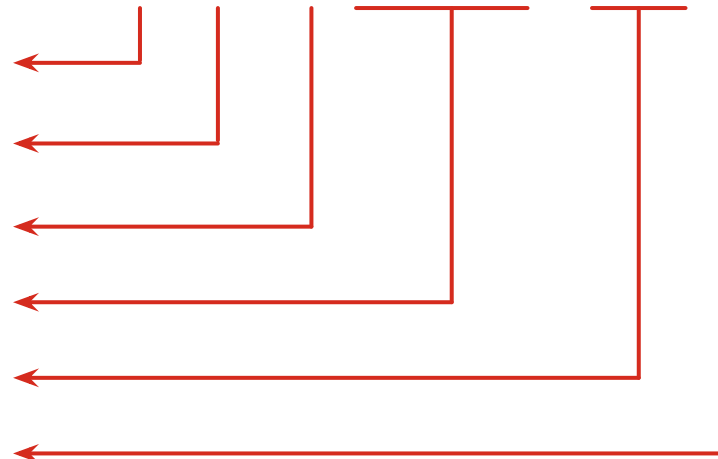
Capacity (in kN)

Load Center (in dm)

Special model identifier:

› S = Short wheelbase

ECG330-12S



Our electric PORTFOLIO

Kalmar offers an extensive range of electrically powered forklift trucks with lifting capacities from 5-33 tonnes, three different lifting masts and a wide range of specialist attachments: making our electrically powered forklift trucks suitable for a wide variety of material handling tasks.

Additional Energy Storage

You can use additional energy storage units to capture excess power that you may have produced to use at a later time when required instead of buying from the grid.

Power Cabinets

Power cabinets manage the required electricity flow from the grid to your charging points. Power cabinets are modular and the number required is dependent on the number of charging points required.



Reachstackers

Kalmar offers a choice of electrically powered reachstackers with a wide range of lifting applications, battery solutions and 42 to 45 tonne lifting capacities.



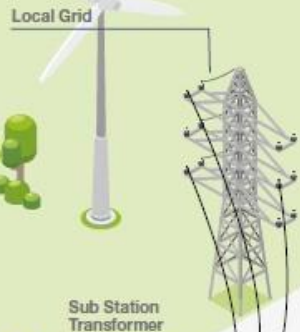
Empty Container Handler

Kalmar is currently developing a range of electrically powered empty container handlers that can run up to 17 hours on a single charge, which will be able to lift 8-11 tonnes up to 2 containers at a time and stack them up to 8+1 containers high.



Terminal Tractors

Kalmar's T2E+ electrically powered terminal tractor has been designed specifically for distribution centres and container terminals. There is a choice of different battery solutions designed to meet your operational requirements.



Local Grid

Sub Station Transformer

Site Power Grid



Heavy Li-ion Electric Forklift



Charging Post

Battery and Charging Monitoring

Real-time status on battery capacity and health along with charging usage and timing allows for optimised operational planning and usage.

Kalmar Insight

Kalmar Insight gives you the ability to monitor your fleet's operational status in real time no matter what type of your equipment you operate.

Charging Room

Separate ventilated space for the safe and efficient charging of Lead Acid batteries.

Light Li-ion Electric Forklift



Medium Lead Acid Electric Forklift

Medium Li-ion Electric Forklift



Medium Lead Acid Electric Forklift



Charging Post

We offer several different charging solutions. They can come with one or two charging guns and we have a small mobile unit that can be used to quickly charge your equipment if it isn't near a charging point and has run out of charge.

**REMA-charge
(80V / 120V)**

**CCS-charge
(670V)**



Chargers technology - HEAVY range

Li-Ion (LI) with High Voltage 670V:

- Heavy range forklifts 18 - 25 / 28 - 33 tons.
- Energy capacity 163 - 245 - 392 kWh.
- Li-Ion (high volt) has been in use since 2020-.
- New solutions with higher price levels.
- Typical charger capacities **75-180-350 kW**.
- Charging gun: **CCS-1 or CCS2 (1x)**.
- Connection: 400V / 50-60Hz / 3-Phase (NE).
- MP: 100A - 500A (75 - 350 kW)
- Outlet: for above



Based on High Voltage Directive (>200V)