

ECO EFFICIENCY IN ACTION

The Kalmar

ELECTRIC MEDIUM FORKLIFT

ECG90-180
Lead Acid and Lithium-ion.

KALMAR

The time is **NOW** to go electric

Kalmar's electrically powered 20,000-40,000 lbs capacity forklift trucks will help improve the eco-efficiency of your operations while maintaining the highest levels of productivity and safety. With a choice of either Lead Acid or Lithium-ion batteries and different charging solutions, we can work with you to design a solution that will deliver for your business.

Eco-efficiency built in.

Being electrically powered, your forklift truck will produce zero carbon emission at source, making them cleaner and safer to operate. You can cut your carbon emissions even further by using green energy sources where available or start to generate and use your own power. Getting an electrically powered forklift is only the start of our eco-efficient journey. One that we will be with you every step of the way.

Productive by nature.

With an electric powered driveline your drivers will notice a big difference with faster and smoother acceleration and more responsive handling while still being able to lift up to 40,000 lbs efficiently and safely. Less time will be spent servicing and maintaining the electric powertrain since it has less moving and mechanical parts, plus you will be able to keep it running optimally within a broad range of temperatures, with Kalmar's Thermal Management System fitted to the Li-ion battery version as standard.

Safety in focus.

Kalmar's range of electrically powered 20,000-40,000 lbs capacity forklift trucks offer highly responsive handling and superior visibility from the cabin, helping to keep your driver safe and in control at all times. Your drivers and co-workers will also benefit from the reduced noise and vibrations with a smooth and quiet electric powertrain. There are also a large range of safety options available that can further enhance the safety of your equipment and the drivers operating them.

BE SAFE

A full range of electrically powered forklift trucks.

Kalmar offers an extensive range of electrically powered forklift trucks with a choice of two different battery technologies, lifting capacities up to 72,000 lbs, different masts and numerous attachments we can work with you to design a solutions that delivers against your exact requirements.

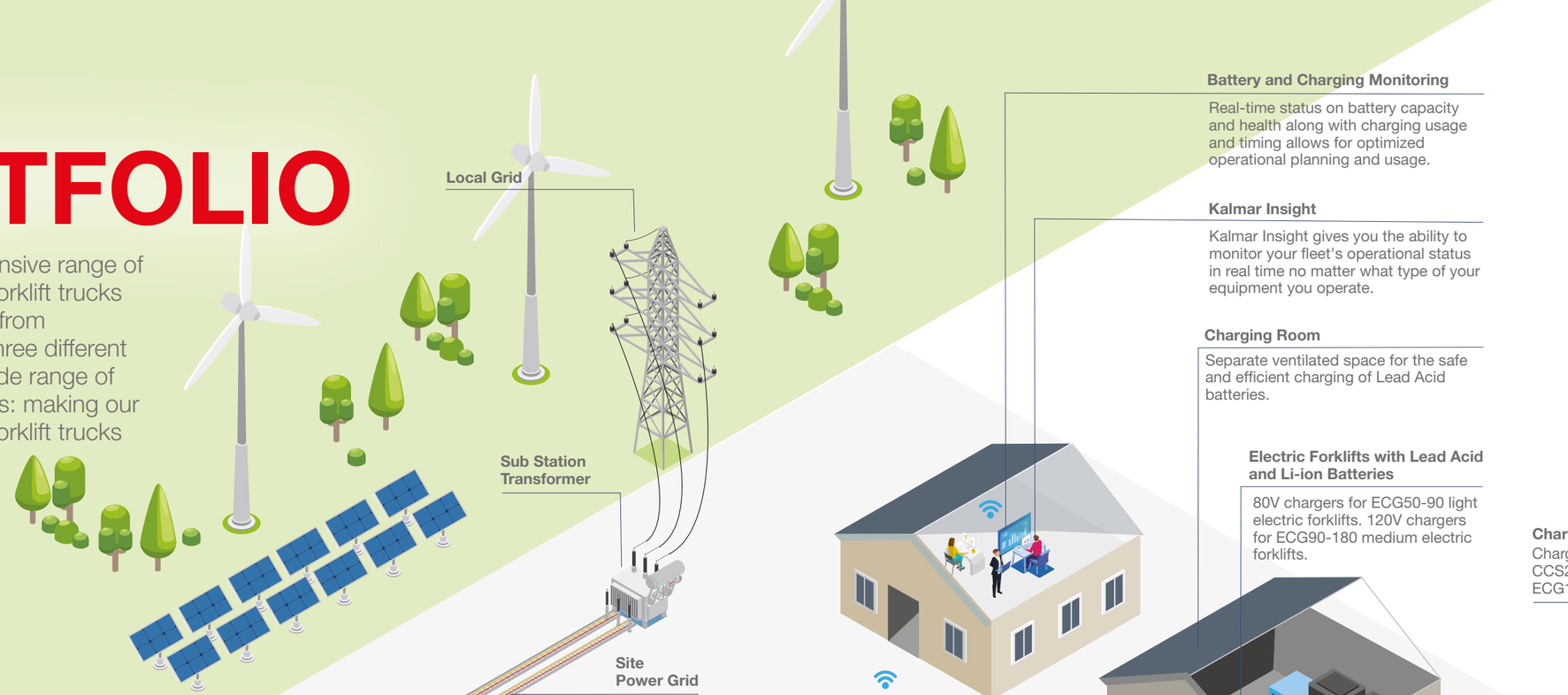


ECG120-6 Li-ion, with 26,000 lbs lift capacity at 24" load center and 173 kWh battery energy.

Our electric

PORTFOLIO

Kalmar offers an extensive range of electrically powered forklift trucks with lifting capacities from 11,000-72,000 lbs, 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.

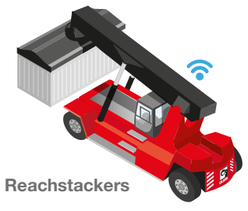


Additional Energy Storage

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.



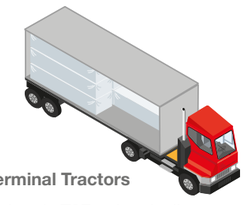
Reachstackers

Kalmar offers a choice of electrically powered reachstackers with a wide range of lifting applications, battery solutions and 92,000 to 99,000 lbs 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 17,500 to 24,000 lbs 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 centers and container terminals. There is a choice of different battery solutions designed to meet your operational requirements.

GOOD for business

Reducing your emission shouldn't come at a cost, it should be beneficial to both the environment and your bottom line.

Kalmar's electric forklift trucks deliver on both accounts. They are just as powerful and efficient as diesel models without producing any harmful carbon emissions. In fact, they produce zero emissions at source, which will help you substantially cut your fuel bills, while improving your environment credentials.

It pays to go electric.
With our electrically powered forklift trucks, you will benefit from reduced fuel costs, spend up to 50% less on servicing - as electric machines have less moving parts - and longer service intervals, both helping to maximise machine availability. Even though electric forklift trucks cost a little more than diesel models, the payback period can be as little as two years. After this time, the savings really start to add up.

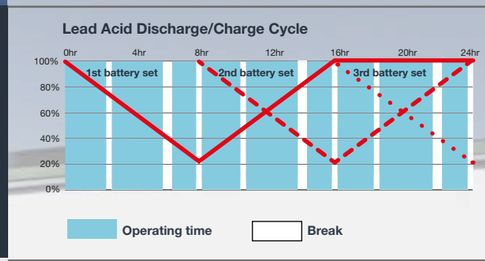
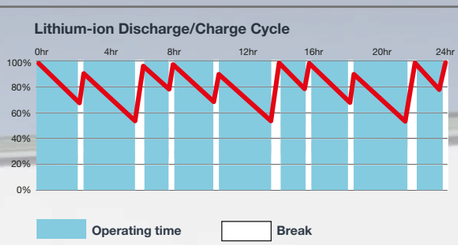
Eco-efficiency at work.
Reducing the fuel consumption of your equipment also reduces your emissions, which will enhance your environmental reputation and help you meet current and future emissionsstandards. Together we can shape the future of cargo handling, with safe and eco-efficient solutions that improve your every move.

ECO EFFICIENCY IN ACTION

ECG160-12 Lead-Acid, with 36,000 lbs lift capacity at 48" load center and 260 kWh battery energy.

GREAT for the environment

What type of battery solution is right for you?
Kalmar offers two types of battery technology to power its forklifts, Lead Acid and Lithium-ion. Here is a chart that demonstrates the difference between the two battery types so you can decide which is the right solution for your operations. The Lead-Acid battery can be charged directly in a safe location without removal, or it may be removed after a shift and fully charged before being refitted onto the forklift. The Li-ion battery can be continuously recharged during operational downtime or statutory break.

	Lead-Acid	Lithium-ion
CHARGING PATTERN		
FEATURES	• Cell lifespan up to **1,400** cycles (1 cycle = 80% of nominal capacity) • Battery efficiency ~**70%** • Maintenance required: regular water topping and cleaning • Requires ventilated charging space • 2 or 3 shift operation possible with battery exchange. One battery set per shift.	• Cell lifespan up to **4,000** cycles (1 cycle = 80% of nominal capacity) • Battery efficiency ~**95%** • Maintenance required: No regular maintenance • No special requirements for charging space • Requires time slots for opportunity charging defined by discharging:charging ratio.
YOUR OPERATIONS	**What is your operational cycle?** 8hrs (6-12hrs) **Are you operating more than one shift?** **Charging time** 7 - 8 hours **Cooling time** 7 - 8 hours	**What is your operational cycle?** 8hrs (4-8hrs) **Are you operating more than one shift?** **Charging time** ~2 hours

Based on full charge 80%



The POWER is in your hands



ECG160-12 Lead-Acid, with 35,000 lbs lift capacity at 48" load centre and 330 kWh battery energy.

Productive in extreme weather conditions.

Our electrically powered Lithium-ion forklift trucks all come fitted with a Thermal Management System, which allows your equipment to run optimally even in extreme weather temperatures. The system keeps your core battery temperature between 77-86°F for optimal performance even when the temperature outside gets down to -22°F or up to 104°F.

THERMAL MANAGEMENT SYSTEM

External temperature	-22°F – 104°F
Battery core temperature	77-86°F

Eco-efficient by nature.

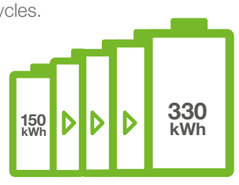
By combining four highly efficient AC-motors [2 for the traction drive and two for the hydraulic pumps] all with direct drive, removing the transmission you get a powertrain combination that will deliver on power and productivity while producing zero carbon emissions at source.

This electrically powered solution has been designed to offer a sustainable and highly efficient forklift range, with great performance, high productivity and is safe and smooth to operate with minimized energy losses - giving you more running hours on each charge. Regenerative power from the braking system returns power to the batteries, further enhancing the overall efficiency of the system. You just need to choose the optimal battery solution for your operation; Lead Acid or Lithium-ion.

Lead Acid.

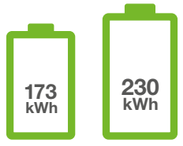
Kalmar's Lead Acid batteries come fully self-contained and can be charged in situ or removed from your forklift and charged in a ventilated charging space. Recharging your Lead Acid batteries normally takes place over night, if you need to run continuous shifts then you will need to have one set of batteries fitted to your forklift, while the second set charges. Three battery sets would be required for continuous operations across multiple shifts. Lead Acid batteries cannot be opportunity charged during your work cycles.

If you choose a Lead Acid battery solution to power your forklift you have the flexibility to upgrade this to a Lithium-ion solution in the future if required.



Lithium-ion.

There are two different Lithium-ion batteries to choose from which can be quickly opportunity charged during operational hours or fully charged overnight.



OPERATIONAL HOURS

DRIVE CYCLE	173 kWh WB 110"/118"	173 kWh WB 128"/138"	230 kWh WB 128"	230 kWh WB 138"
Light	7.7	6.9	10.2	9.2
Medium	6.0	5.5	8.0	7.4
Heavy	4.9	4.6	6.5	6.1

Modular by design.

Batteries and chargers are a big part of your overall investment making it critical that you get a solution that is matched to your operational requirements, which is why Kalmar has taken a modular approach to our Lead Acid and Lithium-ion battery and charging solutions.

There are a number of different charging options available for you to choose from.

Lead Acid solution:
- charging power from 2 x 13kW up to 2 x 28kW
- full charging time 5-10 hours / cooling time 4-8 hours.

Lithium-ion solution:
- charging power up to 1 x 86kW (4 x 21.5kW chargers)
- full charging time 1.5-2 hours {no cooling needed}.

Kalmar can help you work out which battery option and charging solution is right for your business based on your current work cycles.



Managing your power.

With our Lead Acid solution, the Battery Monitoring Unit [BMU] is mounted within the battery cell and is connected to the battery, charger and cloud. This enables the BMU to monitor the current, voltage, water level, temperature and balance between cells.

For the Lithium-ion solution, the Battery Management System [BMS] is mounted within each battery cell, connecting the battery, charger and Kalamr cloud. This enables the BMS to manage battery charging and all other important parameters.

Data from the BMS is displayed in Kalmar Insight* allowing you to secure optimal battery use to ensure warranty conditions are met and the longest possible lifetime of the battery can be obtained.

* Kalmar Insight access is through a separate subscription agreement.

EFFICIENT
and productive

Buying an electric forklift doesn't mean compromising on power, as electric powertrains provide full torque immediately and are smoother to operate. Making operating cycles shorter, driving up your operational productivity. With extended servicing cycles and improved diagnostic tools your machine will benefit from higher availability rates than the diesel alternatives.

A simpler design.
Electric forklifts have less moving parts than diesel models. Without the need to change the starter motor, turbo or fuel filters, servicing and maintenance on the powertrain will take less time and cost up to 50% less. As less parts are required, your parts replacement costs and stock levels will also be substantially reduced.

All Kalmar electric forklifts have individual settings for acceleration (1-10) and brake retardation (1-10), both easily adjustable from the control panel.

Reduce energy usage by up to 20%.
Kalmar ECO Drive allows you to optimize your truck's performance with three different modes:

Power Mode:	when high performance is required. With full motor power, you will be able to move quickly about, lift and lower at full speed, without compromising on safety.	
Normal Mode:	when you need a balance between energy usage and productivity. You can expect slightly lower acceleration and speeds.	**Save up to 15%**
Economy mode:	when you need the most efficient energy usage. With reduced acceleration and speeds - your batteries will run for longer.	**Save up to 20%**



DESIGNED
for the driver



Ergonomically designed.
Kalmar Electric Forklifts come fitted with our ergonomically designed EGO cabin. With slim line a-pillars, adjustable seating, steering wheel and control panel, your drivers will benefit from a superior operating environment and visibility.

A healthier work environment.
Electric forklifts are safer to use both indoors and outdoors than traditionally powered forklifts as they:

- Less vibrations make handling sensitive goods safer and reduce stress and strain on your operator's body.
- Electric forklifts are extremely quiet, making working indoors less disruptive for both operators and by-standers.
- As electric forklifts produce no exhaust fumes they are safe to operate inside and where other staff are working or sensitive goods are stored.

Easy to operate.
Our electrically powered forklift trucks give you a wide choice of joysticks or lifting levers, an electronically adjustable work console and side tilting steering wheel. All designed to make operating your reachstacker easier and more efficient to operate.

More comfortable.
With a choice of comfortable driver seats, an ergonomic pedal system and powerful Electronic Climate Control system with smarter controls your operator will benefit from improved ventilation heating and cooling, plus a cabin with superior comfort and lowest noise level inside and outside.

Extra smart.
Our intuitive user interface combines visibility, sound and touch to create a perfectly balanced operating environment with an intelligent color display at its heart. Advanced diagnostics, battery status overview and smart settings allow improved operational control and optimal opportunity charging planning.







OPTIONS

BE SAFE

Kalmar has a range of options that make operating your equipment even safer:

Alcolock. To ensure that your driver is at their best when operating your equipment you can install an Alcolock system. This system makes sure that the driver meets alcohol blood level standards before being able to start the machine, much like a breathalyzer.

Reverse Beeper/Alarm System. When your staff are working side by side with moving vehicles there is always a safety risk. Installing a reverse beeper/alarm system provides a clear acoustic alert when the machine is reversing so personnel can make sure that they are out of harm's way at all times.

Additional lighting. Extra lighting, particularly if you operate your machine at night can bring greater operational visibility and safety for personnel working on the site. You can choose additional LED working lamps on specific positions.

Reverse Warning System. Knowing what's going on behind you is critical when other personnel are present. Rear sensors and a reversing camera relay real-time information to an in-cabin display, alerting the driver to potential dangers, increasing personnel and driver safety. You can also add additional cameras e.g. on the front of the machine, on the mast, carriage or forks.

Fire Suppression System. To protect your operator and machine from fire you can fit a Fire Suppression System to your machine. The system utilizes multiple spray nozzles that release a high pressure fire suppression agent from a re-chargeable tank. This can be activated manually via a switch in the cab or a switch on the frame, or automatically through system fire detection.

EFFICIENCY IN ACTION

Kalmar has a range of solutions that will help make your equipment more eco-efficient and sustainable:

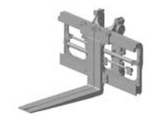
Tire Pressure Monitoring System. Helps to reduce wear and tear on tires which results in reduced fuel consumption. Bluetooth sensors keep the driver advised of the condition of the tires continually. Active care of your tires can result in a 10-40% increase in tire life.

What do you need to LIFT?

Choose between a wide range of lifting masts, carriages, forks and attachments. We offer complete solutions whereby we assemble the attachment in the factory and integrate it with the forklift's other functions.



Carriage sideshift / fork positioning



Carriage with kissing forks for steel handling



Fork shaft system (Hook on type or roller type)



Coil ram in various dimensions (Hook on or integral)

Forestry.
With our medium electric forklift you will be able to handle most loads indoors or out, including lumber packages, pulp, paper, board and waste. Moving raw materials off trucks or train cars, to moving wood around during the milling process or lifting and moving final goods ready for dispatch.



Concrete, Energy and Heavy Industry.
Flat, round or bulky pre-cast concrete, bricks and other heavy loads for the wind, oil, gas and biomass sectors will be handled with ease.



Metal Industry.
Our medium electric forklift truck can lift steel slabs, plates, coils and pipes up to 40,000 lbs in weight, which is made even easier and safer when you have a magnet, a clamp or coil ram fitted to the lifting equipment.



Logistics and Stevedoring.
Whether you're moving sensitive goods like fresh fruit and vegetables, pallets filled with goods ready for dispatch or moving containers this electric forklift can handle your loads efficiently and safely both indoors and out as it produces no carbon emissions.



SUPPORT

when and where you need it

Our job doesn't stop once we deliver your new Kalmar forklift. We can also offer a range of support services that help keep your new equipment running at its optimal best. With a global network of over 1500 service and support staff, in more than 100 countries we will always have someone nearby to give you the support you need.

Support through extensive network of independednt authorized dealers.



Financing options.

You may choose to buy your new forklift outright or consider leasing or renting your equipment. Kalmar offers a range of leasing and renting options that can give you the financial predictability you need and the option to upgrade your equipment after a fixed period. With our leasing packages you can focus on your core operations, while we perform all your service and maintenance needs required by your fleet. You just need to choose which leasing package and level of service and maintenance support is right for your business.



When the right part matters.

When something needs to be replaced you need a spare part that meets your exact needs – urgently. Kalmar offers a rapid delivery service for over 50,000 premium quality genuine parts through our network of independent authorized dealers, with installation support if needed.



Kalmar Insight. Turning data into actionable, impactful insights.

Kalmar Insight* is a performance management tool for cargo handling, which gives you an easy to use overview of your fleet operations, by aggregating data from multiple sources, including equipment built by other manufacturers. This information is then accessed through an easy to use interface that is available on mobile, tablet or more traditional screens.

You can review your entire fleet activities, schedule maintenance and order the required parts automatically. All enabling you to take action on real-time information, that will help improve your overall operations immediately. Kalmar Insight comes fitted and ready to be activated in all new Kalmar equipment, and can be retrofitted into existing Kalmar equipment or those built by other manufacturers.

*Installation costs and/or an annual subscription fee may apply.

STANDARD

Norms Standards and Regulations
- Machinery Directive 2006/42/EC
- Safety Industrial Trucks ISO 3691-1 & EN 16307-1
- Safety Low & High Lift Trucks ANSI/ITSDF B56.1
- Low Voltage Directive 2014/35/EU
- ANSI/ITSDF-marking for North America trucks

Chassis
- Strong, durable and welded C-profile heavy-duty chassis
- Powerful front end unit for drive axle and lift mast fixations
- Solid tilt cylinder fixations in chassis and mast
- Full access to the entire powertrain with tilting cabin
- Easy access to battery, TMS and power distribution
- Very good visibility in forward, up, sideways and rearwards
- Lifting eyes and anchor points (front & rear)
- Tow pin through rear counterweight (long handle)

Body
- Strong and protective steel fenders (front / rear)
- Long bottom running board between the fenders (anti-slip)
- Short access steps (2x) up to the cabin (anti-slip)
- Big rear view mirrors on front fenders (2x)
- Welded light brackets on front fenders (2x)
- Basic noise insulation kit

Steer Axle (Rear)
- Kalmar steer axle mounted dual pivot bearings
- Steer axle with mechanical side stops
- Power steering with double acting cylinder
- Steer axle with narrow turning radius
- Steer links of “dog-bone type” (easy to change)
- Steer angle sensors for reduced speeds while turning

Drive Axle (Front)
- Kessler D81 dual-input drive axle with hub reductions
- Motor drive, steer angle sensors for electronic differential
- Maintenance-free oil-cooled Wet Disc Brakes (WDB)
- Dual parking brake, spring loaded & hydraulic release
- High pressure filter (10 µm) for the brakes

Wheels (Tires and Rims)
- ECG90-160: diagonal tire 12.00x20” / rim 8.50x20”
- ECG180-180S: radial tire 12.00R20” / rim 8.50x20”

Powertrain
- Schabmüller electric asynchronous AC-motors (3-phase)
- Dual drive motors (2 x 49.6 hp) with electric fan cooling
- Dual pump motors (2 x 67 hp) with electric fan cooling
- Single brake pump motor (1 x 3.3 hp)
- Re-generative brakes system / energy back to battery
- Electric cooling fans for drive / pump motors & inverters
- Electric motors are protected inside the chassis

Power Electrics (120V)
- Electric system voltage 120V
- Dual power cables with REMA-640 power connectors (2x)
- Charging standards REMA-640 charging plugs (2x)
- Electric cabinet with main controllers mounted on chassis left side

Battery (Lead Acid)
- Lead-Acid batteries (2x), with dual rear mounted boxes
- Robust, simple and proven technology, 1200-1400 cycles
- Ventilated charging, maintenance needed, efficiency 70-80%
- Automatic central water topping system for battery cells
- Battery Monitoring Unit (BMU) for safe charging
- Charging power: 13-28 kW per unit (2 chargers)

Battery (Lithium-ion)
- Lithium-ion integral battery unit, with TMS/BMS
- High capacity NMC-technology, 4000-5000 cycles
- Maintenance-free battery, need equalization-charging with efficiency 90-95%
- Battery capacity: 173 kWh (1500 Ah) / 3-pack
- Battery with passive and active cooling and heating (TMS)
- Battery Management System (BMS) with CanBus
- Charging power: up to 86 kW per unit (4 chargers)
- High-power Lithium-ion chargers with CanBus

Thermal Management System (Lithium-ion)
- Battery Management System (BMS) with CanBus
- Smart controls of cooling and heating units
- TMS with passive-active battery cooling & heating
- Cooling unit with coolant tank, pump and cooler
- Heating unit mounted on the battery cells
- Power limitation functions to optimize consumption
- Limp home function at low SOC (speed 5mph)

Load Sensing Hydraulics
- Parker load-sensing piston pumps (2x)
- Power-on-demand function with high lifting speeds
- Pumps for mast, tilt, fork carriage, brakes & steering
- Fixed pump for brake oil pressure / accumulator (1x)
- Pressure filter for hydraulics / brakes (2x/10 µm)
- Power steering, power brakes and ORFS-couplings
- Hydraulic tank (58gal), breath filter and level glass
- Main control valve, steering valve and accumulator
- Mast tilt angles: 14° fwd / 10° bwd

Lifting Mast
- Large selection of mast types and lifting heights.
- Duplex Standard: 2-stage mast, with free-visibility
- Strong, durable mast design (pair of cylinders/chains)
- Heavy-duty mast profiles and strong cross members
- Mast with strong mast wheels, bearings & guide pads
- Large shafts-bearing for mast, strong tilt fixation

Fork Carriage
- Large selection of fork carriages, types and optionals
- Carriage with strong wheels, bearings & guide pads
- Width: 98”

Forks
- Large selection of fork dimensions, tapering and designs
- Cross sections: 7.9” x 2.8” up to 9.8” x 3.9”

Electrical System (24V)
- 120V to 24V converter and main power switch
- Electric cabinet, mounted behind driver
- 2 LED working lights on front fenders (main beam)
- 2 LED working lights on mast (first cross member)
- 2 LED working lights on rear counterweight
- 4 turn signal lights (front / rear)
- 2 tail / 2 brake LED-lights rear in counterweight
- The tail / brake lights flash when reversing
- Reverse camera (wide angle/IR night light), color monitor of 7” size (right side mounted), full HD resolution (1920x1080p)

Cabin EGO
Structure
- Spacious, modern cabin with great ergonomics
- Strong profiles, pillars and cross members
- FOPS certified drivers cabin (Falling Object Protective Structure)
- Tiltable cabin with full access to powertrain & hydraulics
- Large window sections with great visibility in all directions
- Large access doors with air-damper & key-lock
- Doors: sliding windows + access handles

Comfort
- Driver’s seat, mechanical spring suspension
- Comfort seat, adjustable, sensor & 2-point belt
- Electric adjustable work console (up-down/fwd-rev)
- Work console: lift levers, controls, lamp buttons etc
- Inside rear view mirror (right side)
- Interior lights with fade away function
- Fully adjustable steering wheel with tilt function
- Power steering wheel with steer knob
- LED background light for buttons & switches

Controls
- Electric levers / joystick for mast, tilt & forks
- Auto rev-up pump motor RPM at lifting / tilting / fork position
- Electric accelerator pedal (hanging)
- Double brake pedals (left and right)
- Lever for electronic parking brake (on/off)
- Safety override for hydraulic functions (by code)
- Multi-function lever on left steer column (parking brake/travel direction switch)
- Combined horn and turn signal lever
- Warning - parking brake (on/off) leaving seat

Climate
- ECHV, electronic controlled heating & ventilation
- Powerful cab heater, power 6.0 kW (20,500 Btu)
- High-capacity ventilation unit - max air flow 284 cfm
- Multiple individual vents (8x upwards / 2x downwards)
- Fresh air and recirculation filter (replaceable)
- Double wipers / washers on front window (larger area)
- Single wipers / washers on roof and rear windows
- Intermittent wiper functions on front, roof and rear windows

Information Systems
- Kalmar CanBus controls with 4.3” monitor
- Menu controller with scroll wheel & push buttons
- Programmable settings and full monitoring of all main systems

Accelerator / Brake Settings:
- Programmable accelerator in 10 steps (1-10)
- Acceleration: from soft to fast (low to high energy)
- Programmable brake re-generation in 10 steps (1-10)
- Brake regeneration: feed energy back to the battery

Operator menu:
- System voltage
- Travelling speed (km/h or mph)
- Combined hydraulic and brake oil temperature
- Clock and date
- Operating time (hour meter)
- Service time indicator (hours)
- Status of heating system & AC system
- Estimated time before empty battery (hour/min)
- Service indicator
- Trip computer / statistics

Various warning lights & signals:
- Battery discharge indicator (BDI)
- Safety system disconnected
- Fault indicator
- Low brake oil pressure
- Low coolant level battery (Li-ion)
- Low coolant level electrical components (Li-ion)
- High coolant temp battery (Li-ion)
- High coolant temp electric components Li-ion)
- Low power battery volt level
- Low/high battery cell temperature (Li-ion)
- Low/high battery cell volt level unbalanced power battery (Li-ion)
- Hydraulic and brake oil temperature
- Low washer fluid level

Color
- Chassis, tanks & fenders: Red RAL 3000
- Mast, carriages, forks and axles: Black RAL 7021
- Cabin: Iron-Grey RAL 7011
- Rims: Iron-Grey RAL 7011

Documentation & Decals
- Load chart diagram inside cabin
- Machine data plate on chassis (left side) including load chart
- Warning, tire pressure & oil pressure labels
- Lift lever / joystick and function labels in cabin
- Fuse diagram
- Instruction manual
- Maintenance manual
- Spare parts catalog

Warranty
- Kalmar standard warranty: 12 months / 2,000 hours

OPTIONS

Chassis/Body
- Models with standard and short wheelbases
- Wheelbase 148” with 298-330 kWh (lead acid)
- Anti-slip strips: fenders, tanks & lamp brackets
- Extra mud flaps (front and rear)
- Steel grid light protections: fender, mast & rear
- Stacking box for wood dunnage boards (left side or rear)
- Additional stacking box for wood dunnage (left side or rear)

Wheels (Tires and Rims)
- Spare wheels, tires and rims of various brands
- Diagonal and radial tires of well known brands
- Radials: Continental RT20 and Michelin XZM
- Super-elastic (CSE): Solideal CSE
- Other brands upon request

Battery (Lead Acid)
- Capacity: 149 - 330 kWh per set (1240 - 2752 Ah)
- 1-shift: 1 battery set (2 batteries + 2 chargers)
- 2-shift: 2 battery set (4 batteries + 2-4 chargers)
- 3-shift: 3 battery set (6 batteries + 2-4 chargers)
- Quick-change battery fork pockets on battery tray
- Battery combinations depending on energy consumption

Battery (Lithium-ion)
- Capacity: 230 kWh only on wheelbase 128”-138”
- High-power Lithium-ion chargers with CanBus

Hydraulics
- Extra hydraulic function including hoses (per function)
- Push-button hydraulic function via magnet valve
- Quick release couplings “aerogrip” 1/2” (per function)
- Individual fork positioning including 5th hydraulic function
- Hydraulic accumulator for lifting function
- Hydraulic accumulator for lifting function “auto on/off”
- Hydraulic oil cooler unit
- Functions for attachments (paper, steel, precast)

Lifting Mast
- Duplex Standard (LFL): lift heights 118”-276”
- Duplex Freelift (FFL): lift heights 118”-276”
- Triplex Freelift (FFL): lift heights 177”-276”
- Duplex Heavy-Duty (LFL): lift heights 157”-236”
- Other lift heights / lowered heights upon request

Fork Carriage
- Fixed carriage: manual moving forks (width 98”)
- Sideshift carriage: manual moving forks (width 98”)
- Sideshift/fork positioning: (98” / 116” / 136”)
- Sideshift/fork position: pin-type (width 98”)
- Sideshift/fork position + center levelling: (width 98”)
- Attachments: carriage sides, chain brackets & hoses
- Attachment of various brands for factory integration

Forks
- See fork dimensions under Specifications
- Length: 48” up to 96” in steps (special)
- Width: 7.9” / 8.7” / 9.8”
- Thickness: 2.8” / 3.5” / 3.9”
- Fork mountings: roller-type or pin-type
- Tapering: standard 0-24” full thickness / 24”-tip with taper
- Tapering: various optional tapering / short or full taper
- Fork Shaft System: hook-on type / forks, coil ram or attachment
- Fork Shaft System: pin-type / forks, coil ram or attachment
- Kissing forks with chamfer inside/outside (integral roller-type)
- Kissing forks with chamfer inside/outside (FSS hook-on type)
- Hydraulic levelling fork (up/down) on left fork and/or right fork

Electrical System (24V)
- Tuner FM-AM, RDS, MP3, USB, Bluetooth, Stream
- Tuner FM-AM, RDS, MP3, USB, Bluetooth, Stream / DAB
- Power sockets: 2x24V and 2x12V (in door columns)
- Power sockets: 2x24V / 1x12V / 2xUSB 5V
- Electric air pressure horn
- Reverse alarm (beeping or white noise - multi frequency)
- Protection against chain slack (electronics)
- Mast with automatic vertical function (auto-tilt)

Lamps
- 2 extra LED working lights - in mast (fwd)
- 2 extra LED working lights - rear on cabin (fwd)
- 4 extra LED working lights - rear on cabin (mix)
- 6 extra LED working lights - rear on cabin (mix)
- 2 extra LED working lights - front on cabin roof
- 1 extra LED working lights - between tilt cylinder
- 1 LED rotating warning beacon (on adjustable pole, left side)
- Blue safety light, rearward (when reversing) or forward
- Red safety light, rearward (when reversing) or forward
- Red safety zone light, left and right direction
- Rotating beacon LED, activated via reverse gear

Safety functions
- Overload indication for lift/tilt with speed restriction
- Speed limitation: default 9 mph (set by technician)
- Speed limitation at specified load (set by technician)
- Speed limitation at specified lift height (set by technician)
- Speed restriction set by customer in display: default 9 mph
- Tire pressure monitoring system (TPMS / Bluetooth)
- Alcolock Draeger in cabin

Cabin EGO
Structure
- Globetrotter cabin +7.8” higher, roof window 0.5” thick (replaces 0.25”)
- Elevated cabin 11.8”
- Rotatable Driver Seat, electric 180 deg (to the left)
- Turnable Driver Seat, manual 55 deg (to the right)
- Steel grid protection for front window
- Steel grid protection for roof window
- Door opening holder (left side and / or right side)
- Flat front window with steel profiles, tinted and laminated, with roof window 0.5” thick (replaces 0.25”)
- Electric cabin tilt pump (up/down)
- Electric heated mirrors, front fender/standard pos
- External cabin reverse mirrors (2x)
- External cabin reverse mirrors (2x) electrically heated and adjustable
- Electric heated and adjustable mirrors (2x), front fenders

Comfort
- Air cushioned driver seat with horizontal suspension
- Extended seat backrest
- Headrest for driver’s seat
- Armrest adjustable left side
- Seat heating
- Seat cover in vinyl
- Leather reinforced seat, high backrest, 3-point belt and heating
- Grammer Actimo XL, air cushion, heating, high back, 2-point belt
- BE-GE 3700, air cushion, heating, high back, 2-point belt, leather reinforced seat
- Isringhausen 6830KA/880, air cushion, heating, high back, 2-point belt
- Extra trainer seat with 2-point belt
- Bracket for terminal and monitor (RHS)

Controls
- Travel direction switch on 1st lift lever (F-N-R)
- Electronic joystick (EGO)
- Electronic lever steering (without feedback)
- Electronic mini-wheel steering
- Search light maneuverable via remote control

Climate
- ECC, electronic heating, cooling (AC) & ventilation
- Strong AC cooling unit, power 14.0 kW (47.700 Btu)
- Tinted windows including laminated front window
- Sun visors front, roof and rear windows

Additional Equipment
- Enhanced Safety Package
  - Speed limitation default 9 mph (set by technician)
  - Blue safety light backwards via reverse direction
  - Seat belt interlock (active before driving - seatbelt on)
- Semi-automatic fire suppression system (DAFO Forrex)
- Tool kit
- Central greasing system (14-18-24 grease points)
- Tilt indicator of mechanical type
- Tilt indicator of electronic type (in display)
- Electronic weight indicator in main display
- Heat protection kit (with hoses)
- Heat protection mechanical kit
- Wheelnut protection
- Additional equipment for roadtraffic (LGF-sign)

Camera safety
- Modular full HD solutions (1920x1080p)
- Extra front mast camera - to cab monitor
- Extra front carriage camera - to cab monitor
- Radar warning sensors rear (2x) to cab monitor
- Monitor 7in Quad, max 4 connections (repl Dual)
- Monitor 10in Quad, max 4 connections (repl Dual)
- DVR recorder, up to 4 channels, with SD-card (128 GB)

Eco Drive Modes (EDM)
- Performance mode settings: Power - Normal - Eco
- With EDM you can optimize productivity, performance and operational time

Information Systems
- VDI - Vehicle Data Interface

Fleet Management (Kalmar Insight)
- Telemetric hardware for Kalmar Insight
- Insight license (only certified countries)
- Insight Driver Monitor (RFID reader + 10 driver tags)
- Insight extra driver tags (10 tags)

Color
- Other RAL color than standard, chassis
- Special and multiple colors, chassis
- Other color than standard, striping foil
- Reinforced anti-corrosion protection

Documentation & Decals
- Extra set of documentation
- Workshop manuals
- Load chart lbs/inch in cab & sign “no riders”
- Documentation on memory stick

Training
- Training packages (driver, service, maintenance, software)
- Contact Kalmar Training Center for more information

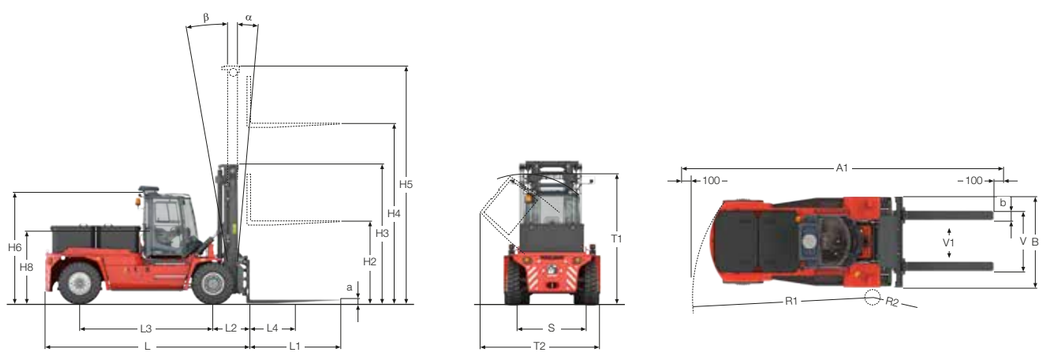
Warranty
- Additional warranty packages available:
  - Gold (complete forklift): max 5 yr/10,000h
  - Silver (drive line): max 8 yr/16,000h
  - Bronze (structural parts): max 10 yr/20,000h
  - Cobalt (battery + charger): up to 8 yr/16,000h*
- Contact Kalmar for more information

* Depending on battery technology and brands.

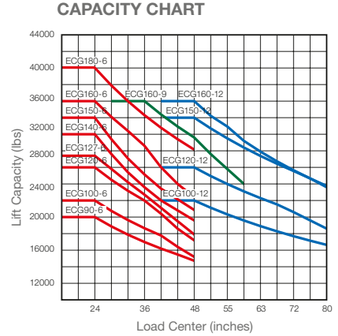
TECHNICAL INFORMATION

					ECG 90-6	ECG 100-6	ECG 120-6	ECG 127-6	ECG 140-6S	ECG 140-6	ECG 100-12S	ECG 100-12	ECG 120-12S	ECG 120-12	ECG 150-6S	ECG 150-6	ECG 150-12	ECG 160-6S	ECG 160-6	ECG 160-9S	ECG 160-9	ECG 160-12	ECG 180-6S	ECG 180-6
LIFTING CAPACITY		Rated capacity		lbs	20000	22000	26000	28000	31000	31000	22000	22000	26000	26000	33000	33000	33000	36000	36000	36000	36000	36000	40000	40000
		Load center distance	L4	in	24	24	24	24	24	24	48	48	48	48	24	24	48	24	24	36	36	48	24	24
FORKLIFT DIMENSIONS		Truck length (to fork face front)	L	in	182	182	182	182	183	191	186	194	194	204	186	194	213	194	204	204	213	213	204	213
		Distance, center drive axle - fork face front	L2	in	36	36	36	36	37	37	39	39	39	39	39	39	39	39	39	39	39	39	39	39
		Wheelbase	L3	in	110	110	110	110	110	118	110	118	118	128	110	118	138	118	128	128	138	138	128	138
		Truck width (over tires)	B	in		98			98			100			100			100				100		100	
		Roof height cabin (basic forklift)	H6	in		115			115			115			115			115				115		115	
		Seat height cabin	H8	in		71			71			71			71			71				71		71	
		Height / width, max (with tilted cabin)	T1 / T2	in		134 / 133			134 / 133			134 / 133			134 / 133			134 / 133				134 / 133		134 / 133	
		Track (c-c), front / rear	S1 / S2	in		73 / 77			73 / 77			73 / 77			73 / 77			73 / 77				73 / 77		73 / 77	
		Turning radius, outer / inner	R1	in		156 / 3			156 / 3	165 / 3	156 / 3	165 / 3	165 / 3	172 / 5	156 / 3	165 / 3	188 / 17	165 / 3	172 / 5	172 / 5	188 / 17	188 / 17	180 / 17	198 / 20
		Aisle width min, at 90° driving with forks	A1	in		247			247	257	297	306	306	313	250	259	329	259	266	290	306	329	274	292
		Ground clearance, min - max	T1	in		7.5 - 13			7.5 - 13			7.5 - 13			7.5 - 13			7.5 - 13				7.5 - 13		7.5 - 13	
LIFTING EQUIPMENT	**Duplex Standard**	Lifting height	H4	in		197			197			197			197			197				197		197	
		Mast height, min	H3	in		165			165			165			165			165				165		165	
		Mast height, max	H5	in		264			264			264			264			264				264		264	
		Mast tilt, forward – backward	a – ß	°		14 / 10			14 / 10			14 / 10			14 / 10			14 / 10				14 / 10		14 / 10	
	Forks	Width x Thickness	b	in	7.9 x 2.8	7.9 x 2.8	7.9 x 2.8	7.9 x 2.8	7.9 x 3.9	7.9 x 3.9	9.8 x 3.9	9.8 x 3.9	9.8 x 3.9	9.8 x 3.9	7.9 x 3.9	7.9 x 3.9	9.8 x 3.9	7.9 x 3.9	7.9 x 3.9	9.8 x 3.9	9.8 x 3.9	9.8 x 3.9	9.8 x 3.9	9.8 x 3.9
		Length	l	in		48			48			96		96	48	48	96	48	48	72	72	96	48	48
		Forks position, outside width, min-max.	V	in		23 - 92			23 - 92			26 - 93		26 - 93	24 - 94	24 - 94	28 - 93	24 - 94	24 - 94	26 - 93	26 - 93	28 - 93	26 - 93	26 - 93
		Forks sideshift, max stroke at opening (c-c)	V1 – V	in		17 / 57		17 / 57	18 - 58	18 - 58		17 - 59		17 - 59	18 - 59	18 - 59	16 - 60	18 - 59	18 - 59	17 - 59	17 - 59	16 - 60	17 - 59	17 - 59
WEIGHT (Lead-Acid)	**Service Weight***	Double batteries (Lead-Acid / standard)		lbs	41230	41230	41450	41450	41670	44975	44755	47620	48945	50710	46080	47400	53795	47845	50270	51810	53355	55120	50490	52915
		Without double batteries		lbs	30645	30645	30865	30865	31090	32410	34175	35055	36380	35720	35495	34835	36600	35275	35275	36820	36160	37920	35495	35720
	Axle load front	Unloaded		lbs	18740	18740	18960	18960	19180	20720	22485	24030	24030	25355	22045	23585	26675	23590	24695	25130	26015	26680	24915	25575
		At rated load		lbs	49320	52425	59070	61950	66935	67375	61680	62120	69430	69210	73785	74005	80400	78110	77890	81635	81195	84725	84315	83655
	Axle load rear	Unloaded		lbs	22490	22490	22490	22490	22490	24255	22270	23590	24915	25355	24035	23815	27120	24255	25575	26680	27340	28440	25575	27340
		At rated load		lbs	11910	10805	8380	7500	5735	8600	5075	7500	5515	7500	5295	6395	6395	5735	8380	6175	8160	6395	6175	9260
WEIGHT (Li-ion)	**Service Weight***	Integral battery (Li-ion / 3-pack)		lbs	36595	36595	38140	39240	N/A	41225	N/A	45635	N/A	48720	N/A	46740	53795	N/A	46960	N/A	52470	55115	N/A	51810
	Axle load front	Unloaded		lbs	18740	18740	18960	18955	N/A	20720	N/A	24030	N/A	25350	N/A	23590	26680	N/A	24695	N/A	26015	26675	N/A	25575
		At rated load		lbs	49320	52420	59070	61950	N/A	67375	N/A	62125	N/A	69210	N/A	74010	80400	N/A	77890	N/A	80975	84720	N/A	83655
	Axle load rear	Unloaded		lbs	17855	17855	19180	20285	N/A	20505	N/A	21605	N/A	23370	N/A	23150	27115	N/A	22265	N/A	26455	28440	N/A	26235
		At rated load		lbs	7275	6175	5070	5290	N/A	4850	N/A	5510	N/A	5510	N/A	5730	6395	N/A	5070	N/A	7495	6395	N/A	8155
WHEELS	**Wheels***	Number of wheels, front – rear (x = driven)				4x – 2			4x – 2			4x – 2			4x – 2			4x – 2				4x – 2		4x – 2	
	Tires	Pneumatics, type / pressure		PSI		Diagonal / 130			Diagonal / 130			Diagonal / 130			Diagonal / 130			Diagonal / 130				Diagonal / 145		Diagonal / 145	
		Dimensions, front – rear		tum		12.00x20"/PR20			12.00x20"/PR20			12.00x20"/PR20			12.00x20"/PR20			12.00x20"/PR20				12.00x20"/PR20		12.00R20	
	Rims	Dimensions, front – rear		tum		8.50x20"			8.50x20"			8.50x20"			8.50x20"			8.50x20"				8.50x20"		8.50x20"	
AXLES	**Steer axle**	Manufacturer, type - designation				Kalmar steer axle / power steering / double acting single cylinder						Kalmar steer axle / power steering / double acting single cylinder						Kalmar steer axle / power steering / double acting single cylinder							
	Drive axle	Manufacturer, type - designation				Kessler D81-dual drive / electronic differential / hub reduction						Kessler D81-dual drive / electronic differential / hub reduction						Kessler D81-dual drive / electronic differential / hub reduction							
	Service brakes	Type – affected wheels				Oil cooled wet disc brakes (WDB) / drive wheels						Oil cooled wet disc brakes (WDB) / drive wheels						Oil cooled wet disc brakes (WDB) / drive wheels							
	Parking brake	Type – affected wheels				Single dry big disc / spring activated - hydraulic release / drive wheels						Single dry big disc / spring activated - hydraulic release / drive wheels						Single dry big disc / spring activated - hydraulic release / drive wheels							
HYDR.	**Hydraulics**	System type / pump type				Load-sensing / power -on-demand / piston pumps						Load-sensing / power -on-demand / piston pumps						Load-sensing / power -on-demand / piston pumps							
	Oil pressure	Max working pressure		PSI	2320	2465	2540	2610	2755	2755	1815	1815	2175	2175	2395	2395	2465	2465	2465	2540	2540	2610	2755	2755
	Tank	Oil volume		gal		58			58			58			58			58				58		58	

Information correct at time of publication and is subject to change.



CAPACITY CHART



PERFORMANCE

				ECG90-6 ECG100-6	ECG120-6	ECG127-6 ECG140-6S	ECG140-6	ECG100-12 ECG100-12S	ECG120-12 ECG120-12S	ECG150-6 ECG150-6S ECG160-6S	ECG160-6 ECG160-9S	ECG160-9 ECG180-6S	ECG150-12 ECG150-12 ECG180-6
SPEEDS	Travel speed, forward - reverse	Unloaded	mph	15 - 15		15 - 15		15 - 15		15 - 15		15 - 15	
		At rated load	mph	15 - 15		15 - 15		15 - 15		15 - 15		15 - 15	
	Lifting speed	Unloaded	fps	1.8	1.5	1.5		1.1		1.1		1.1	
		At 70% of rated load	fps	1.6	1.3	1.3		1.1		1.1		1.1	
	Lowering speed	Unloaded	fps	1.3		1.3		1.3		1.3		1.3	
		At rated load	fps	1.3		1.3		1.3		1.3		1.3	
POWER	Gradeability, max	Unloaded	%	32	32	30	27	26	24	26	24	23	22
		At rated load	%	20	19	17	16	17	16	15	14	14	13
	Gradeability, at 3 mph	Unloaded	%	28	28	26	24	23	21	23	21	20	20
		At rated load	%	18	17	15	14	15	14	13	12	12	11
	Drawbar pull		kN	12585	12585	11915	11915	11915	11915	11915	11915	11915	11915
SOUND	Noise level, inside EGO cabin	EN12053, L_{pAZ}	dB(A)	69		69		69		69		69	
	Noise level, outside	EN12053, L_{WAZ}	dB(A)	100		100		100		100		100	
	Noise level, outside	2000/14/EC, L_{WAZ}	dB(A)	104		104		104		104		104	

POWERTRAIN

			ECG90-6 ECG100-6 ECG120-6	ECG127-6 ECG140-6S ECG150-6S	ECG100-12S	ECG100-12 ECG120-12S	ECG140-6 ECG150-6	ECG160-6S	ECG120-12 ECG160-6	ECG160-9S ECG180-6S	ECG150-12 ECG160-9	ECG160-12 ECG180-6
MODELS	Wheelbase (L3)	in	110			118			128		138	
ELECTRIC POWERTRAIN	Motor, manufacturer		Schabmüller Germany			Schabmüller Germany			Schabmüller Germany			
	Motor, type / model / active cooling		AC motor / asynchronous / air-cooled			AC motor / asynchronous / air-cooled			AC motor / asynchronous / air-cooling			
	Motor, speed control type / number of steps		High frequency MOSFET / Stepless			High frequency MOSFET / Stepless			High frequency MOSFET / Stepless			
	Output power - drive motor (at duty class)	hp	2 x 49.6 hp (S2 60 min) / with air cooling			2 x 49.6 hp (S2 60 min) / with air cooling			2 x 49.6 hp (S2 60 min) / with air cooling			
	Output power - pump motor (at duty class) intermittent	hp	2 x 67 hp (S3 15%) / with air cooling			2 x 67 hp (S3 15%) / with air cooling			2 x 67 hp (S3 15%) / with air cooling			
	Output power - brake motor (at duty class) intermittent	hp	1 x 3.3 hp (S1) / no cooling			1 x 3.3 hp (S1) / no cooling			1 x 3.3 hp (S1) / no cooling			
	Regenerative brake function		Yes / charging of battery			Yes / charging of battery			Yes / charging of battery			
	Acceleration settings / power programming		In 10 steps (1 - 10)			In 10 steps (1 - 10)			In 10 steps (1 - 10)			
	Retardation settings / brake programming		In 10 steps (1 - 10)			In 10 steps (1 - 10)			In 10 steps (1 - 10)			
	Energy consumption, normal driving, average values	kWh/h	Lower: 18 / Medium: 23 / Higher: 28			Lower: 20 / Medium: 25 / Higher: 30			Lower: 20 / Medium: 25 / Higher: 30			
BATTERY (Lead Acid)	Battery / charger, type - voltage - number of units	V	Lead-Acid / 120V / 2+2			Lead-Acid / 120V / 2+2			Lead-Acid / 120V / 2+2		Lead-Acid / 120V / 2+2	
	Nominal energy capacity (min-max) at SOC 100%	kWh	149 - 165			186 - 206			223 - 248		260 - 289	
	Useable energy capacity (min-max) at SOC 80%	kWh	119 - 132			149 - 165			178 - 198		208 - 231	
	Capacity at 5h discharge, current, min-max	Ah	1240 - 1376			1550 - 1720			1830 - 2064		2170 - 2408	
	Battery weight, min-max (per battery)	lbs	5140 - 5335			6220 - 6535			7475 - 7525		8290 - 8640	
	Battery dimensions (W x H x L)	in	72.4 x 30.7 x 28.3			72.4 x 30.7 x 34.2			72.4 x 30.7 x 39.3		72.4 x 30.7 x 45.2	
	Charging power, min / max (per charger)	kW	13 / 14			13 / 14			21 / 26		26 / 28	
	No. of chargers x charger power supply (per charger)	A	2 x 25			2 x 25			2 x 50		2 x 50	
	Charger / battery connector, type - size		REMA-640 (2x)			REMA-640 (2x)			REMA-640 (2x)		REMA-640 (2x)	
BATTERY (Lithium-ion)	Battery / charger, type - voltage - number of units	V	Lithium-ion (NMC) integral / 117V / 1+1			Lithium-ion (NMC) integral / 117V / 1+1			Lithium-ion (NMC) integral / 117V / 1+1			
	Nominal energy capacity (min-max) at SOC 100%	kWh	173			173			173 or 230*			
	Useable energy capacity (min-max) at SOC 80%	kWh	138			138			138 or 184*			
	Capacity at 5h discharge, current, min-max	Ah	1500 (3-pack)			1500 (3-pack)			1500 (3-pack) or 2000 (4-pack)*			
	Charging power, max	kW	86			86			86			
	No. of chargers x charger power supply (per charger)	A	4 x 63			4 x 63			4 x 63			
	Charger / battery connector, type - size - amount		REMA-640 (2x)			REMA-640 (2x)			REMA-640 (2x)			

*Note:
Lead-Acid: Optional wheelbase 148" has battery energy 298 - 330 kWh (2752 Ah).
Li-ion: Optional wheelbase 148" has battery energy 173 - 230 kWh (1500 Ah).

Lifting data.

DUPLEX STANDARD (2-stage / LFL)

ECG90-140			
Lift height	Mast height		Free lift
H4	H3 min	H5 max	H2
118	126	185	-
128	131	195	-
138	136	205	-
148	141	215	-
157	146	225	-
177	156	244	-
197	165	264	-
217	175	284	-
236	185	303	-
256	195	323	-
276	205	343	-

DUPLEX FREE LIFT (2-stage / FFL)

CG90-140			
Lift height	Mast height		Free lift
H4	H3 min	H5 max	H2
118	126	185	59
128	131	195	63
138	136	205	68
148	141	215	73
157	146	225	78
177	156	244	88
197	165	264	98
217	175	284	108
236	185	303	118
256	195	323	127
276	205	343	137

TRIPLEX FREE LIFT (3-stage / FFL)

ECG90-140			
Lift height	Mast height		Free lift
H4	H3 min	H5 max	H2
177	124	244	59
197	130	264	65
217	137	283	72
236	143	303	78
256	150	323	85
276	156	342	91

DUPLEX HEAVY-DUTY (2-stage / LFL)

ECG90-140			
Lift height	Mast height		Free lift
H4	H3 min	H5 max	H2
157	160	232	-
177	170	252	-
197	180	271	-
217	190	291	-
236	200	311	-

1. The lifting cylinders are mounted behind the mast profiles on Duplex Standard, Duplex Freelift & Triplex Freelift.
2. The lifting cylinders are mounted outside the mast profiles on Duplex Heavy-Duty.
3. The freelift cylinders are mounted inside the mast profiles on Duplex Freelift and Triplex Freelift.
4. Duplex Heavy-Duty: mast range with additional reinforcements.

Mast options.

Duplex Standard LFL mast:
118”-276”



Duplex FFL mast:
118”-276”



Triplex FFL mast:
177”-276”





KALMAR

Making your every move count

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