

# Kalmar Straddle Carrier



PROVEN PRODUCTIVITY



# Kalmar Straddle Carrier System

The Straddle Carrier System is used worldwide when fast ship-to-shore crane operations and a good service level for landside operations are required.

The Straddle Carrier System is common in import/export terminals, but nowadays many big trans-shipment terminals also use it successfully. The system ensures that one equipment type (SC) takes care of all work phases at the container yard. Therefore, the SC system is well-suited for operating in the fully automatic mode. Patrick's terminal in Brisbane Australia is a good example of proven, fully automatic operation.







## Good Versatility Due to Modular Design

Kalmar's Straddle Carriers with modular designs have the same reliable base structure and components. This gives the possibility to tailor machines to various applications, based on customer preferences.

### **CSC**

- Proven effective in use – the most common straddle carrier in the world
- Simple and easy to service, excellent support worldwide

### **ESC W**

- For higher performance and speed
- Excellent driver comfort and visibility
- Reduced environmental impact with the least quantity of hydraulics
- AC in drive and hoist movement with regenerative energy transfer
- Kalmar hybrid technology is optionally available on the ESC W, reducing fuel consumption and exhaust emissions









# The Ultimate Driver's Machine

## Large W-type front cabin

- More interior space
- Reduced nighttime reflections through W-type windows set-up
- Seat moved 200 mm forward for better visibility
- Low cabin noise
- 180-degree rotating seat+steering column+pedals as option

## High performance ESC W models

- Fast driving speed – 30 km/h with full load
- Fast 30/20 m/min hoist speeds



High productivity and excellent performance are achieved due to the most rigid steel structure in the world, combined with high performance and optimum ergonomics in the W-type cabin.

## Additional features

- Strongest frame on the market
- Excellent cornering stability
- Good protection against impact damage
- All components protected inside the frame contour



# Top Performance and Productivity

## Hoist systems

### Smoothlift™ hoist system

- Simple patented design using a single hoist cylinder
- No gears or brakes needed
- Smart load balancing system
- No lubrication points, no oil spills
- Longitudinally mounted rope sheaves for excellent visibility
- Slim hoist beams for improved visibility
- Smoothlift hoist system is available on CSC straddle carriers

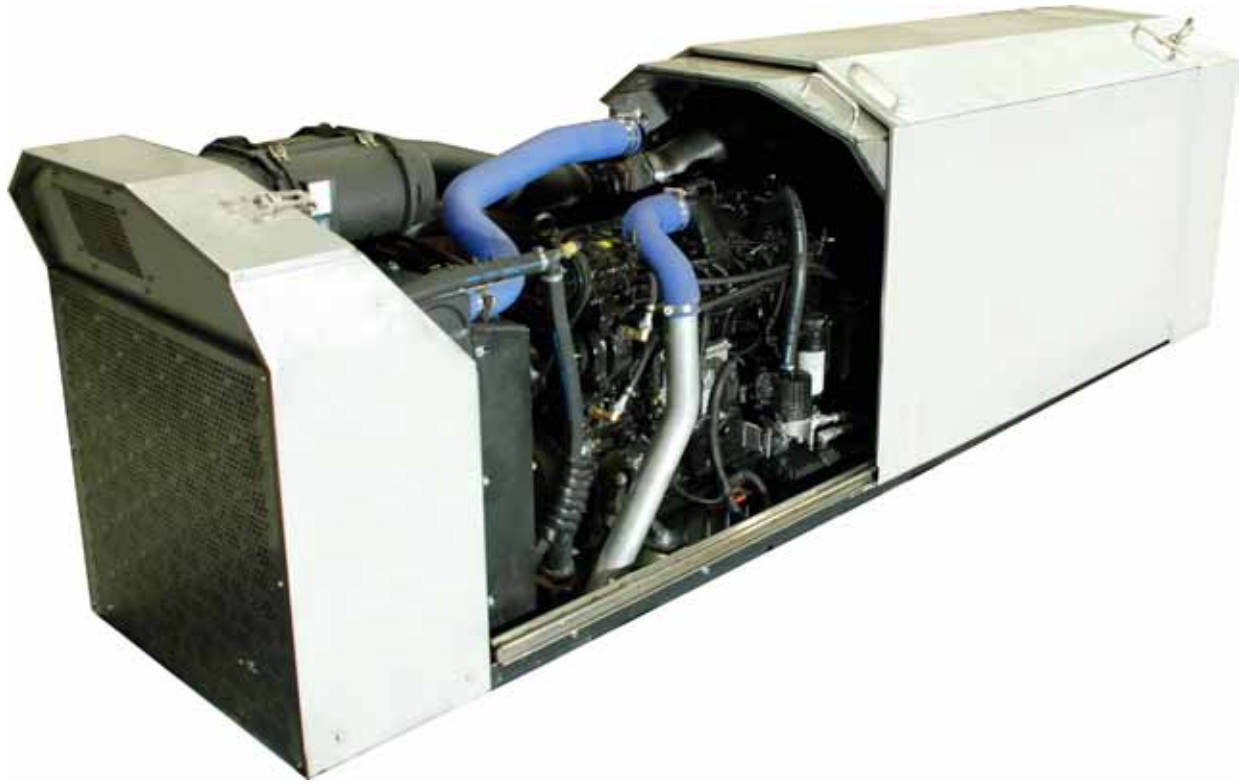


### Winch hoist system

- Environmentally friendly
- Reliable system using 2 x standard IEC AC electric motors, 1 x spur gear type gearbox, 2 x safety type spring loaded heavy duty dry-disc hoist brakes with wear control in brake pads
- Regenerative energy transfer between hoist and drive functions
- Reduced amount of hydraulic oil needed in the machine (120 l)
- Standardised rope type and rope pulleys with Smoothlift hoist system
- Winch hoist system is available on ESC W straddle carriers







# Low Maintenance and Operating Costs

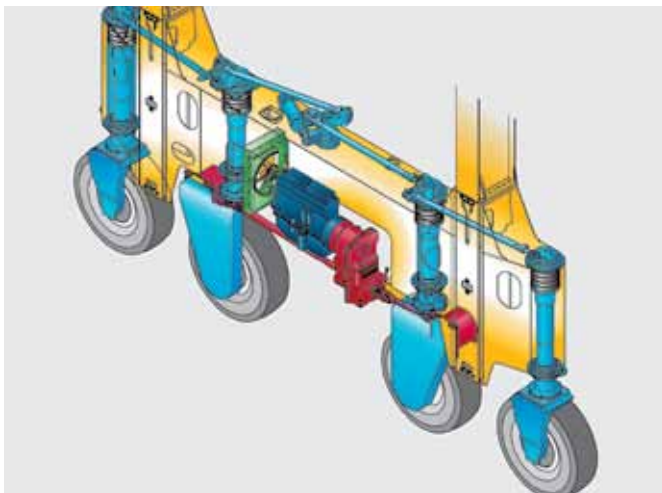
## Powertrain

### CSC powertrain

- Power package below side frame for both easy ground level maintenance and the shortest, simplest possible power transfer
- Constant torque ZF transmission with stepless gear change for improved performance, longer component service life and driver comfort
- Redundant same-type power packages at both side frames for maximum stability and operational flexibility

### ESC W powertrain

- One engine generator package and AC inverters in the top frame
- Two well-shielded standard AC electrical motors on top of each side frame
- Straight propeller shaft from each AC motor for proven wheel hub reduction
- Minimum amount of components in the powertrain
- All ground level components protected inside the side frame contour





# PLC Control System

All Kalmar Straddle Carriers have a PLC-based control system. The PLC system is based on CAN-BUS technology and remote I/O-units.

## Full PLC Control

- Interactive display with easy recalibration or adjustment of the main settings
- Smart power distribution for main functions
- Fault diagnostics and productivity monitoring
- Easy downloading to a laptop computer with Stradmonitor tool
- Designed for full automation
- Ready for Kalmar Remote Management
- PLC also features integrated control of inverters and the diesel engine through CAN-BUS

Every Straddle Carrier is configured so it can either be automated at the factory before delivery or later, using refurbishment modules.

## Optional features

Driver-assisting features (DRAF®) improve productivity and make the driver's work easier and less stressful. These features can also increase a Straddle Carrier's ease of use by making troubleshooting and maintenance simpler, reducing downtime. Our integrated intelligence software provides container position verification.

Portable PLC display unit can easily be used for monitoring PLC software and testing spreader functions. Steer by wire option is also available for all straddle carrier models.







# Automation

Cargotec provides automation solutions ranging from process automation to unmanned operations.

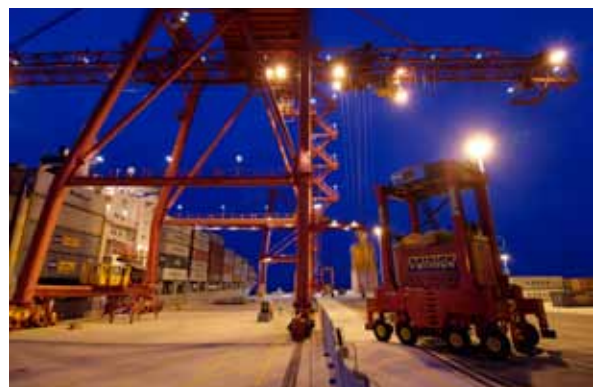
## **SMARTPORT**

SmartPort integrates process automation solutions (Navis) fleet management solutions and advanced driver assistance systems (Cargotec). SmartPort products are technology solutions providing additional efficiencies, improving productivity and equipment utilization as well as reducing manual errors and optimizing service. The products range from reports providing insight into the performance to telematics-based solutions allowing operators to work more efficiently. The key to successful implementation is seamless integration with existing terminal processes and terminal operating systems.

## **UNMANNED OPERATIONS**

Cargotec can provide a fully automated straddle carrier terminal for container-handling customers – the first supplier in the world to do so. The fully-automated straddle carrier terminal is already an optimal automation solution for mid-sized terminals handling 150,000 TEU or more.

In addition Cargotec supplies Automated Shuttle Carriers and Automated Stacking Cranes as well, allowing fully automated terminals to be realized.



# Spreaders

Cargotec has an active and continuous R&D process for all straddle carrier features, including Kalmar spreaders.

Based on 30 years of continuous R&D, Kalmar spreaders are heavy-duty models with advanced, superior features including positive physical longitudinal locking for T-beams and hard wiring for all spreader electric functions. Spreader safety functions are integrated to the straddle carrier PLC-controlled safety system, ensuring safe and rapid container handling.

## Single lift spreader

Kalmar base spreader is a single lift 20'–40' spreader with fully floating twistlocks.

## Optional

The Kalmar twinlift spreader 20', 40', 2 x 20' was already developed in the mid 1990s and is annually installed in 50% of the units. The twinlift spreader is based on Kalmar's robust 20'–40' model and provides enhanced container-handling capacity with minimum service requirements.

## Optional

The latest addition to the Kalmar spreader family is the extendable twinlift spreader 20' – 40' – 45', 2 x 20', enabling 5' movement in twin handling. This enables, for example, easy access to check the door seals right under an STS crane.





# Hybrid Intelligence for the Future

Kalmar hybrid technology is part of Cargotec's Pro Future™ concept and is the best solution to your economic and environmental challenges. Hybrid technology reduces fuel consumption and exhaust emissions while maintaining performance and reducing the total cost of ownership (TCO). Hybrid modules can optionally be added on new 7+ generation ESC W Straddle Carriers.

## **INTELLIGENT TECHNOLOGY SUPPORTING GROWTH**

Kalmar straddle carriers are used throughout the world's leading container terminals. The hybrid straddle carriers have advanced to their 7+ generation bringing wide-ranging benefits for both operations and terminal business. The Kalmar hybrid product family with its latest addition is a proven example of our determination to continue finding cost efficient and yet environmentally sound solutions for the future.

## **RELIABLE OPERATIONS**

With the Pro Future™ hybrid technology module applied on Kalmar's proven and tested 7+ generation ECS W straddle carriers, terminal operators are ensured the reliability and availability levels accustomed to. This presents terminal operators with greater flexibility in their on-going quest to achieve superior dependability and performance by deploying the most economical methods and meeting increasingly stringent environmental requirements. We strive that our product development meets our clients' needs on all levels.

## **SUSTAINABLE SOLUTIONS**

Cargotec's Pro Future™ is a special brand for environmentally friendly equipment that passes set criteria with regard to energy efficiency, power source, emissions, noise pollution and recyclability. With the help of Pro Future™ solutions, clients can genuinely develop more sustainable operations and reduce fuel consumption.

The Kalmar straddle carrier utilises hybrid technology, saving costs through a lower fuel requirement for transporting containers. Hybrid technology cuts straddle carriers' annual carbon dioxide emissions by 50 tonnes per straddle carrier. Other Pro Future™ products include the variable speed rubber tyred gantry (RTG) crane, automatic stacking crane, battery driven forklift truck and ship-to-shore crane with a regenerative energy source.

## **TECHNICAL CONFIGURATION**

A variable-speed diesel generator (VSG) with temperature controlled fan technology set optimizes fuel consumption and reduces noise emissions. It provides environmental and operational benefits on many levels. The electrically controlled viscous fan is used only when cooling is needed, helping to optimize fuel consumption. This is especially useful in moderate climate conditions.

Our energy storage system stores energy when the machine is braking or the container is being lowered. The regenerated energy is then used to reduce diesel engine power usage when hoisting or accelerating. Kalmar PLC control optimizes the hybrid system. The Kalmar hybrid system includes an in-cab energy monitor display from which the user can easily follow the energy flow and so adjust driving habits to save even more fuel.

## **KALMAR HYBRID TECHNOLOGY ADVANTAGES**

- Fuel saving potential up to 25-30% compared to conventional SC/SHC
- Reduction of CO2 emissions over 50 tonnes per year per machine
- Reduced operating and life-cycle costs
- Quieter operation
- No reduction in the performance

Global presence and local service bring  
our solutions closer to our customers.



*Cargotec improves the efficiency of cargo flows by offering solutions for the loading and unloading of goods on land and at sea – wherever cargo is on the move. Cargotec's main daughter brands for cargo handling are Hiab, Kalmar and MacGregor. In addition, Cargotec's global network offers extensive services that ensure the continuous and reliable performance of equipment. [www.cargotec.com](http://www.cargotec.com)*



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