

Kalmar

RTG

Many small changes
make a big difference



KALMAR

Establishing a NEW NORMAL

for RTGs

Big cranes are usually heavy, disconnected and complicated - not any more. Kalmar's latest generation of RTGs brings you many benefits across the board - establishing a new normal for the industry.

Based on your feedback, and recent advancements in technology, we have been able to make hundreds of little improvements that, when brought together in our new generation of RTGs, make a huge difference. A new generation of RTGs that can now offer you an intelligent, optimised solution with a stronger, modular, lighter and simpler crane design. Maintenance tasks are made easier as they can be managed effectively both on-site and remotely making your crane safer to operate, more productive and eco-efficient.

Kalmar's latest generation of RTGs are establishing a new normal by lowering your total cost of ownership and helping you prepare your business for an automated, connected and eco-efficient future.

The choice is yours.

Kalmar offers a full range of RTGs. You can choose from one of our optimised solutions or we can design and build your RTG up to 10+1 wide, to allow a higher stacking density and use the land you have as effectively as possible. You can choose from four different models, all with highly efficient power sources:

- The Kalmar Zero Emission RTG
- Kalmar Hybrid RTG
- Kalmar SmartPower RTG
- Kalmar Classic RTG

All Kalmar RTGs independent of their power source can be automation ready.

New Gen RTG - PLC

8 2

- jjarflut** 12.45pm 17.01
New PLC system is currently being installed.
- freident** 9.45am 19.01
Testing new PLC has been successfully completed.
- jjarflut** 16.15pm 21.01
New PLC fully integrated into all systems and working optimally.

New Gen RTG - DESIGN

10 7

- ricketshp** 07.32am 07.12
Optimised design process completed.
- muhambir** 09.45am 07.12
Achieved reduction in overall weight, while maintaining structural strength.
- ricketshp** 12.45pm 09.12
Overall weight reduction achieved in excess of 10%.

New Gen RTG - CABIN & TROLLEY

5 3

- hestemb** 14.45pm 02.11
Testing new cabin and trolley design started.
- marinud** 12.45pm 06.01
Initial test results demonstrate a faster and more productive combination.
- hestemb** 17.25pm 24.01
New cabin and trolley fitting completed and outperforming expectations.

The Kalmar RTG RANGE

Kalmar RTGs have been proven in the field for nearly 40 years and are known for their reliability and productivity by terminal operators around the world. There are four different RTGs in the range to choose from:

Kalmar Zero Emission RTG.

This RTG runs primarily off a busbar or cable reel power system. Regenerative power is used to keep the auxiliary Li-ion batteries charged for use when needed for cross-stack travel and maintenance operations. The optional Li-ion batteries come with a 5-year warranty as standard and these RTGs have zero emissions at source and are extremely quiet. The all-electric design eliminates the need for any fossil fuels, which greatly reduces its environmental impact, making this our most eco-efficient offering.

Kalmar Hybrid RTG.

The Kalmar Hybrid RTG combines a regenerative energy storage system with a smaller highly efficient diesel power train that uses up to 64% less fuel than a conventionally powered RTG. The regenerative system collects the energy produced by the RTG while operating, and stores it for later use, making it a highly fuel-efficient combination. The batteries, which come with a 5-year warranty as standard, supply the RTG's primary power. The diesel engine only comes into operation when the batteries need to be recharged, which is typically up to 50% of the crane operating time. This also keeps the maintenance costs low as engine running time is significantly reduced.

Kalmar SmartPower RTG.

The Kalmar SmartPower RTG is fitted with a smaller sized variable speed generator with an intelligent power management system which dynamically manages the crane's speed and acceleration rate depending on the available power to limit peak power demand. At the same time this system makes sure that the most efficient engine RPMs are always used, reducing fuel consumption whilst maintaining operational performance. The Kalmar SmartPower RTG enables you to reduce your fuel consumption and lower emissions at the same time.

Kalmar Classic RTG.

The Kalmar Classic RTG is known to be a reliable workhorse, with the longest service intervals in the market and is deployed in many terminals around the world. Our classic RTGs feature a diesel powertrain that complies with global emission standards. You can upgrade this powertrain and add a Variable Speed Generator, which allows the engine to run at the most economical speed for the task at hand, saving you fuel and money.

Mr. Nguyen Minh Hai, TCPH's Director:

"Kalmar equipment has been delivering reliable performance for SNP for over two decades, backed by a competent and committed local services team UNICO VINA JSC that has extensive knowledge of RTG preventive and corrective maintenance. Cutting emissions and noise, while acquiring an advanced trolley drive and higher stacking capacity (1-over-6 high) is an important goal for us, and the Kalmar Zero Emission RTG is the ideal solution to help us achieve this goal."



A foundation for an automated future.

All new Kalmar RTGs can be ready for you to begin your journey into an automated future by automating some or all of your processes; from simple and safe remote control operations to automatic picking and placing on the stack by integrating the Kalmar One RTG application with your Terminal Operating System (TOS).



Small changes make a huge

DIFFERENCE

Even though our new generation of RTGs may not look very different, they are. Take a closer look and you will see that there have been many significant changes and hundreds of small ones, collectively setting a new standard in what you should expect in your RTG. A standard, we like to call the new normal.



An optimised design. By optimising the design of our latest generation of RTGs you will get a lighter crane that maintains the same level of structural strength, is less stressful on your yard and uses less fuel. Reducing both yard maintenance and your fuel costs.

Our latest RTGs also have a shorter wheelbase with smaller wheels, which provide you with greater flexibility if your space is limited. A longer wheelbase can be fitted if required.

A focus on safety. With easier access to key service points, improved cabin comfort, greater operational visibility, improved alarm handling and hundreds of other small changes, your crane will be as safe as possible to operate and maintain. Plus, our new optional electro-mechanical anti-sway system will allow for more precise and safer container handling.

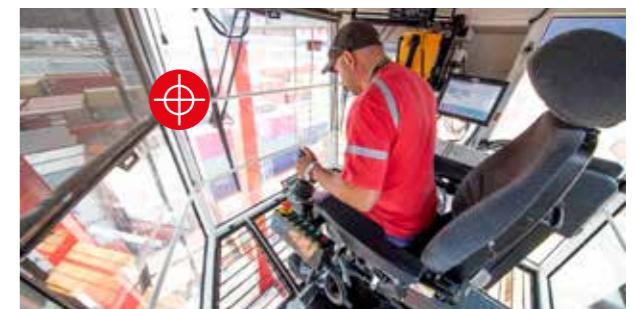
An intelligent solution. Our latest generation of RTGs comes with an optimised peak power management system, which allows for a range of smaller more eco-efficient engines to be used for diesel-powered cranes and smaller mains supply components when operating a Kalmar Zero Emission RTG, reducing your energy consumption and power bills. The PLC has also been updated with new software and a standard interface is now used across the range.

Plus, an optional anti-sway system ready for automation and a redesigned operator interface with improved connectivity. All making our latest generation of RTGs our most intelligent yet.

A more productive work environment. To help your operators work more effectively, the RTG's cabin has many new features, with the operator's user interface and overall visibility dramatically improved. This gives your operators a more comfortable working space with more intuitive controls and greater visibility, making every container move a safer one.

Easier to maintain and service. By redesigning the trolley and maintenance platforms, maintenance tasks will be easier and safer to perform. The trim and skew units have been redesigned and now accessible to service from the trolley platform, a new optional anti-sway system is also easier to maintain, and the power units and fuel tanks have been relocated, improving accessibility for service and maintenance tasks.

More eco-efficient. Kalmar's latest generation of RTGs are even more eco-efficient than before. Not only do you get a choice of different eco-efficient power sources, you get a crane that has been optimised to perform as efficiently and effectively as possible. By reducing the crane's overall weight, installing more energy efficient engines and improving the power management system, you will benefit from reduced fuel consumption and carbon emissions.



Lighter, simpler and more

ECO-EFFICIENT

Reducing the carbon emissions of our new generation of Kalmar RTGs has been a continual process since 2008.

With our latest generation of RTGs we started by reducing the overall weight of the crane by redesigning the structure and having optimally aligned loading lines and reeved-in lightweight spreaders. Resulting in reduced structural and yard surface stress.

By delivering a smarter and simpler design with less components and a considerable reduction of the crane's weight, the crane's fuel consumption can be reduced by 0,5 liters per hour. Many other changes have been made to help cut fuel consumption levels further:

An intelligent crane peak power management system has been installed allowing for a new range of variable speed generators with smaller diesel engines to be used - potentially saving up to 2.5 litres of fuel per hour compared to constant speed engines. Low-weight spreader/head block units have been used - potentially saving up to 1 litre of fuel per hour. Energy-efficient LED lights have been installed across the crane - saving up to 0.5 litres fuel per hour.

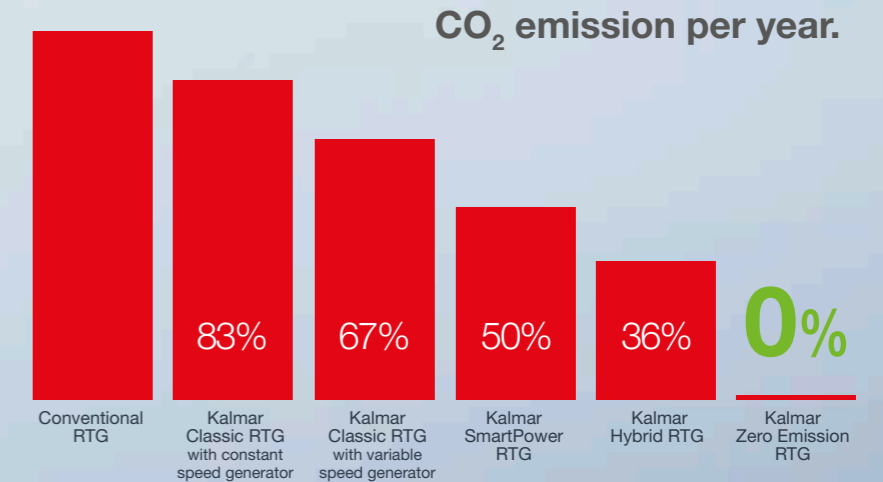
These are just some of the many changes we have made to our new generation of RTGs to cut their fuel consumption and carbon emissions. In addition to these basic design changes and upgrades, a further fuel saving can be achieved with Hybrid or SmartPower models.

Lower your carbon emissions without compromising on power.

Our new generation of RTGs offers you a range of cleaner, greener and eco-efficient solutions to choose from. The all-electric Kalmar Zero Emission RTG produces zero emissions at source while the Kalmar Hybrid RTG can reduce your fuel consumption and emissions by over 50% when compared to most other RTGs. Even our Kalmar Classic RTG with a diesel power source if fitted with a constant speed generator cuts fuel consumption by 17% or with a variable speed generator fuel consumption can be cut by up to 33%. Either choice results in significant reductions in fuel costs and emissions in comparison to other traditionally powered diesel RTGs.

If you choose to automate your RTG cranes now or in the future, your operations will also benefit from a reduction in operational noise and light pollution, as Kalmar AutoRTGs are quiet to operate and require fewer lights to operate in the dark.

Compare for yourself how you can substantially reduce your CO₂ emissions across the Kalmar RTG range:



Eco-efficiency in action at Exolgan.

Exolgan has been operating a fleet of Kalmar Hybrid RTGs and have been able to substantially reduce their fuel consumption and emissions:

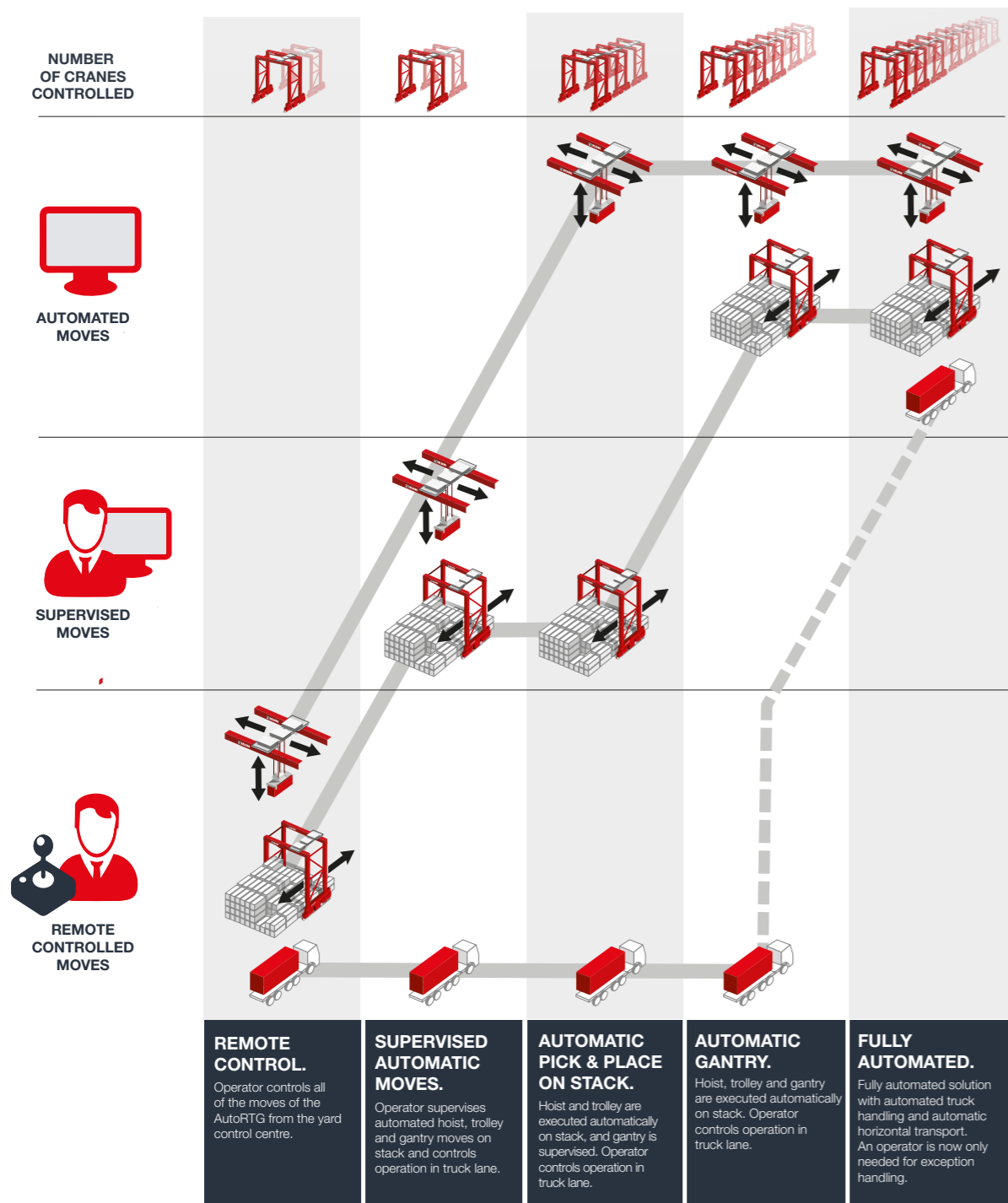
"The hybrid option was perfect for us because it helps us to make our operations cleaner and reduce our carbon footprint without having to make any big changes in our operational processes or infrastructure," Glass explains. "Our fuel consumption has gone down from 12-13 litres per hour to just 5.4 litres on average on the four cranes, which is a significant improvement and of course means lower costs and emissions."



ECO EFFICIENCY
IN ACTION

Ready to **AUTOMATE** when you are

Our latest generation of RTG cranes can be factory equipped or retrofitted to be automation ready. Once the AutoRTG Application powered by Kalmar One has been integrated with your Terminal Operating System (TOS), you can control your own automation journey, from remote controlled operations to automatic picking and placing on the stack, with higher levels of automation available in the near future.



Get smarter with Kalmar SmartPort™.

Kalmar SmartPort is a set of operator assistance features and process automation modules that can be deployed in your terminal to help your RTG move containers more efficiently. SmartPort solutions will track, route and manage containers from the gate through to the quayside, helping to optimise operational productivity, safety, equipment and personnel utilisation rates and ensure that you never lose another container.

Benefit from SmartPort operator assistance features with SmartRail.

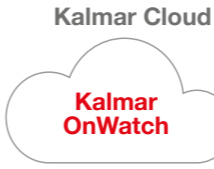
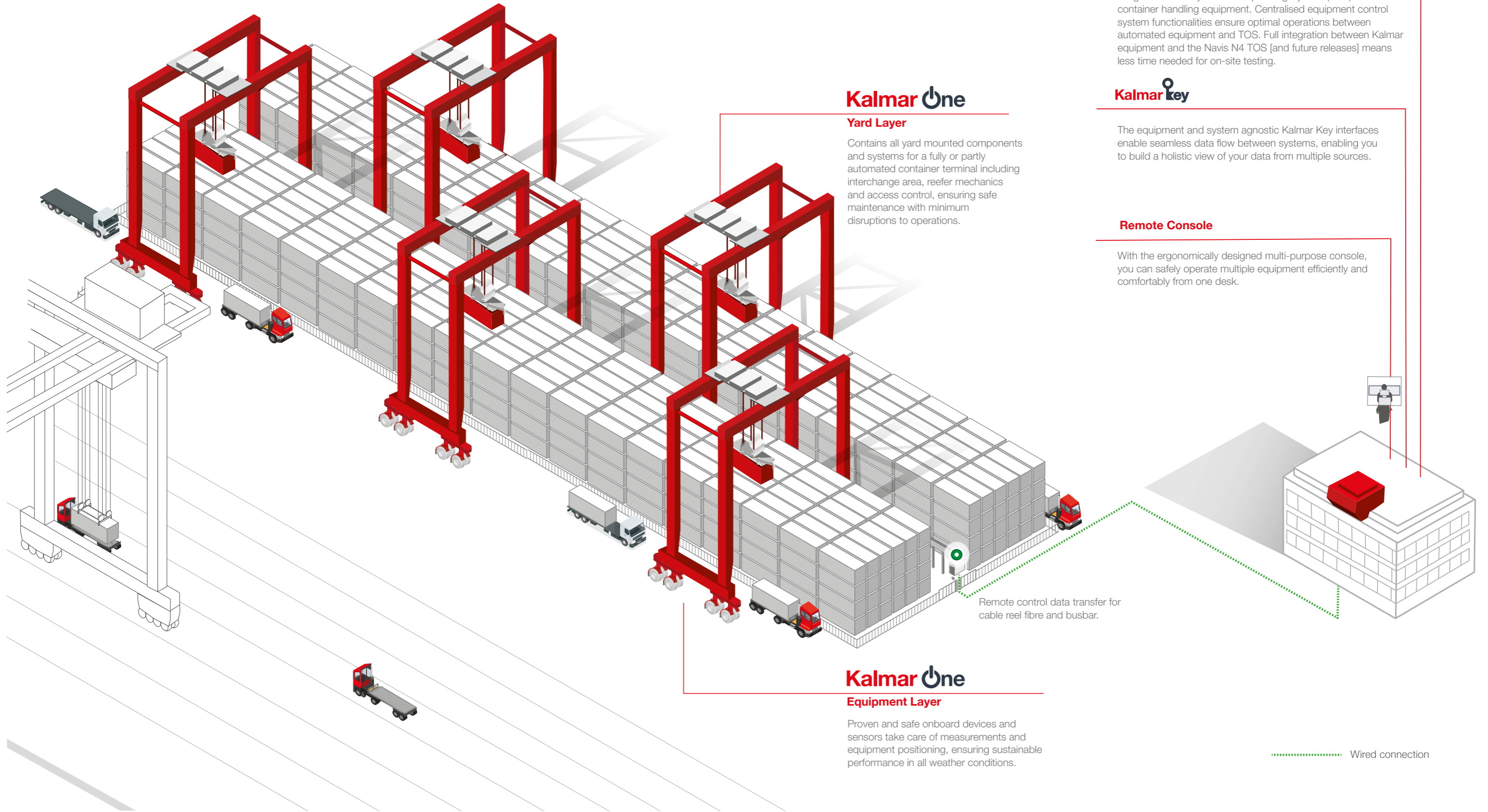
SmartRail is an automatic gantry steering system that will guide your RTG along virtual tracks for real-time positioning and highly accurate steering, negating the need to have fixed rails in place for your crane. SmartRail will also help increase your crane's productivity and prepare you for a more automated future.



Kalmar

AutoRTG

Application



Kalmar One

Terminal Layer

As a standardised and flexible system, Kalmar One can be integrated with any Terminal Operating System (TOS) and all container handling equipment. Centralised equipment control system functionalities ensure optimal operations between automated equipment and TOS. Full integration between Kalmar equipment and the Navis N4 TOS [and future releases] means less time needed for on-site testing.

Kalmar Key

The equipment and system agnostic Kalmar Key interfaces enable seamless data flow between systems, enabling you to build a holistic view of your data from multiple sources.

Remote Console

With the ergonomically designed multi-purpose console, you can safely operate multiple equipment efficiently and comfortably from one desk.

Kalmar One

Yard Layer

Contains all yard mounted components and systems for a fully or partly automated container terminal including interchange area, reefer mechanics and access control, ensuring safe maintenance with minimum disruptions to operations.

Kalmar One

Equipment Layer

Proven and safe onboard devices and sensors take care of measurements and equipment positioning, ensuring sustainable performance in all weather conditions.

Remote control data transfer for cable reel fibre and busbar.

..... Wired connection



POWERED BY
Kalmar One

AUTOMATION REDEFINED

Kalmar One automation system is a flexible, scalable and open automation system. With proven functionalities and well-established processes, Kalmar One will help you streamline and automate your operations. It offers a standardised open system that is compatible with all types of equipment irrespective of manufacturer, making it quicker, easier and more cost-effective to deploy. Each automated Kalmar equipment application is powered by Kalmar One. Kalmar One contains automation and software products and modules that are standardised and harmonised for all different application types. Each of these applications has its standard blueprint of Kalmar One products, which allows us to offer and deliver the same proven and tested solutions to all our customers yet configured to each customer's individual needs.

Kalmar Key. Open up your choice.

Kalmar Key provides a set of open automation interfaces that will allow you to build a complete end-to-end automation solution that is exactly right for your business by using Kalmar One as a common central automation system. With Kalmar Key, you will be able to choose who you work with and adopt an agile way to further develop the capabilities of your equipment and software, possibly with third-party developers.

With an equipment-agnostic approach, Kalmar Key enables a vast range of new applications and equipment to be connected for a total automation solution. Additionally, open interfaces enable a holistic view of data from multiple sources, allowing you to optimise your operations continually and with ease. Opening up your possibilities.





Operate your equipment **REMOTELY**

The Kalmar Remote Console has all the required functions, controls, information and guidance to enable your operators to control equipment remotely.

It is quick, safe and easy to switch between equipment, allowing your operator to handle several cranes at a time. Large format screens provide a clear view of exactly what is happening with each piece of equipment.

In addition, the operator can manage semi-automated moves from the desk, tracking the movement of each container and then prompting the operator when they need to take over or validate a move. Even if your operations are fully automated the console can be used for exception handling. The console is ergonomically designed and can be personalised to optimise operator comfort and safety.



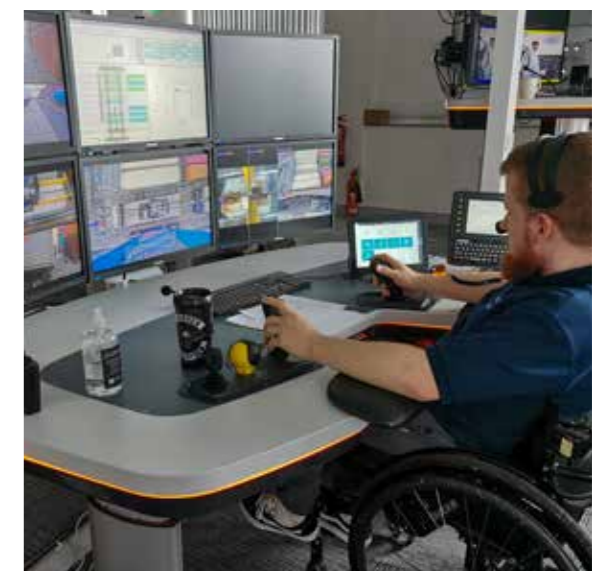
What do operators at Belfast Container Terminal (BCT) think about the Kalmar Remote Console?

"I've been working with the RC desk since July this year, and it's been fantastic. I've never done a job like this before, and after a week of sitting with my trainer I was already confident and competent enough to get started on my own. Although the days are very busy, I'm always excited and motivated to come to work. The layout of the desk works great for me – I can adjust the height to where I need it, and all the joysticks and buttons are in easy reach."

KM Remote Console Operator BCT

"I've been operating our AutoRTGs using the RC desk for about four months now, and this job is very different from anything I've done before. I'm really enjoying it, and when I tell people what I do at work they find it pretty cool and are really interested to know more. I had about a week of training with one of our experienced drivers, learning about the various screens and controls and getting some hands-on experience with the desk. It's fantastic to be working with this kind of cutting-edge technology every day – it really does blow my mind!"

HP Remote Console Operator BCT



More SUPPORT

Our job doesn't stop once we deliver your new application. We also offer a range of support services that help keep your new Kalmar RTG and equipment running at their optimal best. With a global network of over 1,500 service and technical support staff in over 100 countries, we will always have someone nearby to provide the support you need.

Kalmar Care. Making sure your business never stops.

Every Kalmar Care Service contract is specially tailored to meet your business needs and will help keep your equipment operating as efficiently as possible.

Kalmar Genuine Parts

When the right part matters. When something needs to be replaced urgently, you need a spare part that meets your exact needs – immediately. Kalmar offers a rapid delivery service for over 50,000 premium-quality genuine parts to anywhere in the world, with installation support if needed.



Kalmar Insight

Kalmar Insight* is a performance management tool for cargo handling. It gives you an easy-to-use overview of your fleet operations, by aggregating data from Kalmar equipment and other manufacturers' equipment, providing information accessible on mobile, tablet or more traditional screens. Review your entire fleet's activities, schedule maintenance based on your equipment's operating hours and take action on real-time information, all helping you improve your overall operations immediately.

Kalmar Modernisation Services

Kalmar Modernisation Services enables you to upgrade your fleet including Automatic Stacking Cranes (ASC), Rubber Tyred Gantry Cranes (RTGs), Rail Mounted Gantry Cranes (RMGs), Ship to Shore Cranes (STS), Shuttle and Straddle Carriers and help maximise their performance. With our industry-leading experts and decades-long experience we can help you lower your fleet's total cost of ownership and adapt to your changing operational requirements.

Kalmar MyParts

Open 24/7. Kalmar MyParts allows you to order genuine Kalmar parts online 24/7. You can also access information on your Kalmar equipment to ensure that you are ordering exactly the right part.

Kalmar Remote Services

An expert always on hand. With Kalmar Remote Services, you can access our deep pool of experience and expertise to help solve equipment and automation software problems no matter where you are in the world. From one-off issue analysis to continuous monitoring, we will make sure you always have an expert on hand to help.

Kalmar Software Maintenance and Support [M&S]

The Kalmar Software Maintenance and Support team will be by your side for the lifetime of your application, making sure that your chosen automation solution is always up to date and running optimally. Our software support packages will ensure you have the latest version of your software loaded with the latest error fixes and functionality enhancements. You will have access to our experts so you can solve problems quickly and keep your software running efficiently.

Kalmar Terminal Design Services

Building a new terminal, changing operational mode or renewing your current operations is a demanding and risky task, which is why you want a knowledgeable and experienced partner. Kalmar Terminal Design Services, with over 250 projects delivered globally in the last 15 years, provides a full range of design services to help you realise your ambitions and improve the capacity and flow of cargo through your terminal.

Kalmar Training

Get the best from your people. Proper training is key to optimising your operations as it helps you improve the skills of your workforce. Kalmar Training provides technical, operational and systems training, to name a few, on our terminal and industrial solutions. These courses ensure that your operators and technicians are properly prepared to perform their work safely and efficiently.

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



KALMAR

Making your every move count

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