

# Rubbertyre gantry cranes

## LIEBHERR

Liebherr Container Cranes Ltd.



# Rubber tyre gantry crane

## High tensile structural steel

- Reduced weight leading to savings in civil in

## Self powered trolley

- Ensures precise positioning.

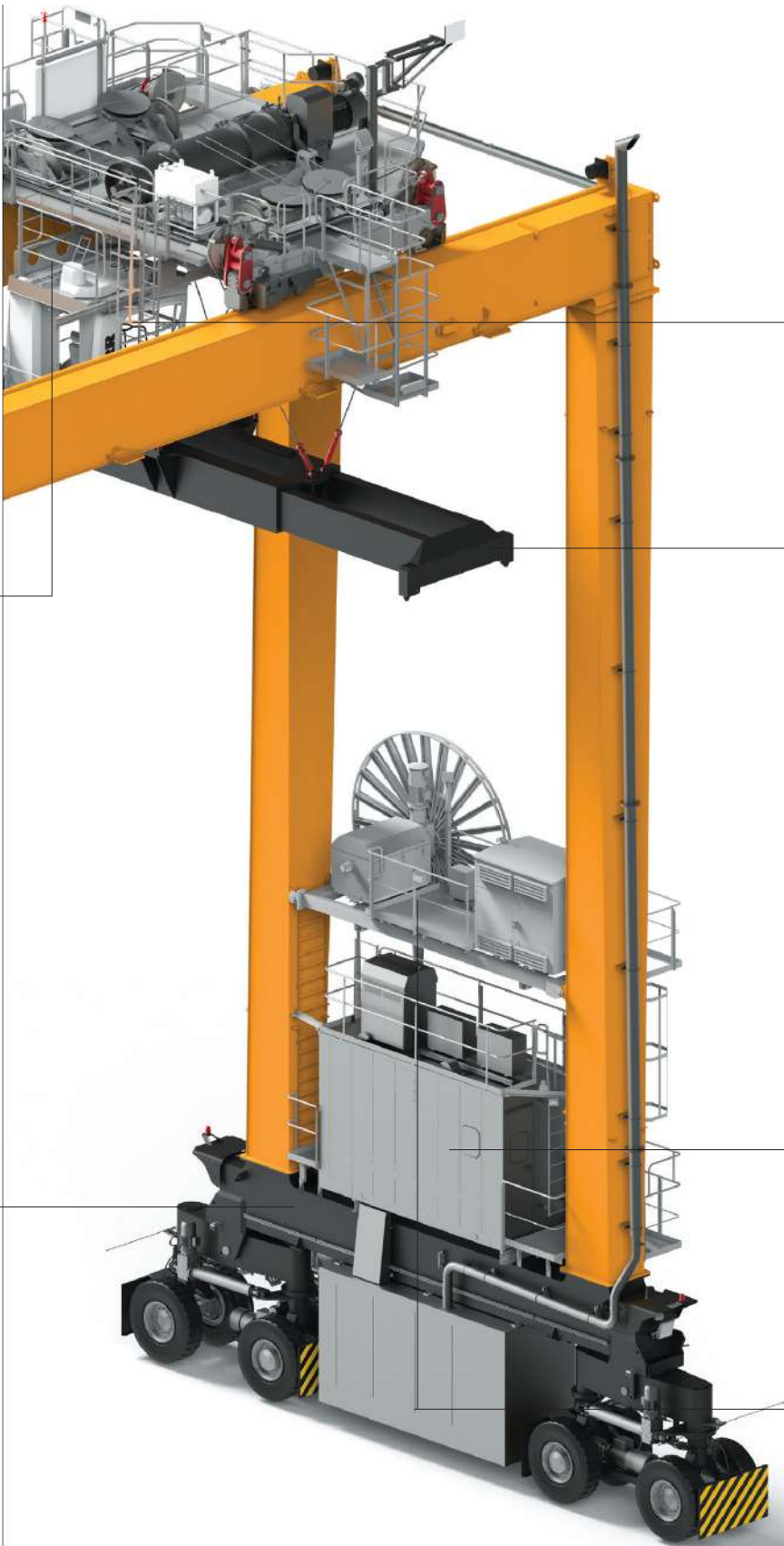
## Simultaneous motion

- Simultaneous motion of all drives for increased productivity.

## Performance and safety

- Anti collision, gantry align and optional DGPS for improved safety and productivity.





**Ergonomic driver's cabin**

- Designed with driver comfort and productivity in mind.
- Reduced fatigue.

**Unique Liebherr hoist system**

- No requirement for a headblock.
- Reduced weight and energy consumption.
- No additional motors or ropes for positioning of spreader leading to reduced maintenance costs.
- Eight rope reeving ensures no sway or skew.
- Precise spreader positioning for increased efficiency.

**Modular drive systems**

- "Plug-in" modular construction of main drives assists fault finding and results in reduced maintenance costs.

**Choice of power options**

- Depending on operational requirements, choose from all electric (cable reel drum or busbar), diesel electric, dual or variable speed diesel, or hybrid.

<b>Span</b>	5 to 10 containers wide plus truck lane
<b>Lifting height</b>	1 over 3 to 1 over 6
<b>S.W.L.</b>	40.6t single lift, optional 50 to 60t lift
<b>Wheels</b>	8 or 16

# Productivity

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## Liebherr technology powering productivity

Liebherr cranes are engineered with efficiency in mind. Each component has been specifically designed for maximum productivity, reliability, and quality.

The result is a crane delivering excellent productivity, with exceptional lifetime costs and industry leading longevity.

## Eight rope reeving system

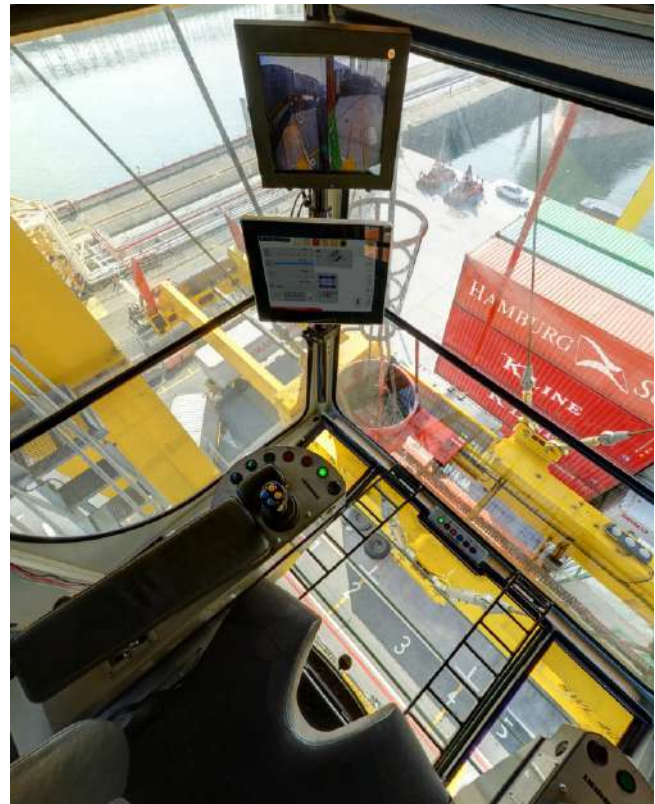
### Sway elimination

The eight rope reeving arrangement for the hoist as located on the trolley ensures load sway is eliminated in hoist, trolley, long travel and skew directions.

Combined with superior fine positioning for stack building and truck handling, allows for productivity increases of between 30 - 40% when compared to alternative designs .

### Electric spreader

The all electric spreader connected directly to the hoist ropes without a head block reduces tare weight, providing a more energy efficient cycle. Single or twinlift execution can be provided.



## Liebherr drive systems

### Liduro drives

Liebherr engineered AC drive control system ensures maximum reliability and ease of service and repair.

The drives feature a crane specific modular design utilising high quality components throughout and a liquid cooling system.

### Drive management systems

Liebherr's drive management system delivers simultaneous motion of hoist, trolley and travel, with increased performance and reduced energy consumption. Drive control is optimised.

## Tools for productivity

### Ergonomic drivers cabin

A spacious ergonomically designed cabin with a high degree of glazing for optimal visibility is provided.

Driver comfort is ensured with the latest in control console and seat technologies coupled with air conditioning and driver aids.

### Options

- Twinlift 50 tonnes/60 tonnes
- DGPS automatic gantry steering
- Container position recognition
- Stack profiling
- Interface to terminal operating system
- Contactless anti-collision system
- Remote access to CMS
- Automation
- Remote control

# Performance and reliability

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Liebherr rubber tyre gantry cranes benefit from extensive in-house expertise in structural, mechanical, electrical and electronic engineering thereby guaranteeing the highest standards in innovative technology, product quality and long term performance as well as reduced operating and lifetime costs.

## Direct driven wheels

Liebherr RTGs feature direct driven long travel wheels driven via motor/gearbox coupling units. The RTGs are available in a variety of models with 8 or 16 wheels. 16 Wheel RTGs deliver lower wheel loads with differential axles leading to reduced tyre wear.

## Steering mode

Liebherr's gantry align steering is supplied as standard on all RTGs, eliminating crabbing and boosting performance.

## Motor selection

All drives are sized for maximum torque and power requirements guaranteeing extended lifetime. The Liebherr hoist unit delivers exceptional control.

## Diesel engine/genset

Fuel efficient engines/ gensets from leading industry suppliers.





SWL41T

RTG006N

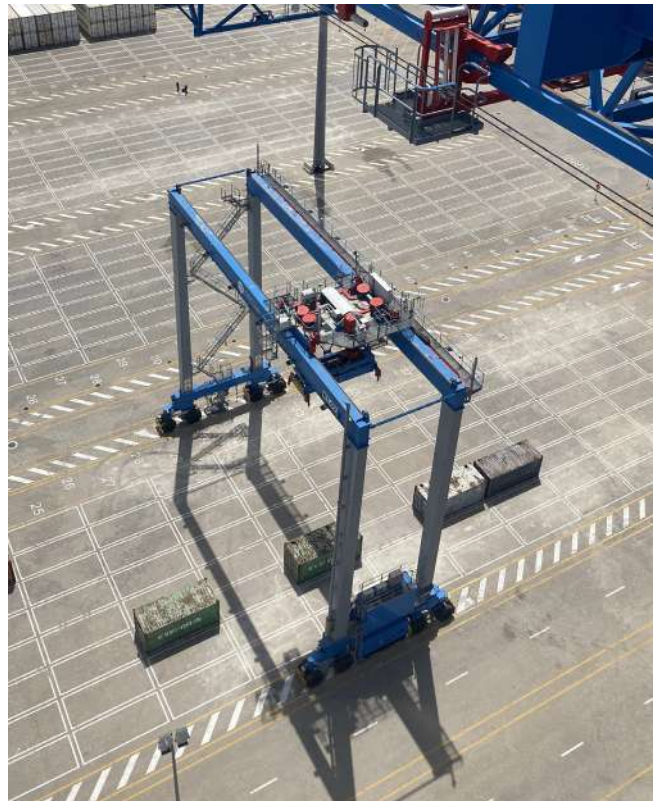
RTG006N

TRANSNET

TR71N

# Automation

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## Productivity

Automation systems from Liebherr increase safety, productivity, predictability and reliability whilst reducing maintenance and environmental impact. Algorithms take care of the most monotonous tasks with human intervention only when needed ensuring a better all-round performance.

## Benefits

### Environment

Liebherr's automation systems ensure that your equipment is performing optimally. Each movement is measured and precise, resulting in reduced power requirements, emissions and noise.

### Safety

The introduction of smart technology reduces the opportunity for human error. Extensive safety protocols are embedded throughout our automation systems.

### Efficiency

Automation brings many benefits including increased predictability, allowing improved operational planning with greater visibility. Operating 24 hours a day, the machines don't get tired and can carry out housekeeping of the stack in quieter periods, growing capacity and operational efficiencies.



## Remote Operator Station

Whilst the entire cycle can be automated, sometimes manual control is necessary.

The Liebherr Remote Operator Station (ROS) allows the crane operator to work in the comfort of an office environment whilst experiencing the same control as an on-board operator.

Depending on operational requirements, the ROS can be used for full remote control, exception handling or manual pick or place of containers.



## Liebherr ROS architecture

The ROS is designed to promote operator comfort and well-being through ergonomic design. It allows for multiple adjustments of desk and screen positions and height to accommodate operators of different sizes. The desk is specifically designed with the operator's needs in mind. The ability to independently adjust the height of the desk and screens reduces strain on the operator, ensuring a comfortable position and preventing fatigue, whilst the adjustable armrests provide further support whilst operating the crane.

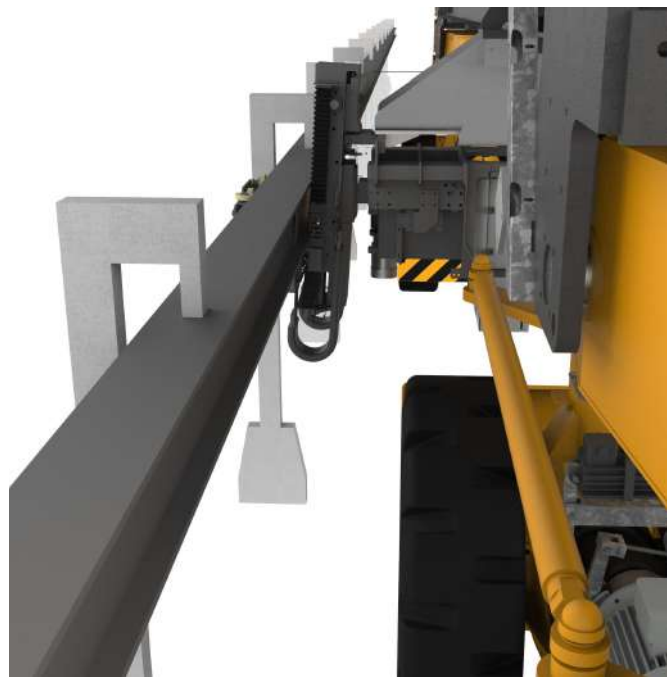
# Conductor bar ERTG - (ERTG-CB)

## Clean, connected, continuous.

The Liebherr Conductor Bar (ERTG-CB) solution eliminates the need for a genset, with power directly from the electricity grid. This proven technology has been widely adopted in container terminals, delivering substantial cost savings, and zero local emissions, allowing for a clean and efficient operation. An always on connection ensures seamless power and data transmission making the ERTG-CB particularly suited for terminals integrating automation and remote operation technologies.

### Advantages of the conductor bar solution

- Eliminates diesel engine, significantly **reducing carbon emissions** and energy costs
- Enables ports to integrate **renewable energy** sources into daily operations
- Supports decarbonisation goals, contributing to **zero-emission targets**
- Absence of a diesel engine slashes the number of moving parts, **cutting maintenance frequency and costs**
- **Reduces noise pollution**, creating a quieter, more productive port environment
- **Reduced weight** of RTG with no engine or fuel tank/fuel on board reducing operational costs – A wired connection is optimum for automation



### RTG cross travel

For instances where the RTG must move beyond its fixed electrified track, Liebherr provides auxiliary power solutions. These external power options can be shared among multiple RTGs, optimising resource usage. Choose from auxiliary diesel genset or Liebherr's cross travel battery the LPO 100

Cross Travel Battery	Liebherr LPO 100
Battery Capacity	85 kWh
Battery OEM	Liebherr
Cross Travel Genset	Diesel Powered
Output	130kW

### Liebherr LPO 100 cross travel battery

The **Liebherr LPO 100 Battery** is a **standalone, high-performance lithium-ion battery system** engineered for electrified port equipment. Designed for flexibility, the battery can be charged up by simply plugging in. The LPO is portable, allowing multiple RTGs to share the same auxiliary power source. A forklift can easily transport and position the battery, enabling quick and seamless deployment.



# Cable reeling drum ERTG - (ERTG-CRD)

## Flexible electrification, zero compromises.

The Liebherr Cable Reeling Drum (ERTG-CRD) is a flexible, yet fully electric alternative to traditional diesel-powered RTGs, significantly reducing operational costs, emissions, and maintenance requirements. A wired, always on connection for power and data ensures no limitations when it comes to automation and remote control. The flexibility of a cable reeling drum avoids extensive civil works and provides a hassle free route to a net zero

### Advantages of the cable reeling drum solution

- Eliminates diesel Engine, significantly **reducing carbon emissions** and energy costs
- Enables ports to integrate **renewable energy** sources into daily operations
- Supports decarbonisation goals, contributing to **zero-emission targets**
- Absence of a diesel engine slashes the number of moving parts, **cutting maintenance frequency and costs**
- **Reduces noise pollution**, creating a quieter, more productive port environment
- **Reduced weight** of RTG with no engine or fuel tank/fuel on board reducing operational costs – A wired connection is **optimum for automation**
- **Avoids extensive civil works**
- **Flexibility** of operations with a center or end stack connection



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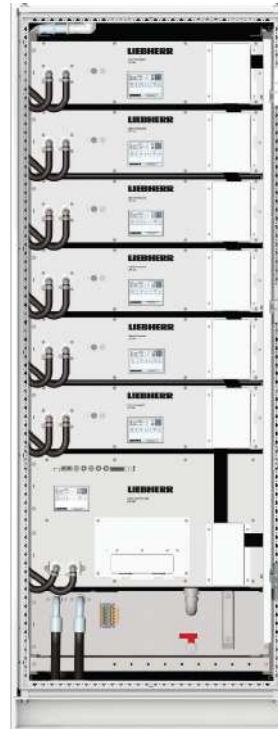


# Capacitor hybrid RTG (RTG-HC)

## Advanced energy storage for peak performance

The Liebherr RTG-HC integrates the Liduro Energy Storage System (LES) to capture and store electrical energy regenerated during hoist lowering and braking. This stored energy is then used to supplement the power supply, significantly reducing fuel consumption, emissions, and operational costs while maintaining peak performance. Energy costs and emissions can be reduced by up to 30 % with the utilisation of a single unit.

By leveraging capacitor technology, the RTG-HC provides immediate energy discharge when required, reducing peak loads on the genset and enabling a smaller engine size for improved fuel efficiency. The Liebherr hybrid capacitor power can also be fitted to RTGs with older generators. It typically offers a payback period of two to three years, making it a cost-effective solution that delivers significant environmental benefits by reducing fuel consumption and emissions.



## Advantages

- **Reduced energy costs:** Lowers fuel consumption by enabling the use of a smaller genset
- **Enhanced efficiency:** Smooths peak loads, optimising energy consumption and crane operations
- **Sustainability:** Enables a downsized genset (250 kW or less), cutting fuel usage and CO<sub>2</sub> emissions by up to 30%
- **Rapid energy deployment:** Capacitors provide near-instantaneous power when required
- **Long lifespan and low maintenance:** Designed for one million charge/discharge cycles, the system ensures long lifespan and low maintenance costs

## Peak shaving – smart energy management

Peak shaving is a crucial energy management strategy that reduces electrical power demand during high-power operations such as hoisting. By integrating the LES, peak power demands are supplemented with stored energy, reducing strain on the main genset and improving overall efficiency.

The LES is capable of outputting up to 100 kW for a period of 15 s, ensuring no loss in performance with the smaller more efficient genset.

# Hybrid capacitor system overview

## Performance and lifespan

The RTG-HC capacitor system is designed for long-term reliability, offering a lifespan of up to **20 years** under standard operating conditions. With over **one million charge cycles**, the system outlasts conventional battery-based solutions, making it ideal for high-intensity operations

The system operates efficiently in extreme climates, ensuring stable performance in temperature ranges from **-20°C to 45°C**

## Energy management system (EMS)

To optimise performance and ensure safety, the integrated EMS continuously monitors and controls the system. Key features include:

- Real-time **State of Charge (SOC)** monitoring
- **Optimised charging and discharging** to ensure maximum fuel efficiency
- Automatic **power balancing** to to maximise the use of stored energy whilst maintaining rated performance
- Seamless integration with the **Crane management system (CMS)** for diagnostics and remote access

## Cooling and maintenance

The LES is **liquid-cooled**, ensuring stable temperatures and extended operational life. The **self-monitoring system** continuously checks operating conditions, reducing the need for manual maintenance. With **low-to-no maintenance requirements**, the capacitor system offers maximum uptime with minimal intervention.

## Technical specifications

Specification	Details
Storage medium	Double-layer capacitors
Cooling	Liquid-cooled
Energy capacity	Up to 4140 kJ
Rated power	200 kW
DC Voltage range	530 - 900 V
Load cycles	>1,000,000
Temperature range	-20°C to 45°C
Protocols	CANopen / profinet
Design lifespan	20 Years*

\*Dependent on capacitor configuration, environment, and working conditions.

# Battery hybrid RTG (RTG-HB)

## Battery powered for reduced running costs/emissions

The Liebherr battery hybrid RTG crane (RTG-HB) consists of a small variable speed diesel generator and a high-capacity battery system with integrated power management. The battery powers all crane systems, including the hoist, gantry, trolley, and auxiliaries. When the battery reaches a predefined lower state of charge, the onboard diesel genset automatically recharges the battery to full capacity, while operating at peak fuel efficiency.

The crane remains fully operational during the charging process, ensuring uninterrupted performance. The battery system recaptures energy when the crane is braking and lowering, energy which on non-hybrid machines must be dissipated in the brake resistor. The crane is totally self-sufficient and requires no grid connection (unless operating in cold climates).



## Advantages

- **Smaller engine for reduced emissions:** Engine can be downsized to 100kW or less, compared to a conventional diesel generator of 350kW
- **Energy efficiency:** Highly efficient energy recovery through Liebherr's proprietary Liduro variable speed drive, e.g., during hoist lowering
- **Improved sustainability:** No engine idling, and full recapture of regenerated energy
- **Extended operations:** During typical operations, the crane can run off a single charge for up to two hours or longer when there is extended low activity
- **Significant saving:** Up to 50% fuel saving\*
- **Fast charging:** Fully recharged in less than 30 minutes

*\*Dependent on several factors such as battery configuration, environment and working condition.*

## Battery management system (BMS)

To ensure optimal battery performance and safety, the **Battery Management System (BMS)** plays a central role in monitoring and controlling battery operations. It is responsible for:

- Monitoring the battery's **state of charge (SOC), health, and performance**
- Managing **charging, discharging, and rebalancing** for optimal efficiency
- Activating **emergency cut-off** if required for safety
- Connecting seamlessly to the **Crane Management System (CMS)** for real-time diagnostics and remote

# Battery RTG overview

## Battery performance and lifespan

The hybrid battery system in the RTG-HB is designed to provide reliable long-term performance, offering a typical battery lifespan of **eight years** under standard operating conditions. This assumes **12 moves per hour, 20 operating hours per day, and a 25-ton load**, with the battery's **state of charge automatically monitored and optimised**. Beyond this point, the battery life may be further extended by means of a straightforward reconfiguration and can ultimately be replaced at very modest cost.

In regions with extreme climates, it is advisable to connect the crane to the grid when not in use to maintain battery health. High temperatures and severe cold can impact battery efficiency, and grid connection helps preserve long-term performance.

## Maintenance and diagnostics

Routine battery maintenance is minimal, focusing primarily on the cooling systems. However, operators should regularly check the **Battery management system (BMS)** via the **Human-Machine Interface (HMI)** for diagnostic messages.

For more advanced troubleshooting, Liebherr enables **remote access** to the BMS, allowing expert analysis without the need for on-site intervention. Additionally, Liebherr supports customers through **service and spare parts hubs** located worldwide, ensuring global availability of components and technical assistance.

## Cooling system

Battery cooling is essential for maintaining system stability, safety, and longevity. The RTG-HB features a **dual cooling** solution, consisting of:

- **Liquid cooling** for the battery modules, ensuring even temperature distribution within the cells
- **Air conditioning** for the battery housing and power electronics, preventing overheating and maintaining a controlled operating environment

This combined approach enhances the battery's lifespan and reliability, even in high-demand applications or challenging environmental conditions.

## Technical specifications

Specification	Details
No. of Battery Modules	8
Capacity (Ah)	250
Packing Voltage (VDC)	592
Capacity (kWh)	148*
Rated Power (kW)	350
Typical Lifespan	8 Years**
DC Bus Bar Voltage Range	500-640 VDC

## Energy efficiency and fuel savings

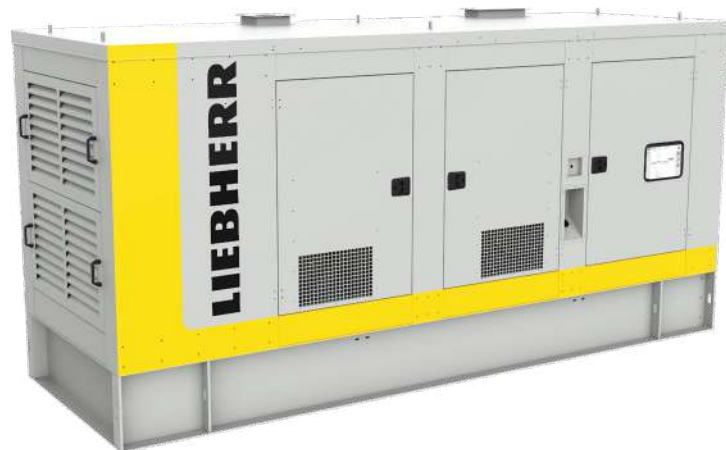
The RTG-HB's hybrid system delivers significant fuel savings through its integration of a **downsized 5-litre genset** and state of the art battery modules and power management system. Compared to Liebherr's variable-speed diesel genset, this hybrid power system offers reductions in fuel consumption by up to 50%, with associated cost savings and substantial environmen-

# Variable speed genset RTG (RTG-VSG)

## Efficient power management for flexible operations

The Liebherr variable speed genset rubber tyre gantry crane (RTG) delivers high performance while reducing fuel consumption and emissions. By continuously adapting engine speed to match requirements, the RTG-VSG offers significant operational savings, quieter running, and lower environmental impact.

Designed for terminals where electrification is not practical, the system ensures reliable crane operation. Smart energy management and HVO compatibility allow for increased sustainability.



## Advantages

- **Lower operating costs:** Reduces fuel use by matching power output to actual crane demand
- **Reduced emissions:** Efficient combustion and smart control reducing CO<sub>2</sub> and NO<sub>x</sub> output
- **Low noise levels:** Smart idle and sound-optimised enclosure enable quieter operation
- **Longer component life:** Reduced engine wear due to optimised load response
- **Minimal maintenance:** Lower strain on components and built-in monitoring reduce

## Smart genset technology

The RTG-VSG employs a real-time, load-responsive energy strategy that ensures only the required power is delivered when needed. This intelligent system increases energy efficiency without compromising crane performance.

- **Load-matching control:** Adjusts genset speed based on real-time work-load
- **Smart idle function:** Maintains system readiness at reduced RPM during standby
- **Fast load response:** Instantly ramps up to full power during crane operation
- **Integrated diagnostics:** Data is displayed through the crane management system (CMS), allowing real-time monitoring and maintenance planning

## Alternator

The alternator is designed for high reliability and energy efficiency.

- **Self-exciting technology:** Generates excitation current internally, eliminating the need for an external power source
- **Automatic voltage regulator (AVR):** Maintains consistent output voltage
- **Thermal monitoring:** Dual thermistor probes continuously monitor temperature and integrate with the Crane Management System (CMS) for real-time diagnostics and protection

## Engine controller

The engine controller ensures precise power management and operational efficiency.

- **Integrated with crane PLC:** Displays real-time information, messages, and diagnostics on the CMS
- **Touchscreen interface:** Provides local monitoring and ease of maintenance
- **Remote connectivity:** Enables instant diagnostics and event logging, reducing downtime

## Enclosure design and features

The genset is housed in a robust enclosure engineered for **durability, noise reduction, and ease of**

- **Integral base frame and fuel tank:** Includes a 1,000-litre fuel tank with built-in mounting points for engine, alternator, and radiator
- **Anti-vibration isolation:** Reduces mechanical stress and operational noise
- **Noise reduction:** Designed to achieve 85dBA, ensuring a quieter work environment

## Maintenance and accessibility

Liebherr ensures maximum uptime with minimal maintenance requirements. Key accessibility features

- **OEM maintenance guidelines:** Detailed service instructions supplied
- **Easy access doors:** Located on both sides for convenient servicing
- **Integrated roof lighting:** Two centrally mounted lights with a **switch on each side** for enhanced visibility

# Choosing the right RTG for you

RTG cranes typically operate for 20 years or more and perform up to two million container movements. The choice of power system has a profound impact not just on operating costs, but also on carbon emissions and overall efficiency. Whilst power systems typically represent less than 10% of the initial purchase price of the machine, they can have a profound impact on lifetime operating costs and environmental impact.

Choosing the correct machine and power system for your operations can result in millions of euros in savings over the lifetime of the crane, along with a substantially lower carbon footprint. In short, the cheapest option today, may prove to be the most expensive over the extended lifetime of the crane.

## Liebherr RTG models

Model	Power source	Advantages
ERTG-CB	Electric (conductor bar)	Fully electric RTG with low lifetime costs and a wired connection, ideal for automation
ERTG-CRD	Electric (cable reeling drum)	All the benefits of the ERTG-CB but with flexibility and limited civil works
RTG-HC	Hybrid (capacitor)	Energy storage by capacitor allows for a smaller genset and reduced emissions with faster energy recharge and peak performance
RTG-HB	Hybrid (battery)	Battery powered hybrid for when flexible sustainability is the number one priority
RTG-VSG	Diesel (variable speed genset)	Fuel efficient RTG with smart power management for reduced emissions

## Expected savings

- **Hybrid crane options** offer **fuel and emission savings of 30–50%**, depending on the model and operational conditions. Indicative lifetime savings may be as high as **€1 million**
- **Fully electric cranes** can deliver **lifetime savings of up to €2 million** compared to traditional RTG cranes
- **Savings vary** based on equipment selection and usage patterns, with considerable scope to optimise lifetime operating costs prior to your investment decision
- **Liebherr's proprietary CAPEX and ROI analysis software** helps you select the **optimal RTG** solution for your specific operational needs

## Return on investment and cost analysis

Understanding the financial impact of power system choices is key to optimising operational efficiency. Using proprietary software, Liebherr provides comprehensive return on investment (ROI) analysis, factoring in:

- Depreciation and inflation, fuel, energy and maintenance costs, based upon the work performed by the machine
- Energy cost comparisons for different power system options, based on customer-specific operational data
- Customised recommendations using validated energy models to determine the most cost-effective solution

By leveraging real operational data and predictive analytics, Liebherr helps customers make informed investment decisions, ensuring the best balance of performance and cost efficiency.



**Product Range**

Liebherr Container Cranes supply ship to shore container cranes, rail mounted gantry cranes and rubber tyre gantry cranes, designed to custom specifications, to discerning customers worldwide. Liebherr cranes have been designed and built in Killarney, Ireland since 1958, with the first container crane being manufactured in 1967. Each crane manufactured today, is built on the strength of this vast experience and innovation.

**Exceptional Customer Support**

Liebherr is a one-stop shop for customer and product support for the lifetime of the crane. From our base in Ireland, we offer spares and service worldwide. Service is available round the clock, 24/7 and is just a call away at any time of the day or night.

**State-of-the-art Technology**

Developed in house and utilising the latest technology and considerable experience of the Liebherr group, our cranes offer an extensive suite of productivity and safety technologies from automation to 3D profiling to boost throughput and efficiency.

**Worldwide and Independent**

Hans Liebherr founded the Liebherr family company in 1949. Since that time, the enterprise has steadily grown to a group of more than 140 companies with over 50,000 employees located on all continents. The corporate headquarters of the Group is Liebherr-International AG in Bulle, Switzerland. The Liebherr family is the sole owner of the company.

