

THE ALL-ROUNDERS

# STRADDLE CARRIERS





**LOW SPECIFIC INVESTMENT COSTS, HIGH POTENTIAL FOR TERMINALS**

**A GOOD PAY-OFF**

**Konecranes is a leading supplier of cargo handling solutions for ports, terminals and industry. Our special competence results from our many years of experience in the development and production of Konecranes Noell Straddle Carriers and our intimate knowledge of terminal processes.**

**TWO MODEL HEIGHTS FOR VARIETY OF TASKS**

Konecranes Noell Straddle Carriers are universal machines with low specific investment costs that make practically no demands on the infrastructures in the terminals where they will operate. They can be used for a wide variety of tasks, ranging from horizontal transport to stacking in the container stack to loading and unloading of trains or road trucks.

**DYNAMICALLY EXPANDABLE CONCEPT FOR THE FUTURE**

Konecranes Noell Straddle Carriers are ideal for building and expanding entire fleets step-by-step to match your needs. The machines are designed to make versatile use of terminal space. State-of-the-art control and driver assistance systems and their potential for semi or full automation make Konecranes Noell Straddle Carriers a dynamic concept sure to be a success in the long term.



1968: Pioneer of straddle carrier technology. Konecranes is one of the co-founders of straddle carrier technology. Our plant in Würzburg (Germany) is our competence center for design engineering and production. The excellent quality of Konecranes Noell Straddle Carriers also results from a high level of vertical integration.



**KONECRANES NOELL STRADDLE CARRIERS**

- Low specific investment costs
- Universal cargo handling machine with load capacities up to 60t
- Productive team of Konecranes Noell Straddle Carriers and Konecranes Noell Spreaders
- For building and expanding fleets step-by-step
- Especially eco-friendly drive variants
- Potential for semi and full automation

Right choice for a variety of tasks: diesel-electric Konecranes Noell Straddle Carriers can be used for a wide variety of tasks in the container terminal like stacking high-cube containers.

Models	Drive systems			Max. lifting capacities [t]		Stacking capabilities [9'6" high-cube container]	
	Diesel-hydraulic (H)	Diesel-electric (E)	Hybrid (E ECO)	50	60*	1-over-2	1-over-3
N SC 634 H	✓			✓	✓	✓	
N SC 644 H	✓			✓	✓		✓
N SC 634 E		✓		✓	✓	✓	
N SC 644 E		✓		✓	✓		✓
N SC 634 E ECO			✓	✓	✓	✓	
N SC 644 E ECO			✓	✓	✓		✓

\* In exceptional cases, maximum lifting capacity of 60t; actual lifting capacity dependent on spreader capacity

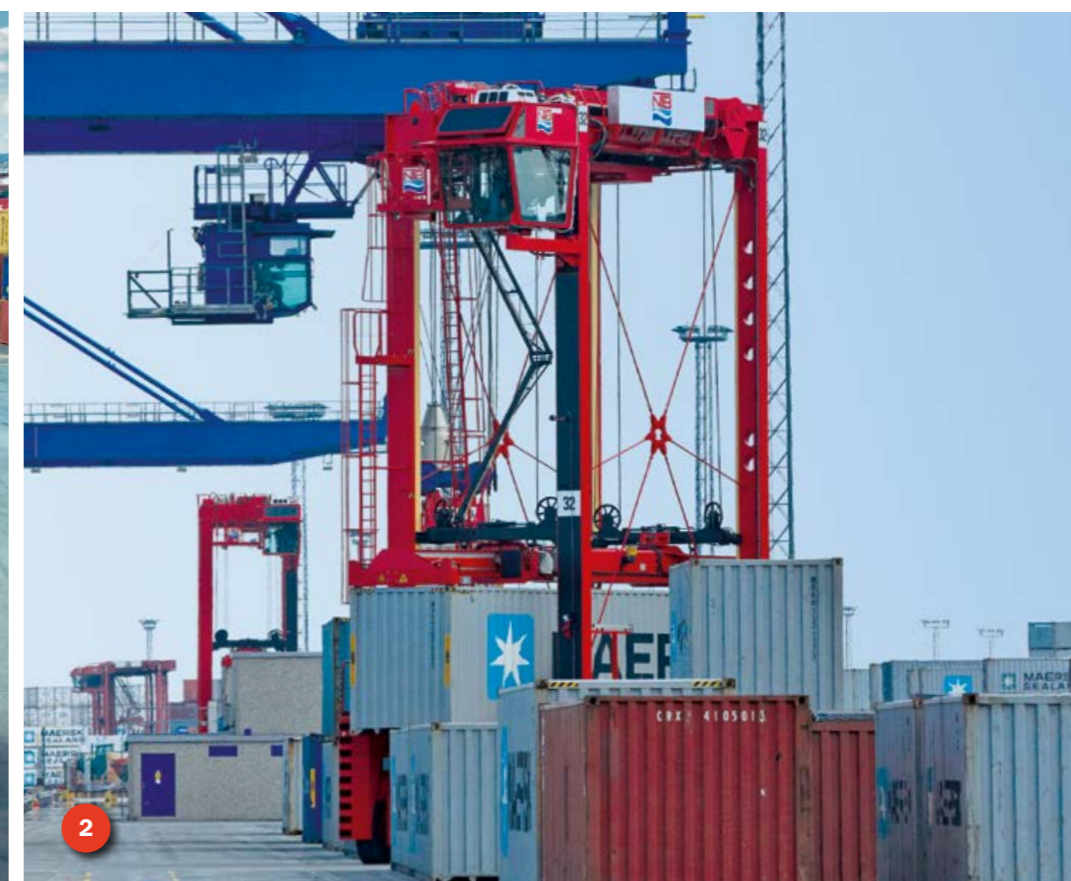
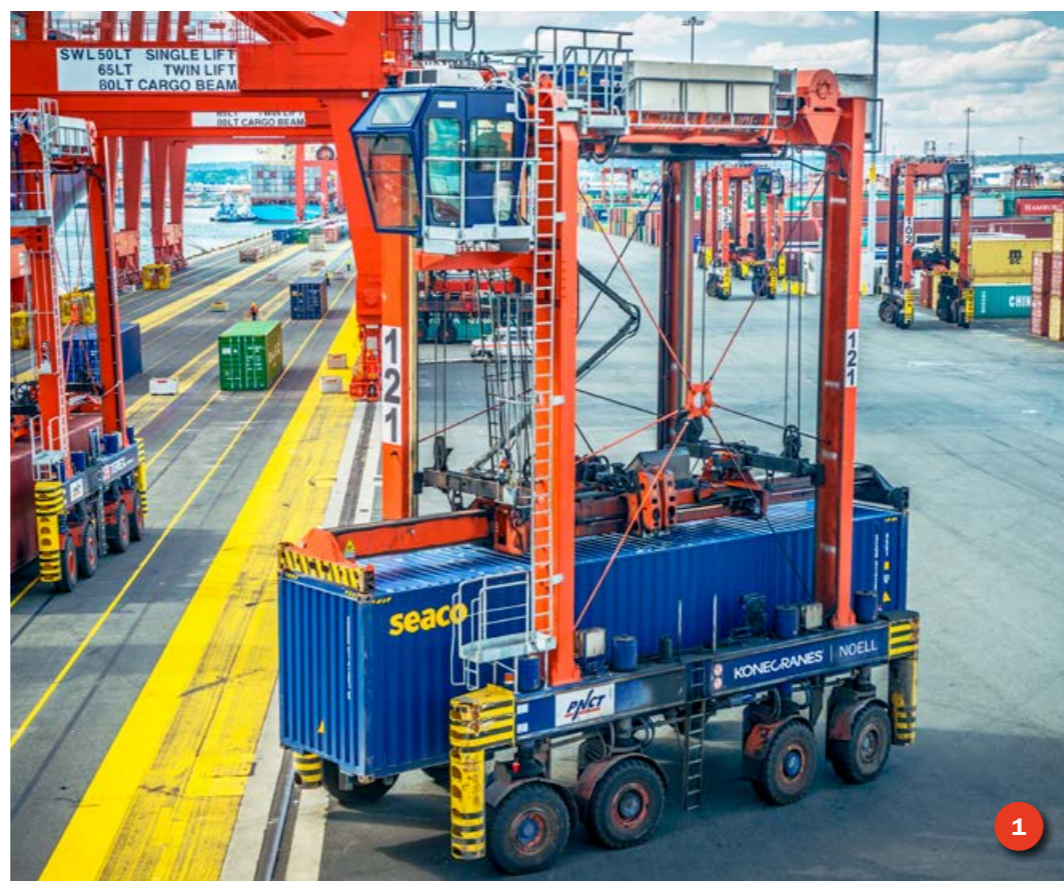


## DIVERSE AREAS OF APPLICATION THROUGHOUT THE TERMINAL

**MULTIFUNCTIONAL**

**Konecranes Noell Straddle Carriers are designed for versatility. To cope with the different processes in day-to-day terminal operation, we have equipped the machines with state-of-the-art technology. An application-oriented holistic system has been created, which allows you to face the challenges of today and tomorrow with confidence.**

- 1** Horizontal transport: with fast and maneuverable Konecranes Straddle Carriers, you can move containers rapidly from A to B in your terminal.
- 2** Rail feeder and loader: if your terminal is connected to the rail network, the machines can bring containers safely to the train or even load them on to it.
- 3** Stacking in the container stack: depending on the model height, the straddle carriers can stack containers quickly and economically, either 3 or 4 high.
- 4** Loading and unloading trucks: if trucks drive in and out of your terminal, Konecranes Noell Straddle Carriers are also the transport medium of choice.

**UNIVERSAL AND VERSATILE**

- Number of machines and interfaces minimized as all tasks are performed by one machine type
- Particularly easy implementation and enlargement of cargo handling fleet when required
- State-of-the-art assistance systems help to accelerate cargo handling
- The fleet management system always has a grip on the operating data



## KONECRANES NOELL STRADDLE CARRIER AT A GLANCE

# ALL-ROUND WELL-BUILT

The design of Konecranes Noell Straddle Carriers takes its cue from conditions prevailing in the terminal. They are easily maneuverable and offer high travel speeds. Their light-weight, but adequately rigid and durable steel structure and their low center of gravity provide a high degree of safety and convenience for the driver.

The slender portal and an all-round glazed cab offer drivers the best possible view of the whole working area at all times. In combination with the Konecranes Noell Spreader and the use of state-of-the-art components, the result is a highly cost-effective vehicle design.

### VETROKAB DRIVER'S CAB

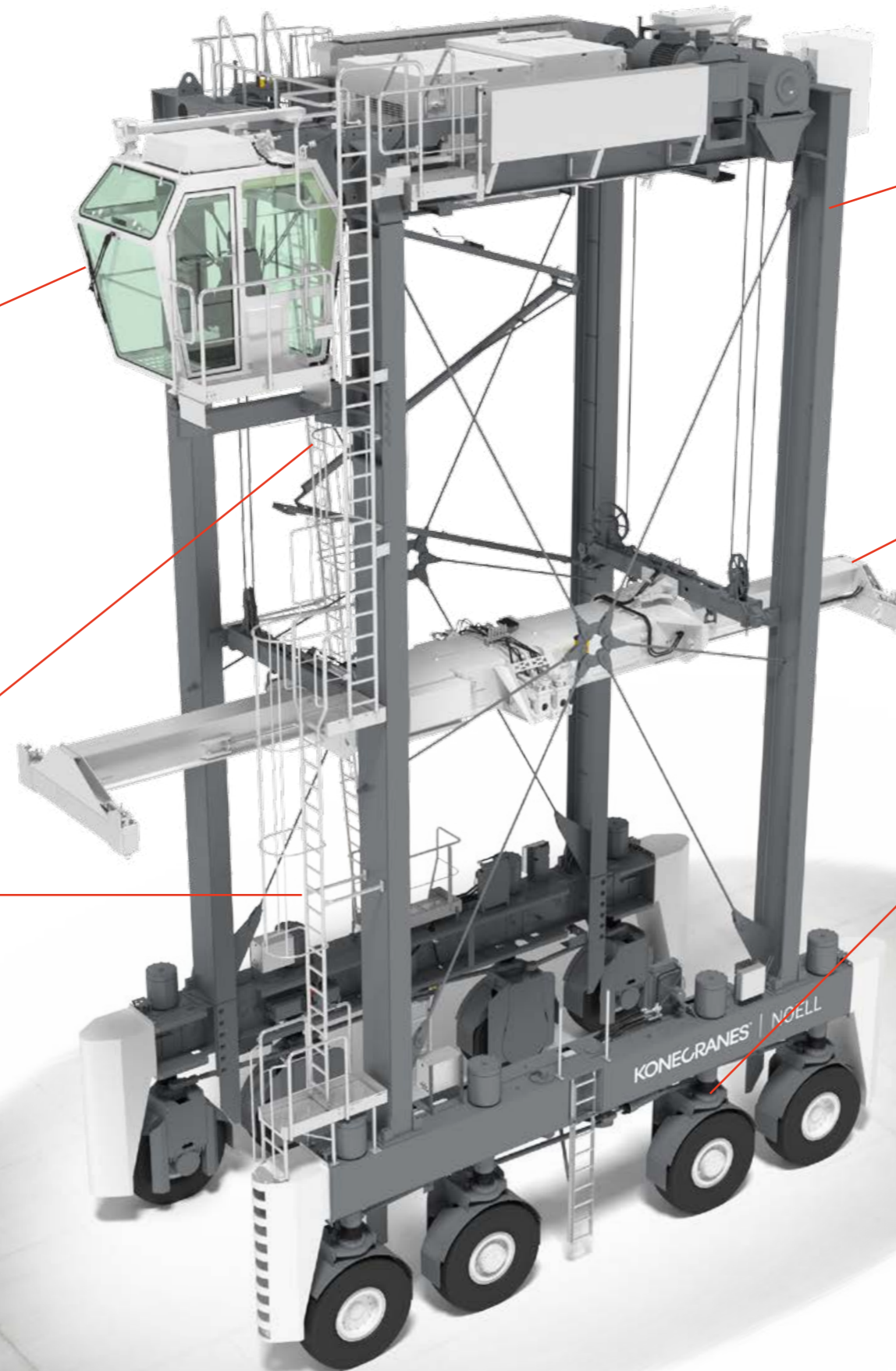
- Large glass panels for good all-round visibility
- Ergonomically designed, adjustable driver seat; electrically rotatable on request
- Clearly structured displays
- Second seat for training instructor (optional)
- Other cab models available



Customer-specific cab configurations possible.

### STAIRWAYS

- For easy and safe access to the driver's cab and machinery platform
- Second stairway (optional)



### PORTAL

- Lightweight steel design with diagonal braces
- Yoke beam guided by low-maintenance sliding pads in the portal
- Spreader power and hydraulic supply via cable scissor arm or cable chain

### SPREADERS

- Konecranes Noell Single-Lift and Twin-Lift Spreaders
- Patented modular twistlock mounting and locking
- Simple thanks to modern interface technology (CAN bus, corresponding to straddle carrier)
- Precise and fast thanks to smart sensor system and laser technology
- Soft landing function, automatic set-down function and low-maintenance guides

### TRAVEL GEAR

- Good load distribution thanks to eight individually steered wheels
- Direct drive units thanks to wheel hub motors in four driven wheels
- Maintenance-free three-phase motors
- Wheels individually steered by steering cylinders and rods
- Individual wheel suspension with maintenance-free spring system
- Low tire wear thanks to electronic steering control
- Main fuel tank easily accessible in the carriage beam



Wheel hub motor



## MACHINERY PLATFORM IN FOCUS

# EASILY ACCESSIBLE

The machinery platform of the Konecranes Noell Straddle Carrier is clearly structured. Its components are arranged for easy access in order to make service and maintenance quick and convenient.

The use of durable components ensures long service intervals, which significantly contributes to the high availability of Konecranes Noell Straddle Carriers.

The diesel-generator set positioned at the center of the machinery platform can be fitted with a compartment to reduce noise emissions from the machine if required. The hoist system of Konecranes Noell Straddle Carriers is positioned at the edge of the machinery platform to save space. It consists of a centrally positioned electric motor and two synchronized rope drums.

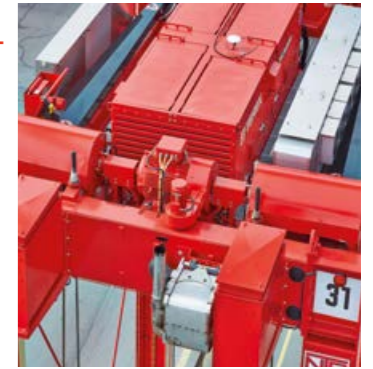


### SWITCH CABINETS

- Contain the entire electrical equipment and electronics
- All cabinets stainless steel, partially air-conditioned

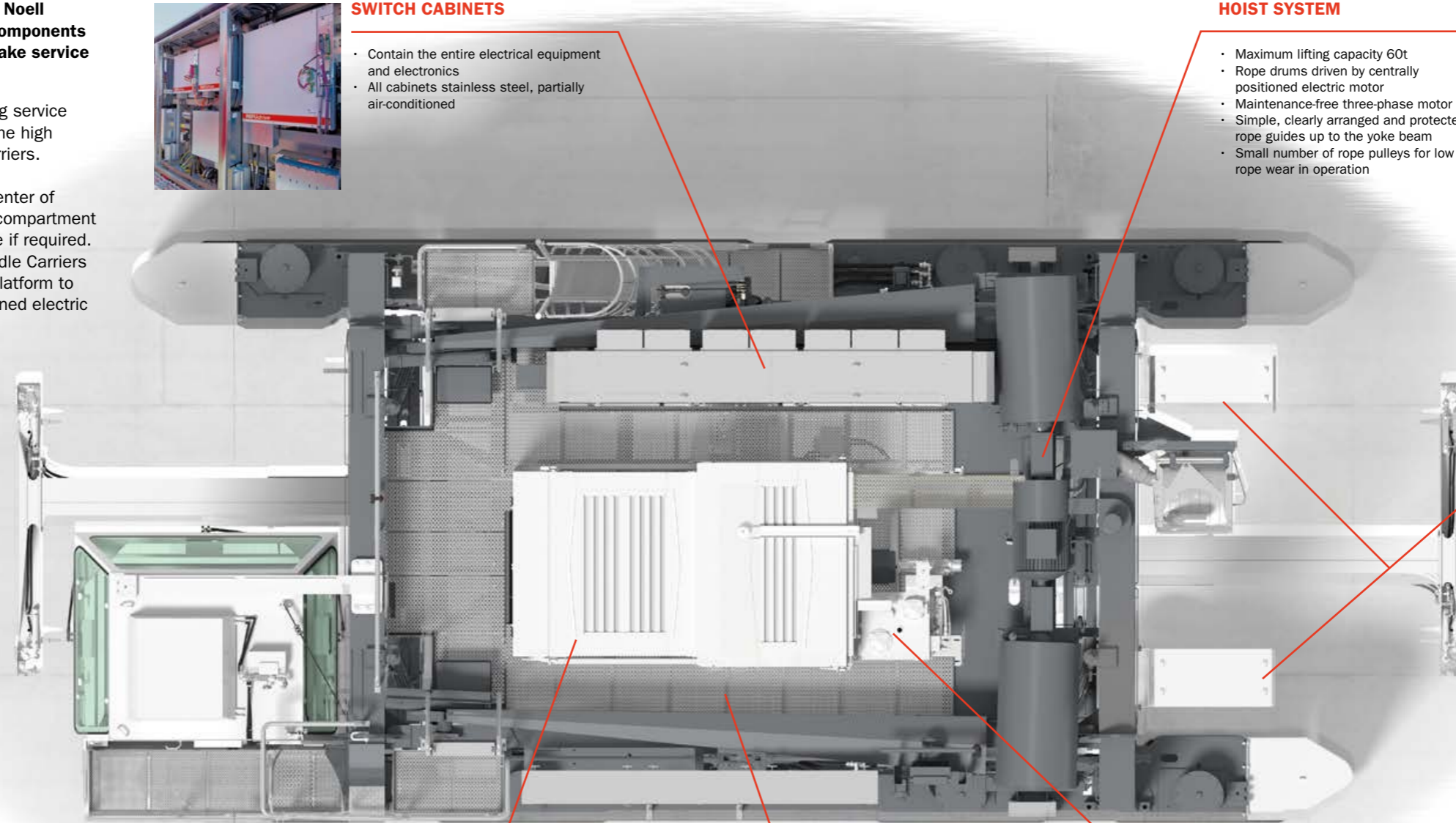
### HOIST SYSTEM

- Maximum lifting capacity 60t
- Rope drums driven by centrally positioned electric motor
- Maintenance-free three-phase motor
- Simple, clearly arranged and protected rope guides up to the yoke beam
- Small number of rope pulleys for low rope wear in operation



### BRAKE RESISTORS

- Both actuated and regulated



### DRIVE UNIT

- High-performance diesel-generator set
- Sliding cover for easy maintenance access

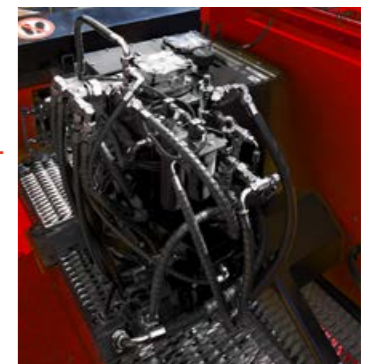


### WALKWAYS

- Amply dimensioned

### HYDRAULICS MODULE

- Supplies spreader, steering cylinders and brake system with hydraulic energy
- Compact construction, physically separated from the diesel-generator set
- Driven by a separate shaft on generator





## ELECTRICAL DRIVE SYSTEMS

# EFFICIENT AND GREEN

Konecranes Noell Straddle Carriers can be equipped with different drive systems. The diesel-electric drive is particularly energy efficient and environmentally compatible, reducing operating costs and relieving terminals from exhaust emissions.

### HYBRID DRIVE

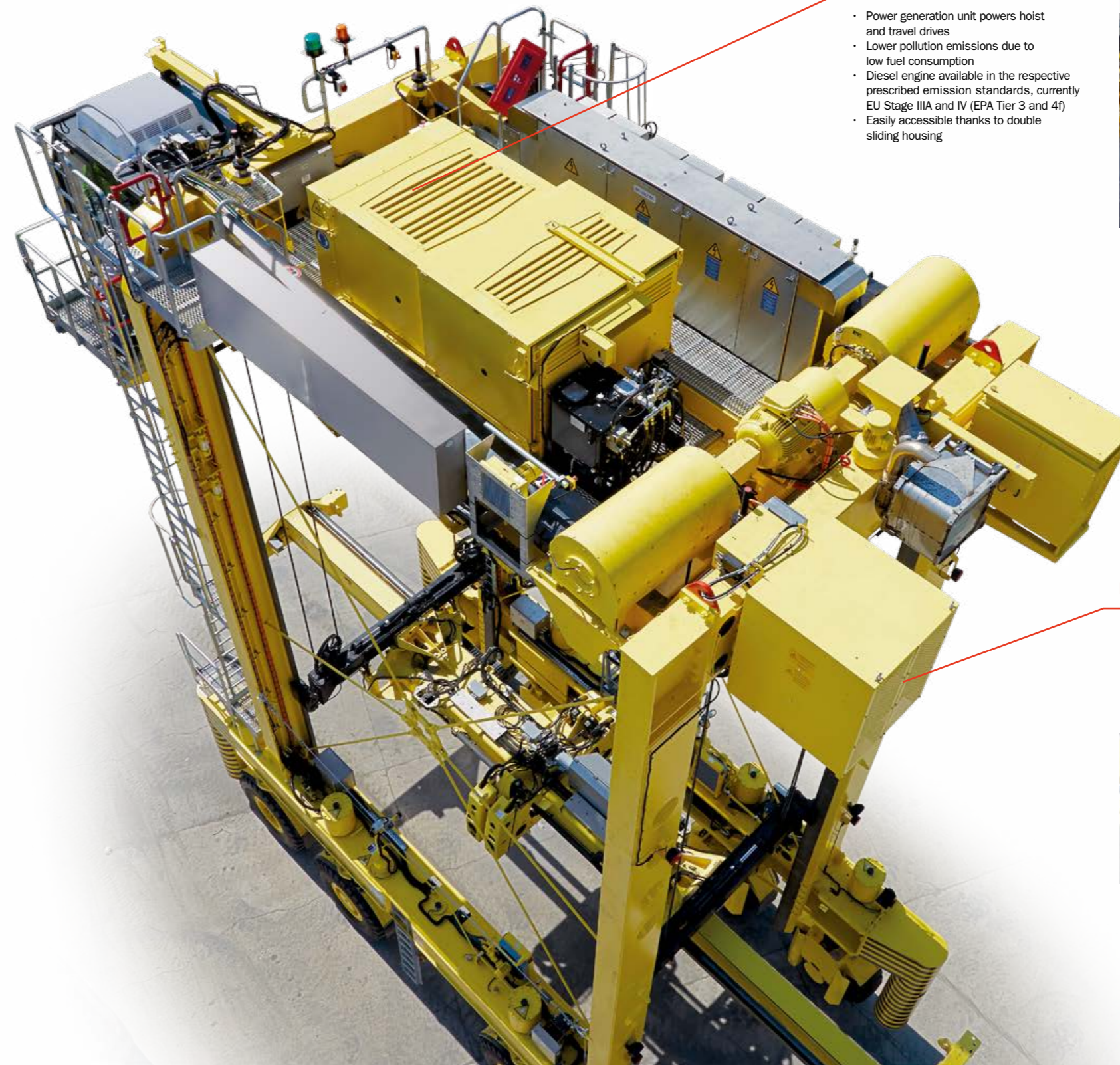
With their optional hybrid drive, Konecranes Noell Straddle Carriers have an even greater sustainable impact. For in the hybrid drive, energy regenerated from lowering and braking is stored in short-term electrical storage modules (ECOCaps) and can be fed back into the on-board power supply when needed.

### ENERGY SAVINGS OF UP TO 20%

The benefits of the hybrid drive not only permit fuel savings of up to 20%, depending on the operating profile of the vehicles, but equally protect the drive components, as consumption peaks are no longer served by the diesel-generator set, but from the ECOCap storage. Engine operation optimized in this way also ensures lower noise emissions for the driver and the terminal thanks to smoother running.

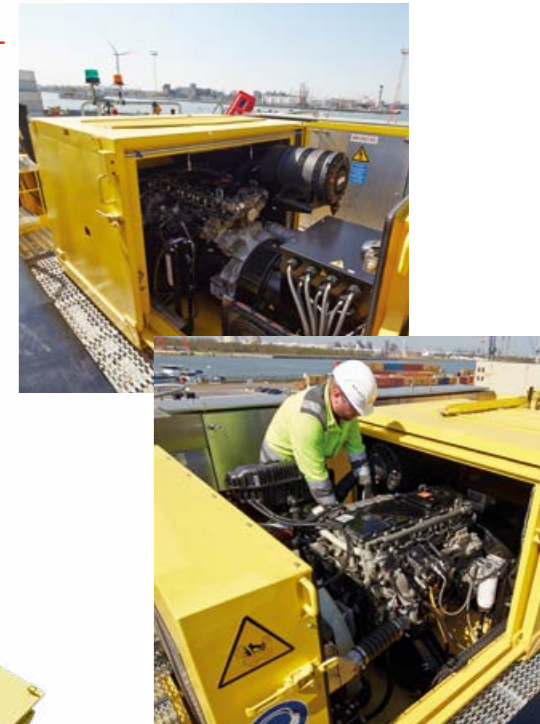
## ELECTRICAL DRIVE SYSTEMS

- Highly-efficient and environmentally-friendly
- Require less energy
- Minimal emissions
- Thus a successful concept in the long term



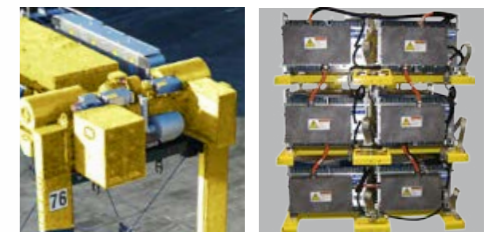
### DIESEL-GENERATOR SET

- Power generation unit powers hoist and travel drives
- Lower pollution emissions due to low fuel consumption
- Diesel engine available in the respective prescribed emission standards, currently EU Stage IIIA and IV (EPA Tier 3 and 4f)
- Easily accessible thanks to double sliding housing



### HYBRID DRIVE

- Second energy source: additional electrical short-term energy storage unit (ECOCap module)
- Maintenance-free, high number of cycles and long service life
- Fuel savings of up to 20% depending on the operating profile
- Easy on all drive components
- Optimizes engine operation, ensures smooth running and minimizes noise emissions



Second energy source: ECOCap module.



## DIESEL-HYDRAULIC STRADDLE CARRIERS

# THE PROVEN ALTERNATIVE

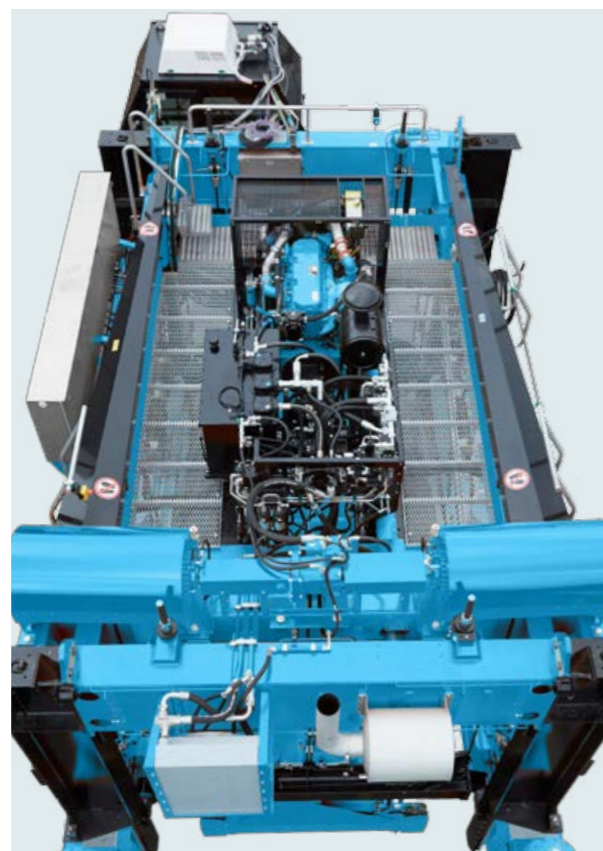
**In addition to diesel-electric straddle carriers, Konecranes also offers you a diesel-hydraulic variant of straddle carriers tried and tested over many years. On diesel-hydraulic straddle carriers, both travel and hoist drives make use of powerful hydraulic motors.**

### GOOD OPERATING CAPABILITIES

As far as their function, performance parameters and operating capabilities are concerned, these diesel-hydraulic straddle carriers are a match for their diesel-electric counterparts. Like these, diesel-hydraulic straddle carriers can handle stacking heights of 3 and 4 containers.

### MACHINERY PLATFORM

- Clear and structured machinery platform
- So good visibility with ample space
- Components easily accessible for service and maintenance
- Diesel-pump set enclosed for reduction of noise emissions (optional)

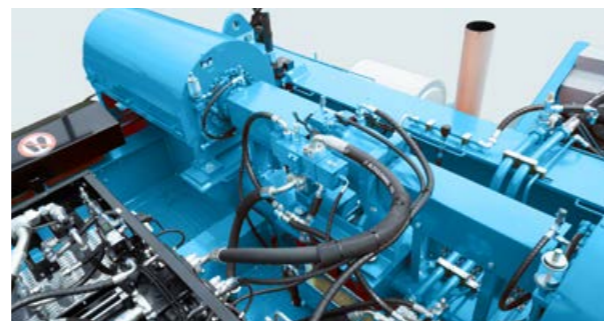


At the same time, terminal operators profit from comparably low initial investments and little need for spare parts. Diesel-hydraulic drive systems also offer benefits in terms of service as these machines are very easy to maintain.

With all their features, the diesel-hydraulic machines are particularly suited for terminals that are starting a step-by-step growth phase and nevertheless need a highly productive machine for the purpose: If, for example, you have organized your container handling with reach stackers up to now and want to achieve higher stacking density in your yard and higher handling efficiency, diesel-hydraulic straddle carriers from Konecranes might be the right choice.

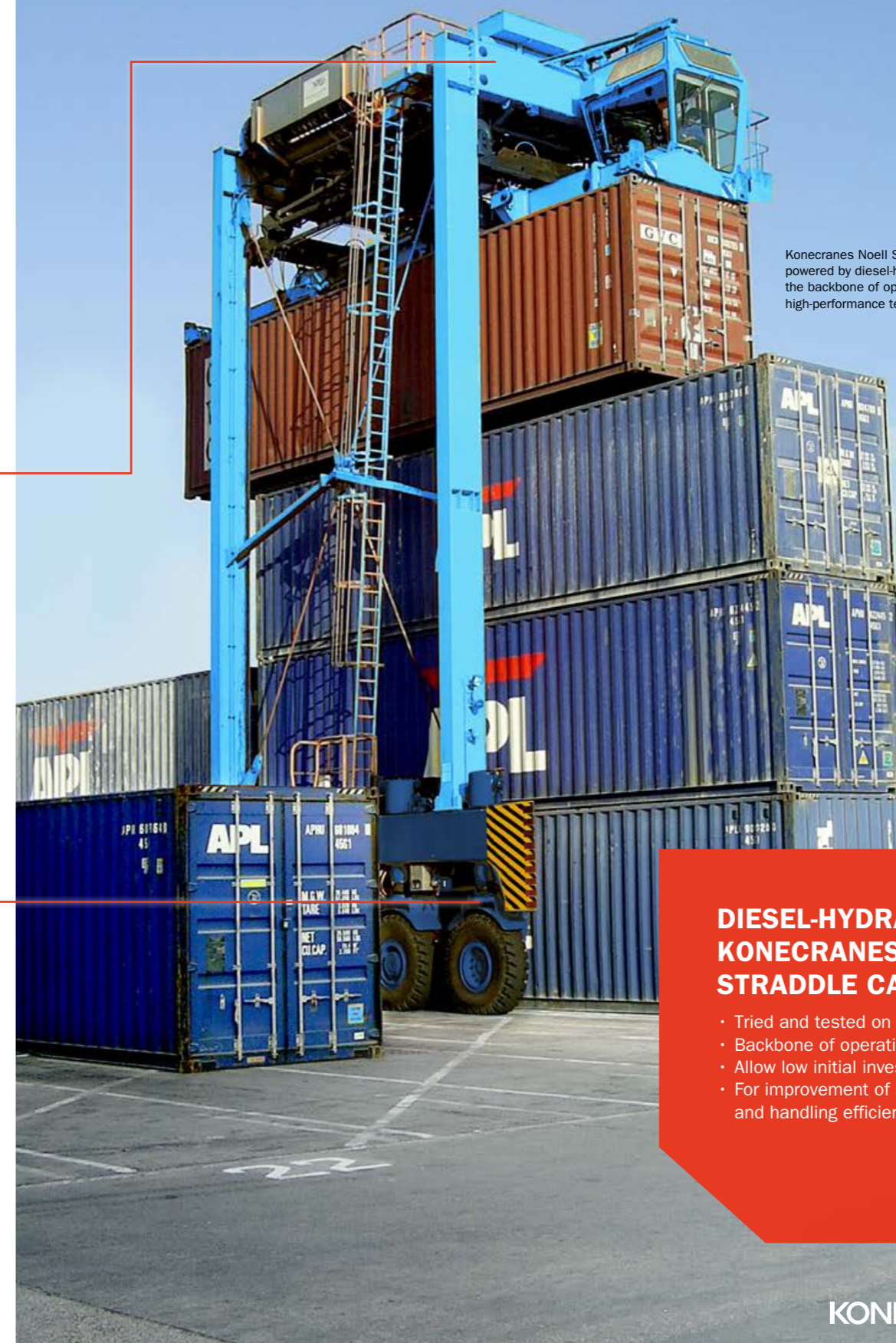
### HOIST SYSTEM

- Maximum lifting capacity 60t
- Rope drums driven and synchronized by centrally positioned hydraulic motor
- High-performance hydraulic motor
- Simple and protected rope guides up to the yoke beam
- Small number of rope pulleys for low rope wear in operation



### TRAVEL GEAR

- Good load distribution thanks to eight individually steered wheels
- Four wheels driven by compact and powerful hydraulic motors
- Wheels individually steered by steering cylinders and rods
- Individual wheel suspension with maintenance-free spring system
- Low tire wear thanks to electronic wheel alignment supervision



Konecranes Noell Straddle Carriers powered by diesel-hydraulic drive form the backbone of operations in many high-performance terminals worldwide.

## DIESEL-HYDRAULIC KONECRANES NOELL STRADDLE CARRIER

- Tried and tested on the market for decades
- Backbone of operations in many terminals
- Allow low initial investments
- For improvement of stacking density and handling efficiency in terminals





## FROM THE VETROCAB DRIVER'S CAB

# BRIGHT OUTLOOK

**As the interface between man and machine, our Vetrocab driver's cab holds the key to safe and productive straddle carrier operation. Together with industrial designers, ergonomics experts and experienced straddle carrier drivers, we have developed both the cab itself and the intuitive operating concept for you. The result: a cockpit that is a pleasure to work in – so the driver has everything under control.**

The large glass panels provide an excellent all-round view and, together with the good noise insulation and the clear arrangement of all the controls, provide a high degree of convenience and safety. The driver's seat, adjustable for individual body size, the flexibly adjustable pedals and a steering wheel adjustable in height and distance turn the cockpit into a personal workplace.

### STATE-OF-THE-ART SAFETY AND ASSISTANCE SYSTEMS

The electronic stability assistant monitors the travel speed of the Konecranes Noell Straddle Carrier in relation to the spreader position and its curve radius and, through automatic adjustment of the speed, ensures safe travel operation of the Konecranes Noell Straddle Carrier. Clearly structured displays always showing current speeds and spreader position keep the driver informed.

Drivers are also supported in their work by state-of-the-art assistance systems. These are partly standard and partly optionally available, further enhancing productivity and safety in the terminal. Among other things, the stability displays, the automatic spreader positioning system (ASPS) and the CAN bus control system for both the straddle carrier and the spreader functions help to achieve improved deployment planning and more economical operation.



A cockpit that drivers like to work in: adjustable steering columns; electrically rotatable driver seat, on request; adjustable pedals.



High above the container stack: optimum view of the whole working area.



Ideal arrangement: everything in the right place for maximum convenience and safety.



WITH THE KONECRANES NOELL FLEET MANAGEMENT SYSTEM

# OPERATING DATA ON-LINE

The operational and health status data of vehicles can be remotely monitored via the terminal WLAN network using the fleet management system (FMS) and can be displayed and recorded by software modules in accordance with your needs. In addition, the system permits remote diagnoses to be carried out by Konecranes experts. The FMS has a modular structure, so the terminal operator can adapt the system to its requirements.

Depending on the module selected, the communication of operating data, container handling rates or fault diagnoses including single-value recording and monitoring of, for example, engine and electronic data, tire pressures or fluid levels is possible – both for individual vehicles and for entire straddle carrier fleets.

**FLEET MORE ECONOMICAL THROUGH DATA TRANSPARENCY**

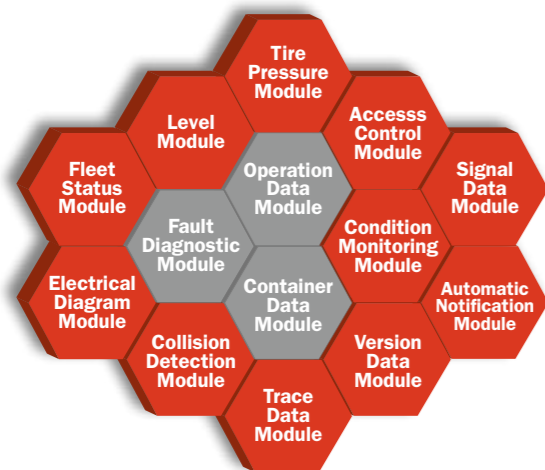
This data transparency makes the fleet more economical, as interventions can be planned much better in advance and operating costs can be reduced by service adapted to the local conditions. Diagnoses can also be carried out more specifically and effectively, which results in a higher level of equipment availability.



Everything at a glance: the data on the straddle carrier fleet are monitored in the terminal control center.



Operating and health status data: operating data are displayed for the driver on large and clearly structured displays.



- Basic modules
- Add-on modules can be individually added and combined

Konecranes Noell Straddle Carriers equipped with our fleet management system are provided with three basic modules. If necessary, terminal operators can upgrade their FMS step-by-step.

Our fleet management system records and transmits a variety of operating data to the terminal control center.



## MODULAR FLEET MANAGEMENT SYSTEM

- Remote monitoring via terminal WLAN network
- Gradually adaptable to operating company requirements
- Data transparency makes the fleet more profitable
- Greater handling performance possible
- Interventions can be planned better in advance
- Deployment scheduling adjusted to service intervals
- Service costs can be significantly reduced



## INCREASED HANDLING PERFORMANCE THROUGH AUTOMATED TERMINAL LOGISTICS

# A-STRADS MEETING CHALLENGES

**Quick and economical loading and unloading of large container vessels with ever increasing capacities demand new technologies in terminal logistics in order to avoid operational bottlenecks and to improve efficiency. These include the semi and full automation of Konecranes Noell Straddle Carrier fleets.**

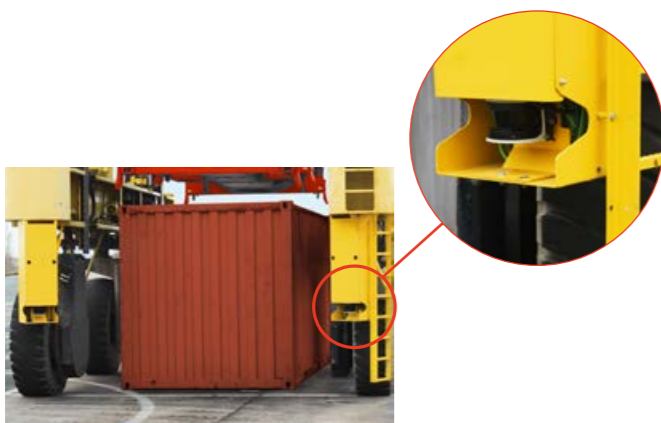
In addition to higher handling rates, the automation of straddle carriers (A-STRADs) also makes possible an improvement of safety and availability. Automation also ensures the consistency and optimization of handling processes, thus reducing fuel consumption and exhaust emissions, which has an overall positive effect on the cost-effectiveness and ecological balance of terminals.

### FROM MANUAL TO AUTOMATED OPERATION

The control system of diesel-electric Konecranes Noell Straddle Carriers is designed in such a way that specific automated solutions can be added without completely modifying existing machines. These solutions permit the operators of existing terminals to convert currently manually operated equipment to automated, unmanned A-STRAD machines. Similarly, a new terminal can start with manual equipment and, after a successful initial phase, can convert to automated operation.

### AUTOMATION WITH KONECRANES OPENS UP POTENTIAL

As a pioneer and pacemaker in the automation of handling processes, Konecranes has many years of experience in both equipment technologies and associated management and navigation software which are also used for A-STRAD solutions. Simulation and emulation of terminal processes gives terminal operators a clear picture of handling performance, equipment requirements and development potentials before they commit to any investments.



Highest accuracy: laser technology positions the A-STRAD precisely above the container.

Works even without a complete modification: the control system of diesel-electric Konecranes Noell Straddle Carriers is designed in such a way that specific automated solutions can be added without completely modifying existing machines.



## STRADDLE CARRIER AUTOMATION (A-STRAD)

- Konecranes is a pioneer of automated container terminal solutions
- Technologies are well suited for straddle carrier solutions
- Operation can start manually and be automated later
- Permits higher handling speeds
- Provides enhanced safety and availability
- Reduces fuel consumption and exhaust gas emissions



# KONECRANES NOELL STRADDLE CARRIERS

## DATA AND DIMENSIONS

	N SC 634 H	N SC 644 H	N SC 634 E*	N SC 644 E*
<b>Speeds</b>				
Lifting [m/min]				
- laden (40t)	20		20	
- laden (50t)	16		16	
- unladen	24		24	
Lowering [m/min]				
- laden (40t)	18		20	
- laden (50t)	16		16	
- unladen	20		24	
Traveling [km/h]				
- laden (30.5t)	30	24	30	24
- unladen	30	24	30	24
<b>Weights [t]</b>				
Maxium static wheel load				
- laden (60t)	14.6	15.4	15.9	16.3
- unladen	7.1	7.9	8.4	8.8
Deadweight**	60	63	67	70
<b>Wheels and tires</b>				
Tire size	16.00 R25 or 480/95 R25		16.00 R25 or 480/95 R25	
No. of wheels / driven	8 / 4		8 / 4	
<b>Engines</b>				
Standard diesel engine	Caterpillar C13	MTU (Daimler) 6 R 1100		
- Maximum power [kW @ rpm]	354 @ 1,800	320 @ 1,700		
- Maximum torque [Nm @ rpm]	2,100 @ 1,400	2,100 @ 1,800		
- Emission standard	Stage IIIA (Tier 3)	Stage IV (Tier 4 final)		
Alternative engine	-	MTU (Daimler) 6 R 460 C		
- Maximum power [Nm @ rpm]	-	335 @ 1,800		
- Maximum torque [Nm @ rpm]	-	2,000 @ 1,300		
- Emission standard	-	Stage IIIA (Tier 3)		
<b>Fuel [l]</b>				
Tank capacity	750 or 1,500 (optional)		750 or 1,500 (optional)	

\* Figures also applicable for E ECO.  
 \*\* Depending on the configuration.

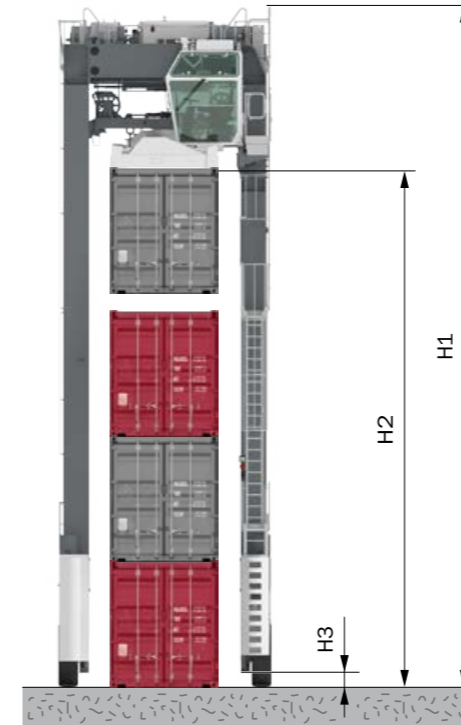
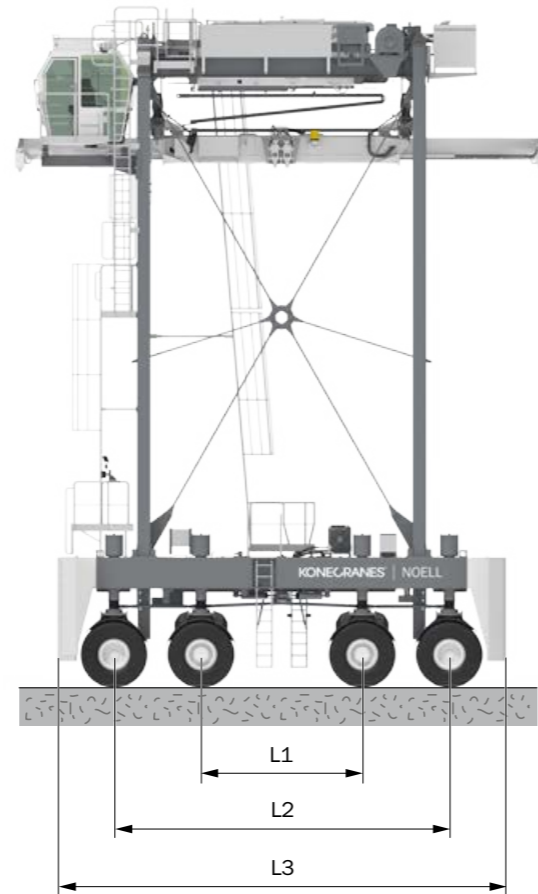
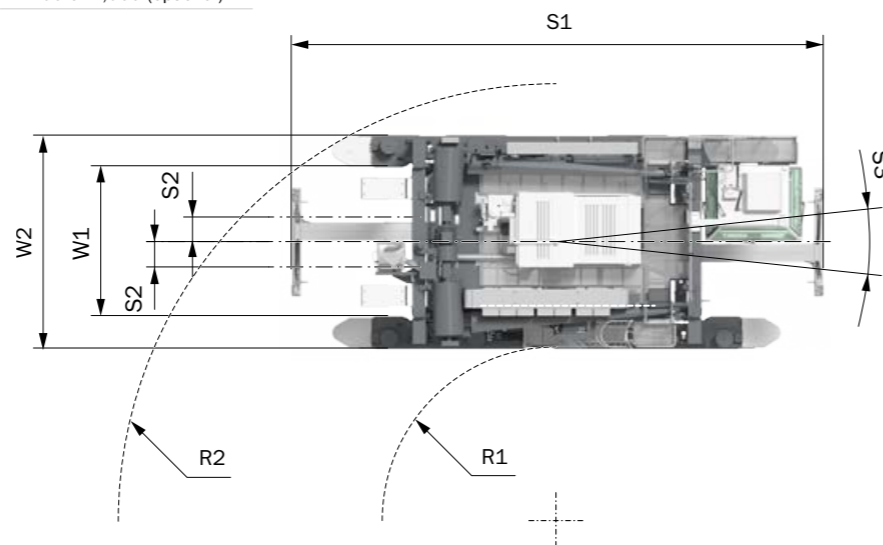


Illustration shows N SC 644 E Konecranes Noell Straddle Carrier.



		N SC 634*	N SC 644*
<b>Heights [mm]</b>			
H1	Total height	12,500	15,700
H2	Maximum stacking height under twistlocks	9,100	12,000
H3	Chassis clearance height	300	300
<b>Widths [mm]</b>			
W1	Inner chassis width	3,470	3,470
W2	Outer chassis width	4,870	4,870
<b>Lengths [mm]</b>			
L1	Wheelbase, inner axles	3,700	3,700
L2	Wheelbase, outer axles	7,700	7,700
L3	Total length	9,300-10,300	9,300-10,300
<b>Other dimensions [mm]</b>			
R1	Inside turning radius	3,600	3,600
R2	Outside turning radius	9,300	9,300
<b>Konecranes Noell Spreader</b>			
S1	Spreader, single-lift	[ft] 20 / 30 / 40	20 / 30 / 40
	Spreader, twin-lift	[ft] 2 x 20	2 x 20
S2	Spreader side shift	[mm] +/- 300	+/- 300
S3	Spreader swivel angle	[°] +/- 6	+/- 6

\* Figures applicable for H, E and E ECO.

**On this page we have compiled the most important dimensions, which apply for both diesel-electric and diesel-hydraulic Konecranes Noell Straddle Carriers. You will also find the technical data for both machine types and heights of the 1-over-2 and 1-over-3 models. We shall be happy to send you further technical information about Konecranes Noell Straddle Carriers on request.**

**Eco-friendly paintwork to your corporate specifications**  
 The Konecranes Noell Straddle Carrier and the Konecranes Noell Spreader are shown here in our standard colors. On request, Konecranes can supply you with straddle carriers painted with eco-friendly water-based paints in accordance with your corporate identity guidelines and marked with your own logos.



Our special brochure details the key components, Konecranes Noell Single-Lift and Twin-Lift Spreaders.



Generously dimensioned: the generously dimensioned machinery platform provides ample space for all service and maintenance measures.

KONECRANES | NOELL

### SERVICE-FRIENDLY

- Maintenance costs and wear are minimized by the use of direct drive units and reliable high-grade components
- Quick correction of faults thanks to smart diagnostics systems
- Ease of maintenance thanks to good accessibility to components

YOUR STRADDLE CARRIERS ARE IN THE BEST HANDS WITH US

## COMPREHENSIVE SERVICE

During the development of our straddle carriers we were already thinking about ease of maintenance. The robust machines are user-friendly thanks to easily accessible maintenance points. Our expertise is based on a high level of vertical integration and is complemented by the use of components from globally renowned manufacturers.

### WE MAINTAIN AVAILABILITY

We contribute to maintaining the availability of your straddle carrier fleet. Our global service organization is local to you in all time zones, and offers you expertise in maintenance and repair in combination with fast delivery of spare parts.

### WE MAINTAIN THE VALUE OVER MANY YEARS

We are the right choice to provide support for your straddle carriers throughout their service life because we built them and therefore know them best. With our comprehensive service portfolio, your straddle carriers remain state-of-the-art, their service life increases and they hold their value over many years.



Service to meet your particular needs: full life cycle support by Konecranes

Diagnoses: quick sensing and correction of faults thanks to smart diagnostics systems.




Manufactured with care: all mechanical, hydraulic and electrical components have been arranged in a clear structure and with care.







Konecranes is a world-leading group of Lifting Businesses™, serving a broad range of customers, including manufacturing and process industries, shipyards, ports and terminals. Konecranes provides productivity enhancing lifting solutions as well as services for lifting equipment of all makes. The Group has 18,000 employees at 600 locations in 50 countries. Konecranes is listed on Nasdaq Helsinki (symbol: KCR).

© 2017 Konecranes. All rights reserved. 'Konecranes', 'Lifting Businesses' and  are either registered trademarks or trademarks of Konecranes.

