# TERMINAL SERVER 50/70

CONTAINER HANDLING IN HINTERLAND TERMINALS







Quiet and clean: the Terminal Server meets the highest environmental standards

### THE TERMINAL SERVER. THE HINTERLAND CRANE.

To further increase the productivity of the seaports and manage the rapidly growing flow of goods as efficiently as possible, innovative solutions are needed in the landside connection. High volumes of traffic and rising transport costs make onward transport of goods by road increasingly unattractive. The goal remains, however, to move end users closer to the seaports. Whereby: where waterways are not available, the railways step into the foreground as an efficient transport system.

The logistical consequence: a network of hinterland terminals is necessary to close the distribution gap between end customers and seaports. Bi-modal transhipment from rail to road is complemented by depots (storage areas) integrated there. In this way on the one hand the desired closeness to the customer is achieved – on the other hand, the large numbers of containers can be bundled better. Along with container handling, of course, chassis transhipment remains a central task of all bi-modal terminals. It also helps reduce road congestion.

For these new hinterland terminals, state-of-the-art infrastructure is needed, with innovative, economical, absolutely reliable cranes that optimally utilise the available space. And are especially low in emissions and environmentally conscious at the same time. For these days, it can hardly be avoided that hinterland terminals are located in mixed-use zones with adjacent residential development.

#### → INFO

What exactly characterises these special cranes for hinterland terminals? What are the key factors?

### → <u>Essentially</u>:

- low investment costs
- low operating costs
- low emission rates
- high handling capacity
- high availability
- → <u>More precisely</u>:
- efficient handling of containers
- the possibility of handling chassis as well as containers
- optimal storage space utilisation
- maximisation of handling capacity and thus short waiting times
- economical unloading and loading
- low maintenance and operating costs
- high availability and reliability
- low-noise, environmentally friendly operation
- great positioning accuracy
- high potential for automation

<u>The Terminal Server is the guarantor for</u> <u>such excellence</u>.



Terminals in the hinterland provide customer proximity

### THE INDIVIDUAL SOLUTION FOR HINTERLAND TERMINALS. THE TERMINAL SERVER.



The robust box girder design is perfectly suited to the Terminal Server's mode of operation

The <u>trolley rails are fixed</u> to the bridge girders

- as a welded rail in the case of a weight-optimised solution: in the statics it can be calculated as loadbearing with 75% of its cross-section
- <u>as a screwed down, clamped rail</u> <u>in the case of a noise-minimised</u> <u>solution</u>: with elastic rubber pads.

The distance between the vertical supports of the fixed and hinged legs is based on the required clearance width for spreaders and containers. Compared with other designs, this results in a much shorter measurement over buffer. A big advantage: on the one hand, at large terminals two cranes are able to travel close to each other. On the other hand, valuable storage space at the ends of the storage area can still be optimally served.

The Terminal Server is our engineers' answer to the question of a modern crane for hinterland terminals.

The most obvious feature is the <u>rigid</u>, <u>very robust steel structure in box girder</u> <u>design</u>. It is both extremely low-maintenance and at the same time perfectly matched to the dynamic operation of the Terminal Server.

The standard crane consists of fixed and hinged legs that are structurally identical and differ only by the two tube diagonals of the fixed leg. The Terminal Server is built <u>in proven two-girder design</u>. For wider gauges and cantilever arms normal tie links are chosen to reduce weight. With large cranes, a box-type system with integrated lattice-type structure is used.

The bridge girders are a box girder construction. Their inside is fully accessible and therefore easy to inspect. The other parts of the steel structure are sealed airtight. As a matter of principle there are no complex joints in the design. As a result the crane is not susceptible to corrosion.



The Terminal Server provides effective transhipment between rail and road



Positioning accuracy: the Terminal Server is ideal for terminal automation

In the Terminal Server, the latest methods of stress analysis, measurements from the wind tunnel and the desire for an optimum hinterland crane thus take concrete shape. In addition to all the rules of engineering, daily practical experience is always the inspiration for further developments. Thus, for example, deformations occurring under extreme conditions are no coincidence. They are already determined during project planning and design and taken into consideration in dimensioning. Only a rigid, inflexible structure is a solid foundation for a powerful crane - and a prerequisite for any kind of automation.

For this crane automation, a <u>swing-free</u> <u>load in the direction of travel of trolley</u> <u>and crane</u> is crucial. Kocks offers different versions of the Terminal Server. First, the machine house trolley with simple rope reeving system and electronic antisway system. Or the more sophisticated version with a fixed rope tower for the swing-free transport of loads. Because of the high degree of positioning accuracy, the latter is ideal for <u>storage automation</u>.

Incidentally, optionally the Terminal Server can be controlled via an external storage yard management system. Here you can choose between

- semi-automatic operation via positioning control in manual operation and
- unmanned, fully automatic operation for all operations.

#### By the way:

The Terminal Server can also be used <u>in solid-wall box-girder design</u> for tri-modal ship-rail-truck transhipment.

#### → INFO

- Typical Terminal Server
- <u>extremely precise</u>: electronic anti-sway system or rope tower
- <u>optimal automation</u>: anti-sway system combined with positioning control system
- extremely light and strong: dynamic deformations occurring under extreme conditions are calculated and minimised

### THERE ARE MANY REASONS FOR CHOOSING THE **TERMINAL SERVER.** THE MOST COMPELLING ARE:



The slewing trolley ensures the correct positioning of containers on railway wagons and lorries. Here the driver's cabin can also move horizontally.

**D1** <u>THE MACHINERY HOUSE TROLLEY</u> The machinery house trolley, the core component determining the performance of the Terminal Server, is the product of intensive development and decades of experience. We have uncompromisingly



Uncompromisingly reliable and maintenance-friendly: the machinery house trolley

based our trolley design on the values of reliability, availability, safety and ease of maintenance. Trolley travel mechanism, lifting mechanism, slewing gear and the associated control are combined on the weight-optimised trolley frame. The aims of reliability, availability, safety and ease of maintenance were uncompromisingly incorporated into the design. And not to be forgotten: the crane driver's cab, the driver's workplace, is also located on the trolley.

<u>Machinery house trolleys</u> are available in four different versions:

- <u>as a slewing trolley with</u> <u>anti-sway system</u>
- <u>as a slewing trolley with rigid</u>
- <u>rope tower</u>
- as a fixed trolley with anti-sway system
- <u>as a fixed trolley with rigid rope tower</u>

Compensation of different rope lengths is possible at the fixed points of the hoisting ropes on the machinery house platform.

With regard to the lifting capacities: for handling single containers, trolleys with a carrying capacity of 50 t on the ropes are recommended. For "Twin Twenty" handling there are trolleys with capacities of 70 t.

By the way: if required, we sound-proof the weather-resistant lining of the trolley machinery house, the side walls and the underside of the platform. And because comfort and convenience are also always part of performance, despite the compact design, for maintenance purposes all components are easily reached and replaced.



### 02 THE HOISTING MECHANISM

We have optimised Kocks hoisting mechanisms over decades, so we can guarantee maximum performance and availability. <u>As standard, they are fitted with compact, powerful drives, high-quality spur gear reducers and rope drums</u>. Disc brakes are of course standard. As a container crane the Terminal Server has a double hoisting mechanism, i.e. two identical winches coupled via a cardan shaft.



The hoisting mechanism: compact and powerful

### 03 THE TROLLEY TRAVEL MECHANISM

Four individual wheel drives provide optimal traction of the running wheels on the trolley rail – and thus guarantee direct power transmission from the high accelerations of the dynamic trolleys. As standard, running wheels with double



The trolley travel mechanism provides high speed and optimum traction

flanges are used, but also, for very high speeds, running wheels without flanges as well as horizontal guide rollers can be chosen.

#### 04 THE SLEWING MECHANISM

With the slewing trolley, the trolley platform is connected to the fixed superstructure and the trolley beams by a large-diameter tube and a ball bearing slewing ring. <u>Two frequency-</u> <u>controlled slewing drives</u> ensure precise positioning during automatic approach of the pre-selected positions in the slewing range of 270°. An option: to ensure zero backlash in the holding positions, a hydraulic disc brake can be placed between the upper and lower parts of the trolley.



Corrective movements of the spreader are carried out hydraulically on the head block



The emergency drive means the spreader can be recovered even if there is a power failure

#### 05 THE CRANE TRAVEL MECHANISM

Because we consider reliability a cardinal virtue, we only use proven components from well-known manufacturers. Characteristic of Kocks travel mechanisms is the distinctly robust design. The travelling mechanisms are largely standardised and can be freely combined in a modular system. So they easily meet the demands resulting from differing operational locations and infrastructures.



The rotary drive moves the trolley precisely to the preselected angle of rotation

TERMINAL SERVER





Gantry travel mechanism with single wheel drive

A travel mechanism highlight is the standard equipping of single wheel drives. Because the travelling speeds of the Terminal Server are above average, this serves to minimise wear due to slippage. The proprietary Kocks optimised drive and control concept results in excellent straight travelling characteristics without the need for active synchronous run control. And another thing: optionally the Terminal Server is also available with a curveable truck mechanism so terminals that go round a curve for space reasons can carry out unrestricted operations fully automatically even in the curve. The special feature here: the Terminal Server can travel from the straight track

Manual storm brake

into the curve and back out without reducing speed. Speeds of 120 m/min have already been tested in continuous operation.

### 06 THE ELECTRICAL EQUIPMENT

Kocks has many years of experience and accumulated know-how in electrical engineering, programming and commissioning. The <u>freely programmable power</u> <u>control</u> for the Terminal Server is therefore on the cutting edge of technology. It is based on proven industrial components that communicate via bus to the digital three-phase frequency converters. <u>Active feedback units</u> increase the energy efficiency (and are a given for us).



Thanks to higher positioned motors, the travel mechanisms can be flooded without damage

Intelligent components and advanced functions are used to control the Terminal Server: remote maintenance via <u>UMTS</u> <u>modem</u> and the <u>crane management</u> <u>system</u> with online help, for example, support preventive maintenance and ensure smooth crane operation.

### 07 THE ELECTROCONTAINER

The standardised electrocontainers contain modularly structured switch racks that are fitted with proven industrial components in state-of-the-art manufacturing facilities. An e-container always leaves the workshop of our Kranunion partner Ardelt <u>completely assembled</u>, <u>installed and tested</u>.



The automatic curveable truck ensures unbraked operation in straight travelling and curve travelling



The driver's cabin offers an optimal view to the load



Crane management system in the e-house



The entire control system is installed in the electrocontainer to make maintenance easy

Its features are convincing:

- clear structure
- tested high quality components and functionality
- low installation work during crane erection

#### **08** THE DRIVER'S CAB

Kocks driver's cabins are always custom-made on the basis of standardised designs. As <u>cabins of the panoramic</u> <u>view type</u>, they always provide full visibility and plenty of comfort. We design them according to customer requirements and operating conditions on location. In concrete terms this means, for example, for the interior: the elements necessary for crane operation are carefully designed and arranged in accordance with ergonomic principles.



The driver's console: a comfortable workplace as the basis for high productivity



Basis for safety and comfort: well thought-out access



Option: lift for people and tools

Furthermore: equipping of the cabin with air conditioning and heating, a WLAN and camera monitoring is possible at any time.

### 09 ACCESS

Part of the Terminal Server concept is that you need to be able to reach the entire structure and the trolley safely and comfortably. As a result, stairs, platforms, ladders and landings complement each other to form a <u>comprehensive and intelligent access system</u>. The installation of an elevator is also possible.

THE TERMINAL SERVER IN USE.

### **THE THEORY:** MAXIMUM HANDLING CAPACITY AND MAXIMUM RELIABILITY. **THE PRACTICE:** THE TERMINAL SERVER.



Basis for high precision and reliability: the Terminal Server's rigid gantry structure

The Terminal Server is used anywhere a quick turnaround is needed. As an exceedingly efficient machine, it is ideal for <u>handling containers from rail to</u> <u>road and vice versa, and for stocking</u> <u>storage areas</u>.

The wide-span design is able to span large areas and thus ensure <u>optimum</u> <u>utilisation of space</u>. The trolley-connected cabin provides <u>excellent visibility</u> <u>and overview of handling and storage</u> <u>areas</u> – a fundamental prerequisite for optimally structured terminal and storage space organisation.

The Terminal Server is also extremely adaptable. Thanks to state-of-the-art software, it can be <u>easily connected</u> to existing terminal management systems.

As an absolutely reliable working crane, it is the best economical solution for any kind of hinterland and inland terminals.

## What distinguishes the Terminal Server overall:

- high operating speeds
- high handling capacity
- high positioning accuracy
- high potential for automation
- high availability
- long service life
- high resale value
- low dead weight
- low maintenance/low maintenance costs
- low operating costs



Electrical power supply and recovery: the Terminal Server offers low energy consumption and low operating costs



Full speed around the curve

### WHY KOCKS? BUILDING CRANES SINCE 1872.

### → KNOW-HOW

Kocks is considered a pioneer in the development of container cranes in Europe. We have been building highperformance ship unloaders since 1913 and we are the world leader in Goliath cranes. We set standards for the high performance of cranes.

Our engineers consistently apply the proven rules of German engineering to the ongoing further development and design work on the cranes. Designing and classification for continuous operation are carried out particularly conscientiously.

The goal is always the same: increased efficiency, safety and environmental friendliness of the cranes.

#### → <u>QUALITY</u>

To us quality means: a sophisticated product concept, profound know-how in the fields of design and control as well as the greatest accuracy with regard to fabrication and execution. It goes without saying that our engineers meticulously test and check all mechanical and electrical components.

All this results in significant benefits:

- maximum performance and reliability of the cranes
- low operating costs
- long service life (even under the toughest operating conditions).

### → <u>SERVICE</u>

For us, perfect service and maintenance are part of a good product. We therefore give our customers' personnel intensive training in crane theory and practice. We want to make sure that continuous availability of the cranes is always guaranteed.

If there should be a failure in spite of all this, we are there to help quickly, flexibly and unbureaucratically. Day and night.

#### → <u>PARTNER APPROACH</u>

The Feeder Server is an extremely durable product. Choosing it signals the beginning of a comprehensive customer/supplier relationship – which is often manifested in repeat and follow-up orders.

We therefore attach great importance to ensuring this relationship is fair and with long-term benefits for both parties. By the way: for us this starts long before the contract is signed. We'll be happy to advise you at any time, just give us a call.



Kocks administrative headquarters in Bremen

### THE TERMINAL SERVER – THE KEY TECHNICAL DATA.

### GENERAL DATA:

### <u>SPEEDS</u>

- → Hoisting / Lowering: 40/80 m/min
   → Trolley travelling: up to 180 m/min
- → Crane travelling:
   → Up to 120 m/min

### LIFTING CAPACITIES

- → TERMINAL SERVER 50 up to 50t on the ropes
- → TERMINAL SERVER 70

up to 70t on the ropes



The interface between rail and road: the Terminal Server is the perfect link

### THE CRANE CONCEPTS:

### STANDARD VERSION

Track
Cantilever arms

up to 35 m up to 12 m



### ONE-SIDED SPANNING

- Track
- Cantilever arm I
- Cantilever arm II
- 30-45 m 15-20 m up to 12 m



### WIDE TRACK AND LARGE TRUSS SPAN

→ Track→ Cantilever arms

45–70 m up to 25 m



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