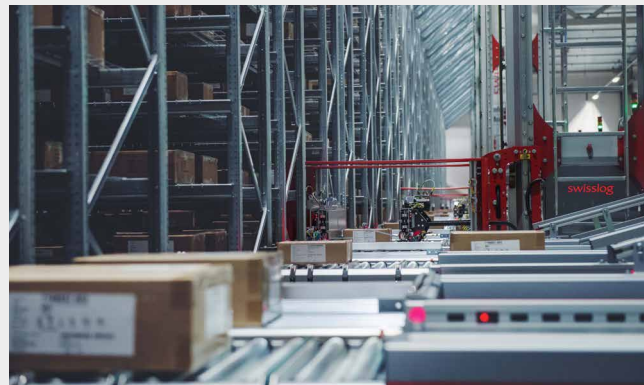
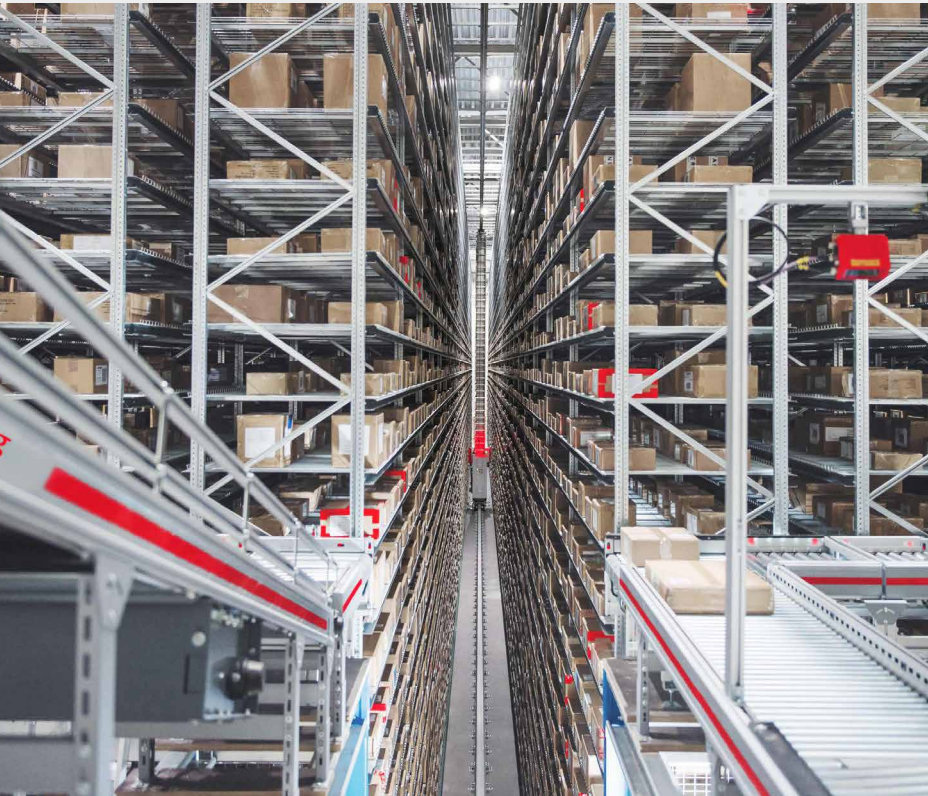


# DYNAMIC & RELIABLE SUSTAINABLE MINILOAD CRANE FOR HIGH PERFORMANCE



Automated light goods storage with Tornado miniload cranes Swisslog's Tornado miniload cranes uniquely combine high throughput, energy-efficient operation, and unmatched reliability. The patented mast and rail design allow a high storage density and considerable heights for a wide range of logistics applications.

## References

Many customers worldwide have already implemented Tornado as part of their overall solution.

Projects implemented with Tornado: **BRØDRENE DAHL** | **CAPTECH** | **DANISH CROWN** | **EAO** | **ENERGEX** | **FORLAGSSENTRALEN** | **HAMA** | **NINZ** | **NOWASTE** | **PAUL KOCH** | **SIGNICAST** | **VK RENZEL** | **WÄRTSILÄ**

## BENEFITS

- **High throughput**  
 Fast and accurate positioning processes thanks to outstanding lightweight design and optimized drive trains.
- **Reliable operation**  
 The connection method deployed for the aluminum structure eliminates the risk of fatigue.
- **Energy-efficient**  
 Reduced energy consumption due to lightweight design.
- **Compact storage layouts**  
 Attractive storage heights and maximized storage utilization thanks to distinctive mast stiffness and front traverse dimensions.

# ROBUST LIGHTWEIGHT CONSTRUCTION AND ENERGY EFFICIENCY FOR HIGH-PERFORMANCE MINILOADS OF THE FUTURE

## ■ DESIGN & RANGE



### GENERAL

Thanks to its scalable and modular concept, Tornado can be easily optimized for various load handling attachments and aisle heights. The crane consists of high-strength and lightweight components, increasing service life and reducing energy consumption. The travel and guide rails also offer easy on-site installation and precise alignment.

### ELECTRICAL EQUIPMENT & CONTROL TECHNOLOGY

Conductor lines are used to transmit the power, ensuring that the crane always remains reliable and eliminating problems with cable wear due to dynamic movements. The state-of-the-art safety solution ensures straightforward and safe operation, including full online diagnostics. Control and operation systems are fully integrated into Swisslog's warehouse software concept, ensuring easy operation and diagnostics.

## ■ COMPONENTS ■ CHASSIS & MAST



### CHASSIS & DRIVES

The patented wheel and rail arrangement saves space. This ensures optimum use of the available storage height. The optimized chassis/mast connection ensures high stiffness and reliability. The Omega timing belt drive guarantees dynamic and precise positioning without wear. Integrated absolute position measurement for reliable operation. The optional low-noise model can be used for applications near workstations.

### MAST & CARRIAGE

The patented single mast design consists of extruded profiles with bolted crossbeams. The Tornado thus offers high stiffness and enables high aisle heights without an extra top drive. The mast can be easily transported in standard containers. The upper frame features a long wheelbase for reduced rail and rack loads. An optional double lifting unit is available for increased throughput.

## ■ LOAD HANDLING UNITS & SOFTWARE



### TELESCOPELOADER

The TelescopeLoader is the ideal solution for containers and trays in standard sizes of 400 x 300, 600 x 400 and 800 x 600 mm. Customized sizes with a total payload of 250 kg in single, double or multi-deep storage are also possible.

### CARTONLOADER

The CartonLoader is the ideal solution for cartons, containers and trays in standard sizes of 200 x 200 up to 800 x 600 mm. Customized sizes are also available. The maximum payload is 70 kg in total for single or multi-depth storage. Separate conveyor areas on the load handling attachment ensure safe tracking and handling.

### SYNQ WAREHOUSE MANAGEMENT SYSTEM

Tornado comes with an application developed Swisslog software. The software application offers a number of general features including user management, bin location management, and interfaces to integrate Tornado with complementing subsystems.

### CONTROL

All movements are controlled by CraneBox software. CraneBox ensures that transport tasks are executed properly and monitors processes to guarantee optimized interaction between subsystems.

## FACTS

Payload	up to 250 kg, standard, higher loads on request
Aisle height	3,5 to 24 m
Operating speed	up to 6 m/s
Vertical speed	up to 3 m/s
Acceleration	up to 4 m/s <sup>2</sup>
Storage density horizontal/vertical	single, double and multiple
Temperature range	from -5° C to 40° C (23° F to 104° F)
Load types	Standard or customized containers or trays (uniform or mixed sizes), cartons with variable sizes, or application-specific solutions

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