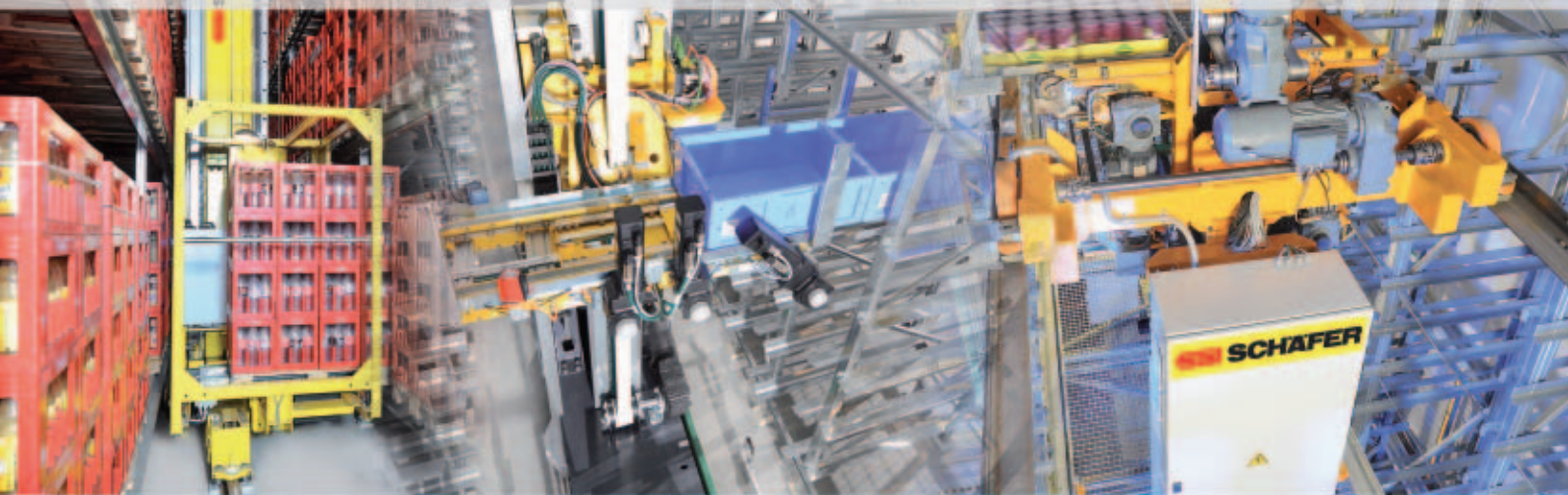


# STORAGE AND RETRIEVAL MACHINES

for pallets, bins, trays









# We optimize space and time.

SSI SCHÄFER provides ideas, concepts and holistic solutions for complex logistics management.

Being a systems supplier with international know-how and a global presence, SSI SCHÄFER is your competent partner.

With engineering services, mechanical engineering, steel construction and control engineering from one source, their own IT and software development department, perfect interaction is guaranteed.

Automatic storage and retrieval machines by SSI SCHÄFER are an important component of a cost-effective logistics chain.

Anywhere optimized warehousing with quick transport of material and short access times is required, we offer innovative storage and retrieval machines that are based on customer requirements and bring economic warehousing to perfection.

Our own production line guarantees unchanging quality and ultimate reliability of end products.

## Green Crane Technology:

SSI SCHÄFER allows for energy-efficient warehousing. Minimal energy consumption is environmentally friendly and also reduces the cost of maintenance. This is for example done by:

- Direct current power pool of drive controls and energy-optimized overlapping of movements in order to transfer brake-energy of one drive into drive-energy of the other
- Energy recovery: Brake-energy is fed-back into the power grid
- Adjustment of speed and acceleration of storage and retrieval machine as required: Depending on the flow of material, the superimposed control system can purport the dynamics of the SRM. This way, energy is saved and abrasion reduced.

## You determine our scope of services

- System planning
- Mechanics
- Control
- IT and warehouse management
- Assembly
- Commissioning
- Connection to sub-systems
- Service and maintenance

## Quality Advantage

due to construction and assembly in SSI SCHÄFER's own center for production and expertise

## Time Advantage

by means of pre-commissioning at the factory and - completely prefabricated modules ready for assembly and suitable for shipment in containers

## System Advantage

modular design with adjustment to the respective situation (new project, integration, modernization)



## Longevity through tests in own technology center:

At the more than 4,000 m<sup>2</sup> large in-house technology center in Giebelstadt, all machines and components of SSI SCHÄFER undergo detailed tests as well as endurance tests. This ensures that our products will not contain any components that are prone to wear. Enhancements as well as constant optimization of our components and machines is also easier to realize and expedite that way.

Of course our technology center is also open for visitations so that you can get an idea of our range of products first-hand.



# Moving Warehouse and System Automation Worldwide.



The list of customers is just as international as the SSI SCHÄFER GROUP. Renowned brands, corporate groups and market leaders have been among our customers for years. A sign of trust that we are proud of. With customized logistics solutions we will continue to build this trust.

Coordinated technology is the key to ideal solutions for the customers benefit.

Storage and retrieval machines transfer goods to and from the adjacent-components of storage racks and material flow-conveyor systems matched to the respective situation.

Be it a short-term buffer with sequencing and high throughput, a warehouse solely used to supply and stock raw material or finished products, or a buffer between the individual steps of production. SSI SCHÄFER will also find concepts and solutions suitable for you.

## **Storage and retrieval machines by SSI SCHÄFER will adjust to your individual requirements.**

- Adjustment to your storage aid by means of dedicated load acceptance devices
- Good utilization of space due to low travel limits
- Optimized handling capacity by means of adjusted dynamics and diversity of drives
- Maintenance friendly through use of premium, proved and tested machine components
- Smooth transport and short assembly times due to compact components and pre-commissioned storage and retrieval machines





# Powerful, compact and economical – the Schäfer Compact Crane (SCC)

**With the SCC (Schäfer Compact Crane) we introduced a fundamentally optimized storage and retrieval machine (SRM). The SRM is designed especially for use in standardized high bay pallet warehouses of medium height.**

Two different models of the Schäfer Compact Crane are available: The SCC-SD for single-deep and the SCC-DD for double-deep storing. The load accepting devices of the SCC are designed for the transport of prevalent Euro and industrial pallets with an overall weight of up to 1,000 kilogram (SCC-DD) respectively up to 1,250 kilogram (SCC-SD) per unit load. Its performance data meets the requirements of most operators in logistics, services, production and industry. The low travel limits of the SCC furthermore allow for a better utilization of space in existing warehouses.

## SCC – Advantages

- Reduced and optimized travel limits
- Reduction of self-weight by means of optimized construction
- High level of standardized components regarding construction, production and installation/IBS
- Pre-commissioning of SRMs in factory-test facility
- Main component including all SRM-drives, hoist unit, load accepting device and switch cabinet is delivered and lifted into the building as one unit
- Optimized processes in manufacture through structural adjustment to modern methods – lead to shorter manufacturing times
- Short assembly and commissioning times through pre-assembled and tested components





# Modular Standards for Custom-Made Warehouse-Logistics.

Due to the modular design of the storage and retrieval machines with individual heights of more than 40 m, the storage and retrieval machines by SSI SCHÄFER adapt exactly to your specific warehouse requirements.

Custom-Made for Highest Efficiency.

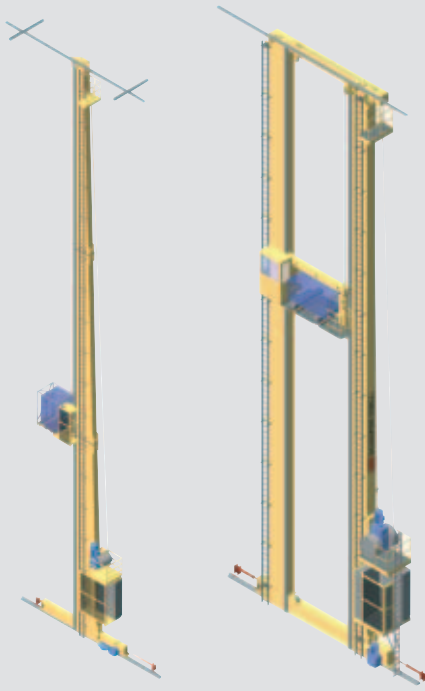
Available in one or two mast design, single-, double- or multi-deep storing, the standard types of storage and retrieval machines meet any demand ideally.

## Types of Warehouses

- Pallet storage single-deep
- Pallet storage double-deep
- Pallet storage multi-deep (deep lane storage)
- Dynamic storage for pallets (live storage)
- Storage for special sizes/ weights







Standard type  
SSC 1250-1

Standard type  
SSC 3500-2

#### SRM-Model Series

##### SSC 1250-1

- Standard-type single-deep
- Efficient 1-mast-device for light to medium loads
- for single-deep storing
- load of up to 1.25 tons
- total height up to 36 m

##### SSC 1250-1/DD

- Standard-type double-deep
- 1-mast-device for double-deep storing
- load of up to 1.25 tons
- total height up to 31 m

##### SSC 2000-1

- 1-mast-device for standard and special loads
- load of up to 2.0 tons
- total height up to 43 m

##### SSC 3500-2

- 2-mast-device for heavy and large-volume loads
- load of up to 3.5 tons
- total height more than 40 m

##### SSC 20000-2

- 2-mast device for heavy loads
- load of up to 20 tons
- total height up to 30 m

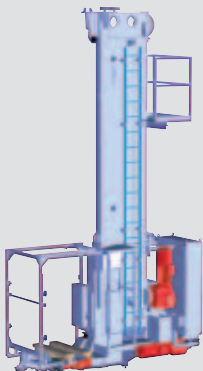
#### Schäfer Compact Crane-Typenreihen

##### SCC-SD

- 1 mast-device for light to medium loads
- for single-deep storing
- load of up to 1.25 tons
- total height up to 20 m
- bottom travel limit 500 mm
- clear width of aisles 1,500 mm

##### SCC-DD

- for double-deep storing
- load of up to 1 ton
- total height up to 18 m
- bottom travel limit 730 mm
- clear width of aisles 1,550 mm



Standard type  
SCC-SD

#### Storage aids

Euro pallets, industrial pallets, system pallets, DIN-pallets, chemical pallets, standardized wood-metal-plastic pallets, mesh boxpallet, customer specific storage aids in different dimensions (e.g. roller container, piggyback pallets, skids, etc.) or direct handling of: packages, extrusion tools, paper rolls, car bodies, ULD, etc...

#### SRM-EQUIPMENT

- Design according to pertinent standards and regulations of EN, DIN, FEM, VDI, VDE
- Traveling speed up to 240 m/min
- Hoisting speed up to 90 m/min
- NTOP (visualization, fault analysis, etc.)
- On-board emergency-control station
- Maintenance and service friendly arrangement and design of aggregates
- Frequency controlled drives
- Control Siemens S7 (Allen Bradley and other manufacturers optionally possible)

#### SCC-EQUIPMENT

Change compared to SRM-Equipment:

- Hoisting speed up to 45 m/min

#### SPECIAL DESIGNS

- Multi load acceptance
- Climate-controlled storage areas
- Deep-freeze application
- Multiple SRMs in one aisle for redundancy and very high stock turnover
- SRM with aisle-change-bridge (turning device)
- Curve-going SRM
- Transport to and from dynamic order-pick positions via SRM
- Camera system for video surveillance
- Green Crane Technology (see page 3)



Be it aisle-linked, cross-linked or curve-going storage and retrieval machines – through highest reliability of mechanical components and innovative control technology, SSI SCHÄFER guarantees high availability, operational reliability and efficiency for effective warehouse management.

#### Double-deep telescopic fork

For the operation of double-deep designed rack systems with two consecutively stored pallets, all SRMs are available with double-deep telescopic forks.

# Schäfer Miniload Crane (SMC)



**With the Schäfer Miniload Crane (SMC), SSI SCHÄFER covers every area of storage automation for bins, boxes and trays.**

With the Schäfer Miniload Crane (SMC), SSI SCHÄFER covers every area of storage automation for bins, boxes and trays.

SSI SCHÄFER integrated every bit of experience they gained in warehouse management into the in-house development of the SMC. Therefore, the SMC does not only feature an outstanding cost-performance ratio but also a design for quality and longevity starting with the first screw.

The SMC is the ideal solution for maximum use of the vertical warehouse direction with a concurrently small footprint. By using boxes, trays or bins as storage aids, there is virtually no limit in shape or surface of the goods that have to be stored or buffered.

SSI SCHÄFER offers a wide range of solutions to connect the SMC to automatic and manual warehouse equipment from goods receiving and order pick positions to goods issuing.

The new SMC by SSI SCHÄFER is the solution for:

- Optimization of storage volume
- Improved inventory reliability and optimization
- Adjustment to your individual warehousing strategy
- Safe storing of sensitive or valuable goods
- High availability of goods
- Short order processing times
- Flexible adjustment to altered logistics parameters and processes





The sophisticated construction of the SMC is geared toward maximum value for the customer. The continuous use of premium steel guarantees high durability and contingency reserves with concurrently low costs.

Due to the diagonal bracing of the mast, a lower weight, higher dynamic and with it a higher throughput is also achieved.

The design is unique and significant. The traveling unit with steel-rail and the successful Omega-drive is entirely designed for high availability and low wear.

Since SSI SCHÄFER also designed the control for the SMC, it can be individually adjusted to customer needs. For example through customized behavior during acceleration and slowdown.

Alternatively to the SSI SCHÄFER warehouse management software the SMC can also be controlled directly through the SAP Extended Warehouse Management.

#### Technical Data

##### Series SMC-1

■ Height	6 – 14 m
■ Width of Aisles	850 – 1500 mm
■ Load	max. 100 kg
■ Storing	single- and double-deep
■ Traveling Speed	5 m/s
■ Acceleration	3 m/s <sup>2</sup>
■ Hoisting Speed	4 m/s
■ Acceleration	4 m/s <sup>2</sup>
■ Bottom Travel Limit	400 mm
■ Upper Travel Limit	680 mm
■ Temperature Range (non-condensing)	-30° to +45° C

##### Series SMC-1 XL

■ Height	14 – 18 m
■ Width of aisles	850 – 1500 mm
■ Load	max. 100 kg
■ Storing	single- and double-deep
■ Traveling speed	5 m/s
■ Acceleration	1,5 – 2 m/s <sup>2</sup>
■ Hoisting speed	4 m/s
■ Acceleration	4 m/s <sup>2</sup>
■ Bottom Travel Limit	450 mm
■ Upper Travel Limit	680 mm
■ Temperature Range (non-condensing)	-30° to +45° C





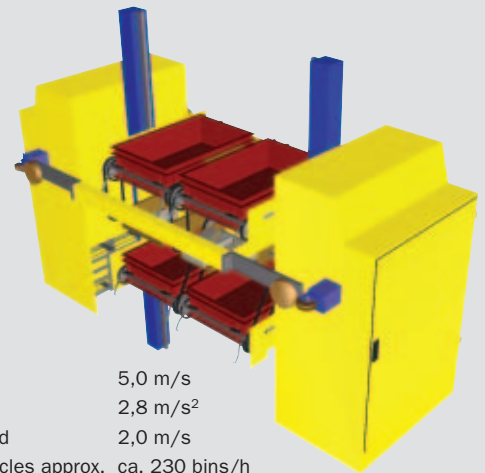
# Schäfer Quad System (SQS)



With the SQS (Schäfer Quad System) SSI SCHÄFER has developed a warehousing system for **highly-dynamic bin processing**. The system which is based on the “goods to man principle” is especially designed for use as an intermediate buffer or a buffer for shipping as well as for the high-performance processing inside the automatic Miniload.

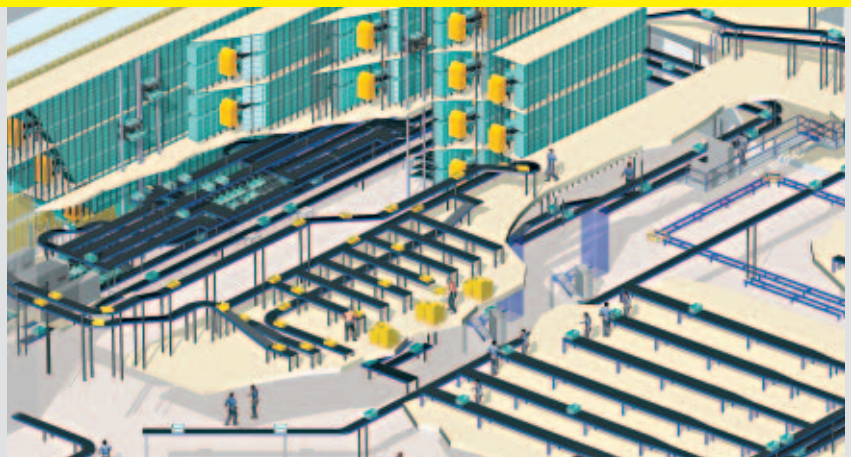
It is used wherever high-performance processes require the quick allocation of as many standard bins as possible in a small area.

Specialty: Through the special design with **four load accepting devices for each shuttle vehicle**, a very high load change velocity and the abandonment of telescope movement, the SQS offers a five- to ten times higher throughput than conventional storage and retrieval machines (SRMs). Furthermore, it is possible to put five SQS on top of each other. For this reason the system stands for highest dynamic in minimal spaces.



## Technical Data:

- Max. Velocity 5,0 m/s
- Max. Acceleration 2,8 m/s<sup>2</sup>
- Max. Hoisting Speed 2,0 m/s
- Capacity/Double-Cycles approx. ca. 230 bins/h
- Capacity/Single-Cycles approx. ca. 280 bins/h
- Load acceptance device with 4-fold telescopic fork
- Hoist unit to operate up to 5 rack-levels above and below the traveling level
- Hoisting height up to 2.90 m for single deep storing





# Schäfer Tray System (STS)

The STS by SSI SCHÄFER is a system used to store and process trays. By grouping several STS-vehicles on top of each other, the warehouse can be used very efficiently and high throughputs can be achieved.

Typically the trays are not directly transferred from the conveyor system to the STS-vehicle, but are allocated at transfer positions via STS-lifts in the rack. That way, this warehousing system can be used very dynamically, highly available and efficiently through the strategic arrangement of individual components which is reflected in the high throughput performance. Unlike with conventional SRMs, no fork runs under the trays but the trays are moved using a gripping and extracting device which yields respective time-advantages for the system.

As a component of the SCP (Schäfer Case Picking), one or more cases are taken off the tray using special separating-pins. The cases are individualized and removed.

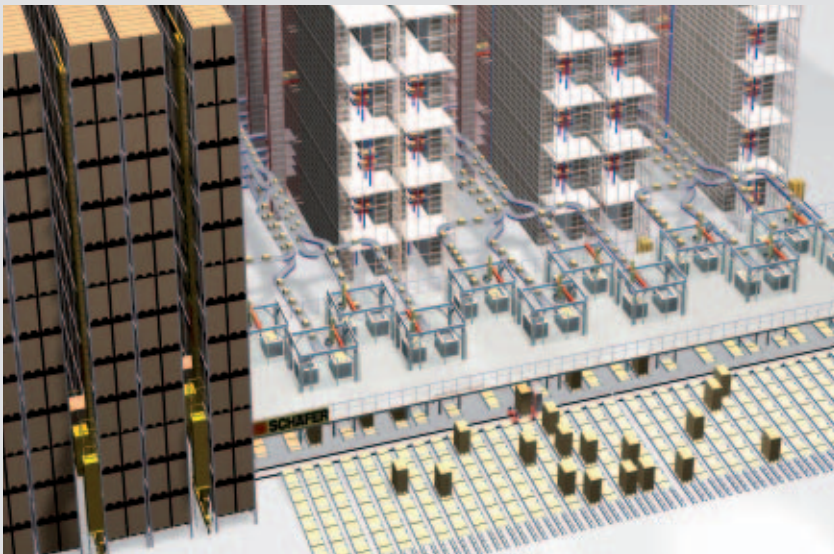
The STS-vehicle is delivered in a solid transport aid made of steel which guarantees safe transport while ideally utilizing the space available. The transport aid also serves to bring the device directly into the rack and install it in the rail without using heavy mounting aids.

## Technical Data:

■ Velocity	4,5 m/s
■ Acceleration	2 m/s <sup>2</sup>
■ Hoisting Speed	1,25 m/s

## Special Features:

- Exchangeability of devices
- Up to 6 levels on top of each other
- Lifts allow for additional sorting (sequencing)

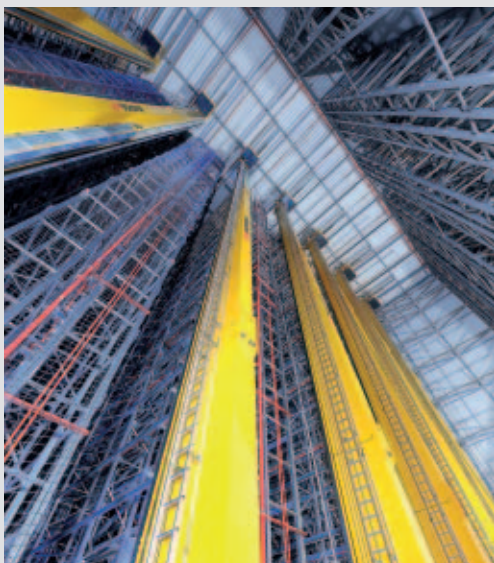


## Transport Aid

- The transport aid is designed in such a way that three STS can be transported in one container.
- The STS is inserted into the rack by means of the transport aid.
- In case of maintenance or breakdown, a "back-up STS" can be put into operation. Hence, long downtimes can be avoided.







## Storage and Retrieval Machines for Pallets

- High Bay Warehouse SRM
- Schaefer Compact Crane (SCC)

## Storage and Retrieval Machines for Bins

- Schaefer Miniload Crane (SMC)
- Schaefer Quad System (SQS)

## Storage and Retrieval Machines for Trays

- Schaefer Tray System (STS)



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