SSI SCHÄFER

PURE WAREHOUSE DYNAMICS

Storage and Retrieval Machines,
Warehouse Vehicles and Shuttles


SSI SCHÄFER

We Optimise **Space and Time**

SSI Schaefer provides ideas, concepts and holistic solutions for complex logistics management. Being a systems supplier with international know-how and a global presence, SSI Schaefer is your competent partner. With engineering services, mechanical engineering, steel construction and control engineering from one source, as well as our own IT and software development department, harmonious interaction is guaranteed.

Automatic Storage and Retrieval Machines by SSI Schaefer are an important part of a cost-effective logistics chain. Anywhere optimised warehousing with quick transport of material and short access times is required, we offer innovative Storage and Retrieval Machines that meet customer requirements and reduce warehousing costs.

Our in-house manufacturing guarantees unchanging quality and reliability.

You Determine Our Scope of Services

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

Green Crane Technology:

SSI Schaefer provides efficient warehouse solutions that reduce energy consumption and therefore minimise your organisation's carbon footprint and costs.

This is done by:

- Direct current power pool of drive controls and energy-optimised overlapping of movements in order to transfer brake-energy of one drive into drive-energy for 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 Storage and Retrieval Machine. This way, energy is saved and abrasion reduced.
- Accompanying balance weights for the lift reduce the necessary use of energy up to 25 %.

Quality Advantage
due to SSI Schaefer's in-house production and expertise

Time Advantage
because of pre-commissioning is done at the factory and – complete prefabricated modules are ready for assembly and suitable for shipment in containers

System Advantage
thanks to the modular design which adjusts to the respective situation (new project, integration, modernisation)

BLUEcompetence Alliance Member
Partner of the Engineering Industry Sustainability Initiative

Our Own Technology Center:
Rigorous Quality Testing for Long-term Performance

At the more than 4,500 m² in-house Technology Center in Giebelstadt, all machines and components of SSI Schaefer undergo detailed, comprehensive testing. This ensures that our products are of the highest quality and not prone to wear. Enhancements to our components and machines are also easier to realise and expedite this way.

Our Technology Center is also open for site tours so that you can see our product range first-hand.

Moving **Warehouse and System Automation** – Worldwide

Our list of customers is just as international as the SSI Schaefer group. Renowned brands, corporate groups and market leaders have been among our customers for years. We are extremely proud of their loyalty to our organisation. With our commitment to quality, customised logistics solutions, we continue to build this trust.

Coordinated technology is the key to developing ideal solutions that benefit the customer. 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, our Storage and Retrieval machines can handle the task. SSI Schaefer can also develop customised concepts and solutions suitable for your individual application.

Storage and Retrieval Machines by SSI Schaefer will adjust to your individual requirements.

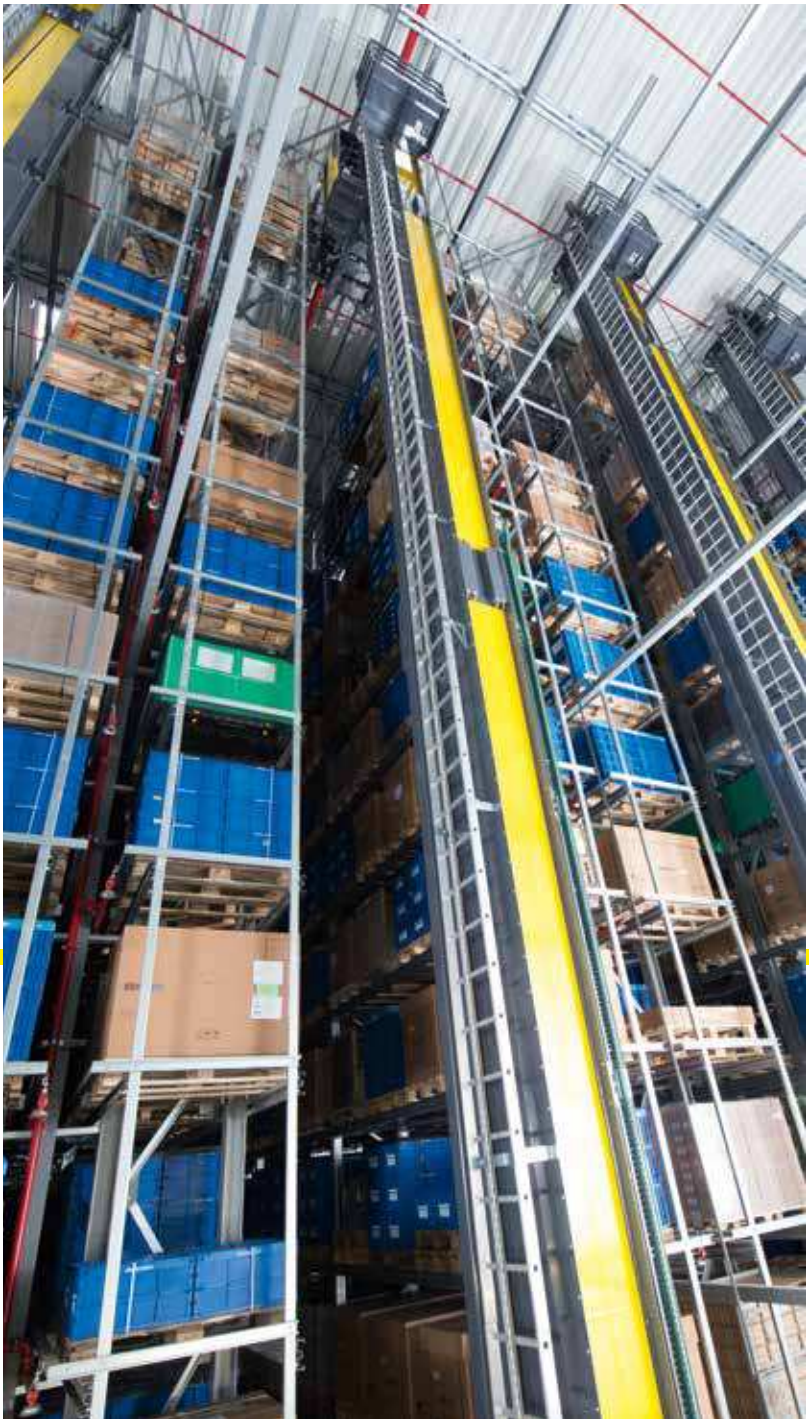
- Adjusts to your storage aid by means of dedicated load acceptance devices
- Utilizes space well due to low travel limits
- Optimises handling capacity by means of adjusted dynamics and diversity of drives
- Maintenance friendly machines developed with premium, proven and tested machine components
- Provides smooth transport and short assembly times due to compact components and pre-commissioned storage

Modular Standards for Custom-Made Warehouse Logistics

Due to the modular design of the Storage and Retrieval Machines with individual heights of more than 45 m, the Storage and Retrieval Machines by SSI Schaefer adapt easily to your specific warehouse requirements.

Custom-made for Highest Efficiency.

Our Storage and Retrieval Machines are available in a one or two mast design for single, double or multifold deep storage and can meet any demand ideally.



Types of Warehouses

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

SRM-Equipment

- Designed 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
- On-board emergency-control station
- Maintenance and service friendly arrangement and design of aggregates
- Frequency controlled drives
- Safety PLC

Special Designs

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

Storage Aids

Euro pallets, industrial pallets, system pallets, DIN-pallets, chemical pallets, standardised 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.

Exyz – New SRM-generation for More Storage Capacity, Flexibility and Efficiency

We are proud to offer our customers a thoroughly optimised storage and retrieval device: the Exyz. From the production of single, individually tailored machines to combinations of standardised machine components, the Exyz offers flexibility and efficiency.

Different, serial-produced basic elements – from single or double-mast devices with one or two load handling devices for a single-, double- or multi-deep storage and retrieval to an Orbiter-version – create a comprehensive pool for customer-specific mounted end devices. Designed as a modular system, the devices can be tailored quickly to the individual requirements of the user from eight to 45 meters height.

With innovative design features, the Exyz provides a multitude of efficiency advantages, high flexibility and more storage capacity. The compact construction has led to an especially high customer volume. The Exyz offers an attractive price, reduced delivery and implementation times as well as highly reliable components. Efficient energy recovery devices are included features in the Exyz.

Exyz – Advantages

Efficient modular design:

- Highest reliability by use of proven components and high quality series manufacturing
- Highest flexibility allows individual configurations to meet specific customer needs
- Shortest delivery and implementation schedules because of intensive pre-assembly and testing in our plant

Efficient use of energy:

- Green Logistics on highest level included in standard design

Efficient geometries:

- More usable storage volume due to the extremely compact design

Schaefer Lift&Run System – Storage Device with Integrated Shuttle for Channel Storage

SSI Schaefer offers an exceptionally economic solution with its Lift&Run system for the highly dynamic handling of pallets in a channel storage warehouse.

Specialty of the system: the storage machine SLR consists of a transfer carriage with lifting device for the extremely flexible load handling device Schaefer Orbiter System (SOS). It runs on two rails and therefore doesn't need upper guiding rails. It is also possible to use many such devices on top of each other in order to scale the SLR to specific customer requirements.

The feed-in and retrieval of the pallets is done via vertical lifts. SLR and lifts work together to form the Schaefer Lift&Run system with which the storage capacity can be effectively heightened and the efficiency of the logistic solution can be increased.

Schaefer Lift&Run System – Advantages

High longitudinal dynamics
- $v_{x,max}$ = 240 m/min
- $a_{x,max}$ = 0,8 m/s² on level 0 or
- $a_{x,max}$ = 0,5 m/s² on higher levels

Low lifting heights
- Height of device up to about 8 m
- Accessible from 2–3 shelf levels per device
- Possible use of multiple devices on top of each other
- Highly effective vertical dynamics despite moderate driving power
- Movable emergency control station not necessary
- Very low bottom rack-in measure

Extremely high level of energy efficiency
- Light weight
- Energy efficient drive
- Economic lift-drive design on account of use on multiple levels

Lifting carriage with flexible Orbiter channel vehicle
- Especially appropriate for use in the beverage industry

High machine safety
- Integrated hydraulic buffer for lifting movements
- Hydraulic buffer for driving movements
- Solid lifting mechanics via chains

Modular design
- Compact
- Easily scalable

The Schaefer Lift&Run system consequently implements the matrix idea in logistics for the handling of pallets. High dynamics, low space demand and efficient use of energy make this system an interesting alternative to the classic pallet SRM for various applications.

Schaefer Miniload Crane (SMC) – SRM for Small-parts Logistics

With the Schaefer Miniload Crane (SMC), SSI Schaefer completely covers rack automation for totes, cartons, and trays and presents the ideal solution for maximum use of vertical storage while using very little floor space.

Since there are a variety of load handling devices to choose from, there are almost no restrictions to the form and surface of the items to be stored or buffered. Whether your SMC has one- or two-masts, your load handling devices can be custom fitted to your requirements. The modular building block system allows for an individual custom design and an ideal cost-performance ratio.

SSI Schaefer utilised every bit of experience and research to the in-house development of the SMC. Therefore, the SMC is designed for quality and longevity starting with the very first screw.

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

SMC – Advantages:

- Optimisation of storage volume
- Improved inventory reliability and optimisation
- 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

Tested systems and innovative solutions for small-parts logistics.

The sophisticated construction of the SMC is geared toward providing the maximum value for the customer. The use of premium steel guarantees high durability and contingency reserves with low costs. Due to the diagonal bracing of the mast, a lower weight, greater elevation and higher throughput are achieved. The design is unique and significant. The traveling unit made with steel-rail and the successful Omega-drive are designed for high availability and low wear.

Since SSI Schaefer also designed the control for the SMC, it can be adjusted to fit each customer's needs. For example, through customized behavior during acceleration and slowdown. The SMC can be controlled by the the SSI Schaefer warehouse management software or directly through the SAP Extended Warehouse Management.

Technical Data

Series SMC1

Height	up to 18 m
Width of aisles	850 – 1,500 mm
Load	max. 100 kg
Storing	single, double and multifold deep
Traveling speed	up to 5 m/s
Acceleration	up to 3 m/s^2
Hoisting speed	up to 4 m/s
Acceleration	up to 4 m/s^2

Series SMC2

Height	up to 24 m
Width of aisles	900 – 1,500 mm
Load	max. 300 kg
Storing	single, double and multifold deep
Traveling speed	up to 4 m/s
Acceleration	up to 2 m/s^2
Hoisting speed	up to 4 m/s
Acceleration	up to 4 m/s^2

SSI Schaefer does not just review the dynamics and performance of the equipment, but also investigates how the performance impacts the overall system. The result is data driven solution designs that provide fast positioning and load changing times, an overall higher throughput and energy efficient, low-wear operation.

Minimum Requirements for Empty Space in the Racks – the **Schaefer Tray System** (STS)

The Schaefer Tray System (STS) is a system for storage and picking of complete pallet loads on trays. With multiple STS vehicles on top of each other, the warehouse can be efficiently used. Each STS vehicle has two load handling devices with a pulling jig installed.

As a result there are very short cycles and minimum requirements for empty space in the racks. The trays are typically supplied via STS lifts to transfer places in the rack.

Based on a strategic alignment of the single components, this storage system allows for highly dynamic, highly available, and efficient use as well as very high throughputs. The rack vehicle is delivered in a stable transport aid made of steel which ensures a safe transport and facilitates the installation of the STS vehicle in the rack.

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.

STS – Advantages:

- Highest dynamic by relinquishing telescope movements
- Modular and scalable system, optimal use of space
- Flexible use of up to 6 levels on top of each other
- High throughput performance by use of transfer stations
- Additional sorting (sequencing) via lifts possible
- Rail and conductor line already integrated in rack construction

Technical Data:

Velocity	up to 4.5 m/s
Acceleration	up to 2.4 m/s^2
Hoisting Speed	up to 1.25 m/s
Load	max. 200 kg/tray
System height	4 m
Aisle length	up to 150 m

Navette – the Scalable Multi-level Shuttle

With the Navette, a flexible multi-level shuttle, SSI Schaefer has achieved another technological breakthrough for increasing efficiency in the storage and picking of trays, totes or cartons in automated warehouses. The shuttle, which can be scaled precisely to the customer's requirements, and the overall system, represent an innovative leap in design and technology.

The matrix idea in the logistics is consequently implemented for the handling of single units. In connection with the 3D-MATRIX Solution unimaginable throughputs are possible now. Navette lifts act as a link between the conveying system and the individual Navette travel levels in these solutions with the user determining the positioning and aisle numbers. The Navette is integrated into the steel framework of the miniload aisles serving up to eight storage levels as single component – two of them actually in parallel. The Navette is equipped with two load handling devices, such as carton grabs which is an important design feature. In one load cycle, the Navette moves a total of four transport units simultaneously, serving storage locations on two storage levels in a single operating sequence. So, unlike single-level shuttles, the Navette is able to operate in genuine double cycles. This minimises travel times and doubles process efficiency.

With its design features, the Navette system delivers maximum synergies within the warehouse and provides high efficiency with maximum flexibility, scalability, energy savings and investment security. All active components can be expanded, replaced and renewed in a totally flexible way. In terms of performance and storage location access, Navette solutions are much more efficient than traditional shuttle applications.

Navette – Advantages:

- Scaled to customer's requirements through multi-level technology
- Flexible concerning the number of storage levels per aisle
- Access to a wide range of items in the storage aisles
- Minimisation of driving times through 2 load handling devices
- Decoupled handover between vehicle and lift
- Stackable up to 24 meters high: Flexible storage configuration
- High throughput through integration of transfer locations

Technical Data:

Speed	up to 2,5 m/s
Load	max. 35 kg/tray
Machine height	2–3 m
Storage	double deep
Temperaturbereich	4 to 40 °C
Aisle length	up to 150 m

Storage and Retrieval Machine for pallets

- Exyz

Storage and Retrieval Machine for pallets

- Schaefer Lift&Run system

Storage and Retrieval Machine for totes

- Schaefer Miniload Crane (SMC)

Storage and Retrieval Machines for Pallets

- Exyz

Storage and Retrieval Machine for trays (left)

- Schaefer Tray System (STS)

Multi-level Shuttle for trays, totes and cartons (right)

- Navette

www.ssi-schaefer.com

quality austria
SYSTEM CERTIFIED
ISO 9001:2008 No.07908/0