SSI SCHAEFER

AUTOMATED SYSTEMS

by the SSI SCHAEFER Group

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With its international headquarters located in Neunkirchen, Germany, SSI SCHAEFER / FRITZ SCHAEFER GMBH primarily targets **equipment to automate warehouses** which includes the manufacturing of steel racks for miniloads and rack-supported buildings. The extensive product line includes a wide range of storage and transport containers, pallet racks, tote shelving, mobile racks, mezzanines and much more.

SSI SCHAEFER NOELL GMBH in Giebelstadt, Germany designs and implements integrated logistics systems. Acting as **general contractor**, the company has completed over 300 systems worldwide. The range includes consulting and system planning, implementing turnkey systems and customizing after-sales services.

SSI SCHAEFER PEEM GMBH in Graz, Austria focuses on modular **picking technology**. The company plans, develops and manufactures highly dynamic conveying systems for totes and cartons as well as automated order picking systems. The scope of business ranges from standard conveying systems to automatic tray handling systems to facilities with robotics as well as automated quality checks of pre-packed orders.

Acting as general contractor, SALOMON AUTOMATION GMBH, Friesach near Graz implements customized, **complete solutions** for all types of warehouse systems – fully automated and manually operated. The company supports its customers throughout the entire life cycle – from problem solving to the selection of optimal IT and warehouse technology infrastructure including the training of warehouse employees to handling the software and the systems. Customized service ensures operating reliability and the highest availability.

SSI SCHAEFER's **production plant** in Hranice, Czech Republic: All products for automation – storage and retrieval machines, pallet conveying systems and the Schaefer Carousel System (SCS) are manufactured, pre-tested and delivered to the construction sites.

Details and Advantages of Being Part of a Group

SSI SCHAEFER's automation division is a worldwide leading expert in the planning, design and implementation of efficient intralogistics systems. With an extensive, market-oriented product range, we generate tailored logistics solutions that fit your business processes. This enables us to assure optimum efficiency and profitability for our customers. In addition, the compatibility of system components offers extensive flexibility and lays the groundwork for future expansions. Using the latest technology, SSI SCHAEFER develops cutting edge automation ranging from single systems to complex installations.

The support, expertise, synergy and innovation under SSI SCHAEFER's umbrella allows us to offer a complete range of intralogistics solutions from one source. As a SSI SCHAEFER customer, you will receive reliable and available state-of-the-art systems, fast project implementation, and lasting value for long-term investments.

Products developed, designed and manufactured by SSI SCHAEFER provide the basis for logistics solutions. In every phase of a project, this facilitates efficiency and flexibility that focuses on your specific needs anywhere in the world.

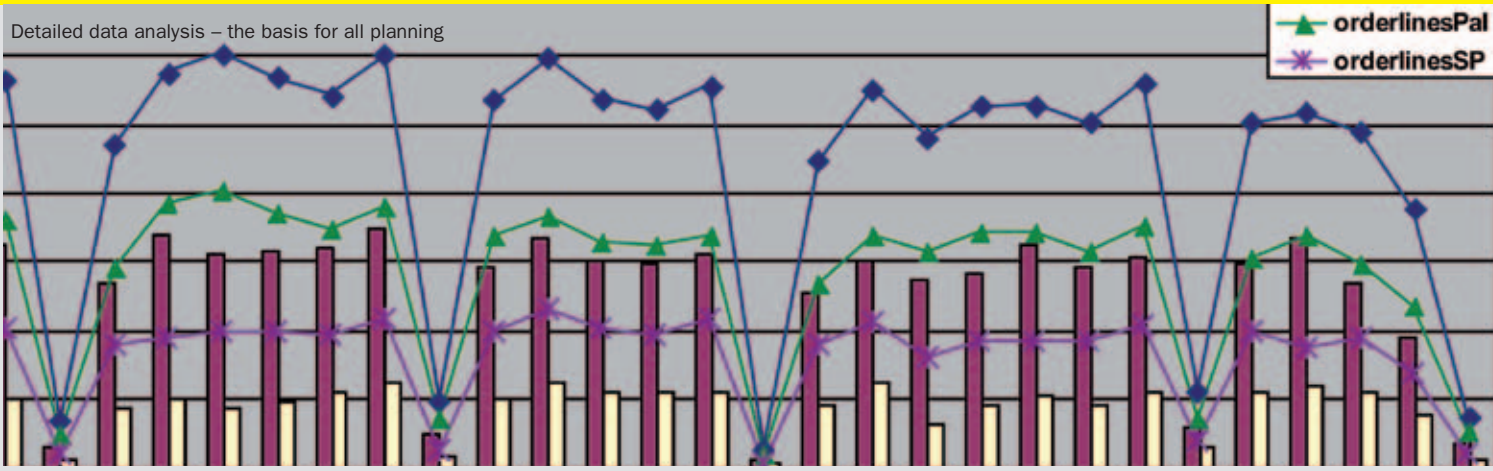
Our services:

- General contracting
- Planning and consulting
- Project management
- IT and automation systems
- Control systems
- Steel construction and racking systems
- Highly-dynamic order picking systems
- Storage and retrieval machines for small parts, pallets / containers etc.
- Conveying systems for pallets, totes, cartons and trays
- Tote handling systems
- Paperless order picking systems
- Sorting and shipping systems
- Upgrading and modifying systems (Retrofit)
- Service and maintenance

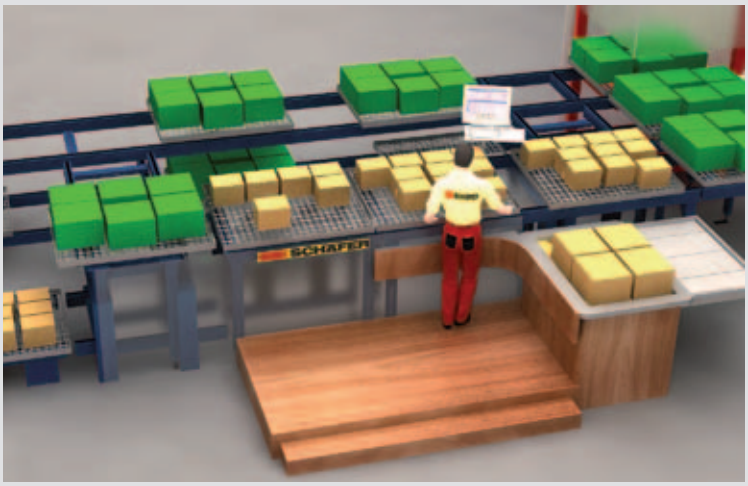
Your advantages:

- Know-how transfer
- Short reaction times
- Highest quality standards due to our own production facilities
- Worldwide availability
- Long-term warranty for all services and products
- Maximum profitability due to optimized planning and short implementation times

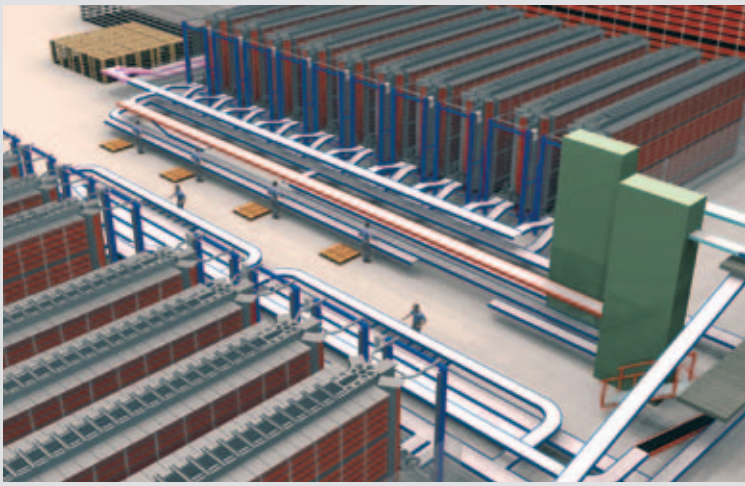
We increase your efficiency – worldwide.



Detailed data analysis – the basis for all planning



Animation in 3D-model



Animation in 3D-model

Creativity, Know-how and Vision – Planning Logistics

Together we plan your future.
Efficient logistics processes are the basis for economic success. Let our specialists do the planning for you. SSI SCHAEFER has completed hundreds of projects around the world for leading logistics service providers in all major markets. Because of our experience, SSI SCHAEFER has the know-how and expertise to deliver innovative ideas and concepts as well as reliable components for integrated solutions of complex logistics management applications.

At SSI SCHAEFER, we involve the customer from the beginning. We work together, starting with the system layout up to the distribution systems for specific materials and work flows. Process analysis, simulation studies and profitability calculations not only confirm the economies of scale of the proposed solutions, but also show the future growth potential for our customer's business.

Solutions all from one source.

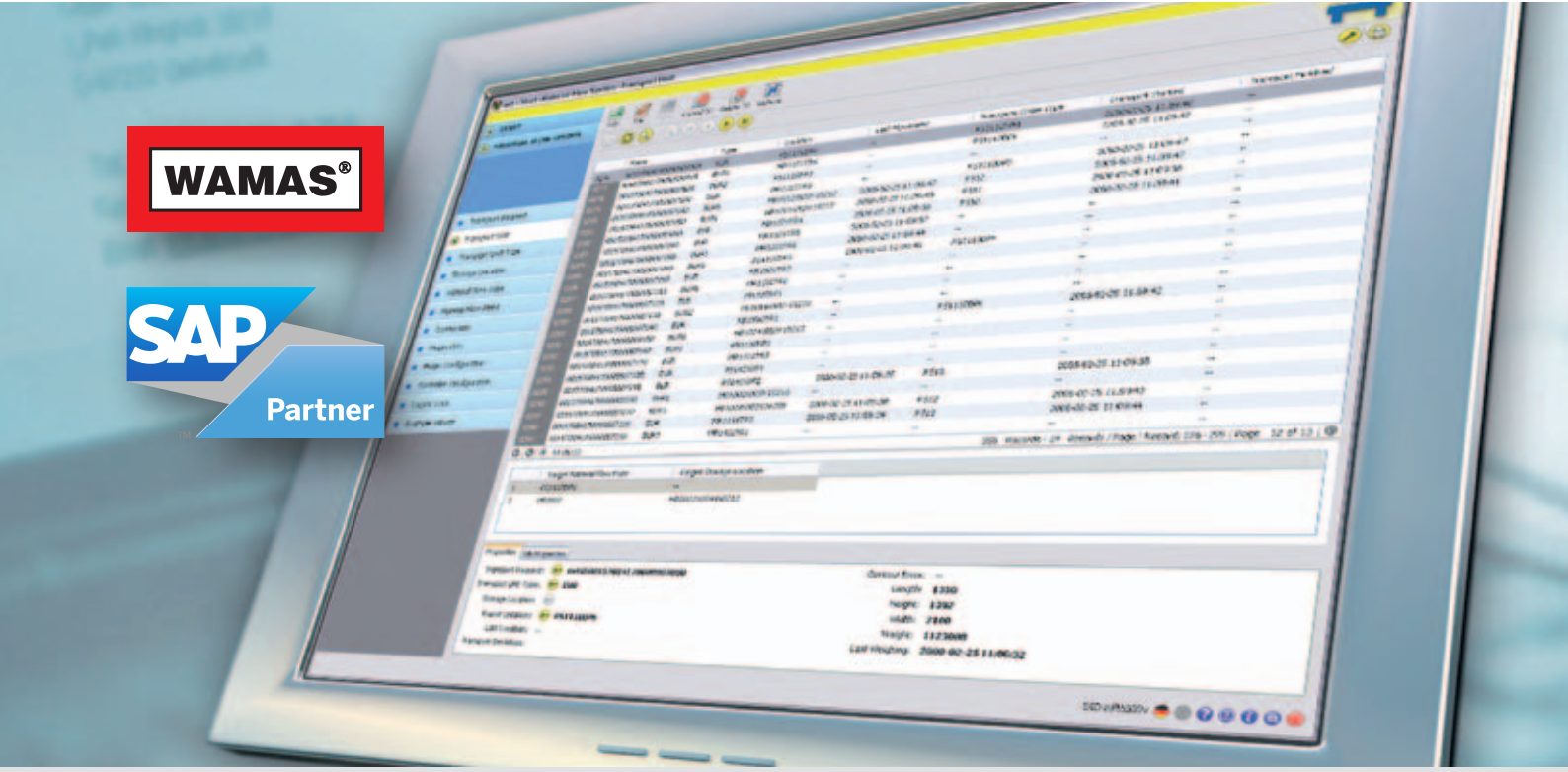
Our tools:

PlanT	■ Data evaluation
Plant Simulation	■ Simulation
Auto Cad / Inventor	■ 2D/3D Layout
3D Studio Max	■ 3D Animation

Automation Technology

As little automation as possible, as much automation as necessary. To implement this golden rule of intralogistics continuous availability and reliability of all system components is necessary. Using software automation results in a coordinated process flow and reliability during continuous operation. The use of the latest electro- and control engineering incorporates the implementation of efficient transport and conveyor processes and assures the compatibility of all components within the conveying system.

With the help of comprehensive, user friendly visualization tools, the material flow system displays the degree of utilization of all system components, based on the detail needed. With just one glance, the processes in receiving such as order picking, goods replenishment or dispatch can be identified and if necessary, early intervention can be initiated.



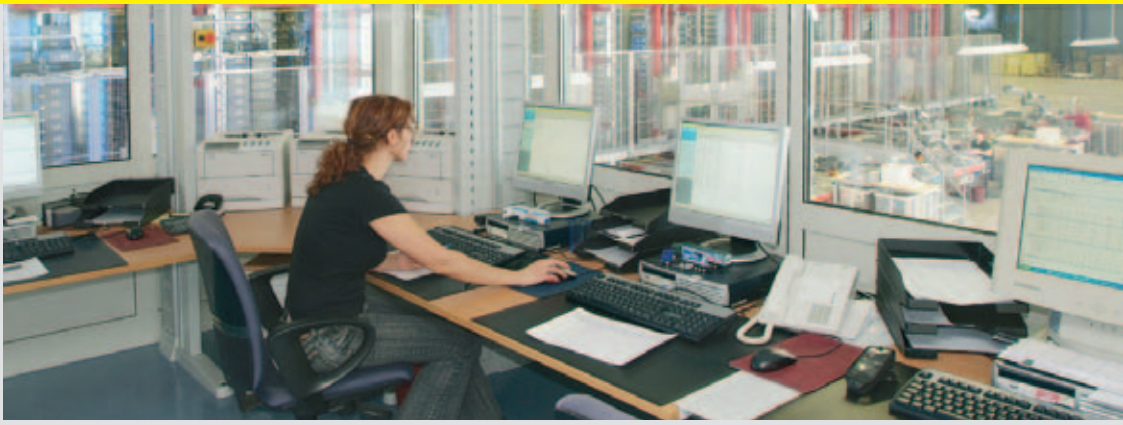
Customized IT

With its Warehouse Management Systems WAMAS and SAP EWM, SSI SCHAEFER provides the information technology basis for continuous transparency and reliable, efficient control of all warehouse management and distribution operations.

The modern, interbranch system architecture and its consequent user-orientation are reflected in the modular design of the system and the diversity of the user-interfaces. The broad spectrum of existing operating interfaces, the control of a wide range of different picking-systems in manual (Pick-by-Light, RF-picking, Pick-to-Voice) as well as in automatic areas (Schaefer Case Picking, MERCURY, goods-to-person picking, SSI Robo-Pick and A-Frame) ensure that an adequate solution is available for each task.

The standardized system is based on the extensive experience of SSI SCHAEFER combined with the processes of evolutionary software development. Adapting to individual customer needs is easy and accomplished via an interactive and incremental approach.

The system contains many recognized logistics processes – for example: goods receipt, storage location optimization, replenishment of supplies, order picking, packaging and dispatch – and offers integration capability to the customer-specific IT-technology. Due to the scalability and adaptability of the system, the customer receives a precisely tailored solution regardless of whether it is for a small warehouse or a complex distribution center.



The Family of Storage and Retrieval Machines – Maximum Efficiency for Pallets, Trays and Totes

Automatic storage and retrieval machines by SSI SCHAEFER are an important component of a cost-effective logistics chain. Where 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 therefore, enhance the economic side of warehousing. Through minimal energy consumption the environment is protected and the cost of maintenance reduced. Because we manufacture our own products, we continuously deliver quality, reliable products to our customers.

Storage and Retrieval Machines for Pallets

Where optimized pallet storage with fast material transport and short access time is required, **automatic storage and retrieval machines** are the answer. They handle storage and retrieval operations in high-bay warehouses and move products to transfer stations.

With the use of building blocks, the pallet SRM **Exyz** can be tailored exactly to the individual needs of users and provides more storage capacity as well as higher flexibility and efficiency. The highest energy-saving categories and efficient energy recovery systems are already standard with Exyz.

The **Schaefer Lift&Run** system represents an economic solution for the highly dynamic handling of pallets in a channel storage warehouse. The storage device SLR consists of a transfer car with lifting device for the load handling unit Schaefer Orbiter System (SOS) and operates in connection with vertical lifts. High dynamics, low space demand, and efficient energy use make this system an alternative to the classic pallet SRM for various applications.

SSI SCHAEFER offers a wide spectrum of standard devices that can be adapted as single or double mast units based on capacities, travel and lifting speeds, installation height and load based on requirement and application to meet the exact needs of the customer. Compact assembly groups and pre-tested storage and retrieval machines guarantee short assembly times. Proven, high-quality machine parts result in comfortable maintenance schedules. Intelligent control routines furthermore provide low-wear and energy-efficient warehouse operation.

Further, models with dedicated load handling devices, multiple load pick-up, equipment for utilisation in a deep-freeze environment, turning devices with aisle-change-bridges, flexible drive concepts as well as redundant configuration with several storage and retrieval machines per aisle are available.

BLUeCOMPETENCE
Intralogistics

SSI SCHAEFER has been involved for years with such topics as energy efficiency, security, and ergonomics. Consequently, we participate in the VDMA initiative “Blue Competence – Initiative in Sustainability for Mechanical Engineering and Plant Engineering”.

GreenLogistics by SSI SCHAEFER

Storage and Retrieval Machines for Small-Parts Logistics

Storage and Retrieval Machines for Pallets

- Exyz
- Schaefer Lift&Run

Storage and Retrieval Machines for Totes

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

Storage and Retrieval Machines for Trays

- Schaefer Tray System (STS)

Nominal space requirements with minimal access times, flexible links to other storage systems and modularity of our time-tested systems are the basis for efficient, automated storage logistics for totes, trays and cartons. From racking and conveying systems to order picking strategies, we design and implement customized solutions that can be adapted to customer specific requirements, down to the smallest detail.

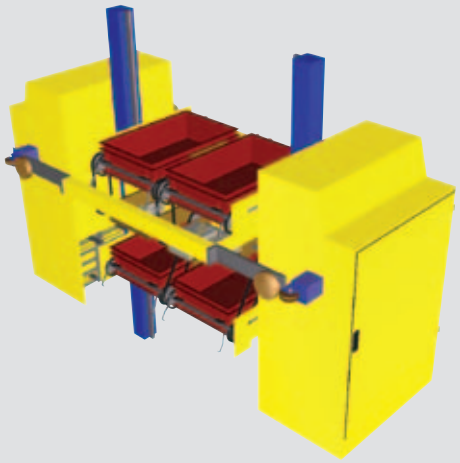
Our innovative logistics solutions like the **Schaefer Carousel System (SCS)**, the **Schaefer Quad System (SQS)** and the **Miniload (automated small parts storage system)** were especially designed to meet the requirements of highly dynamic logistics processes and warehouses and are more than just a complement to our extensive palette of classic system components.

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. With the use of totes, trays or cartons as carrier there are hardly any restrictions to the form or surface of the items that need to be stored or buffered. The SMC is a one- or two-mast machine with different load handling devices that can be tailored to customer requests. The modular building block system allows for an individual custom design and an ideal cost-performance ratio.

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.

Tested systems and innovative solutions for small-parts logistics.

High Density Dynamics – the SQS



With the Schaefer Quad System (SQS), SSI SCHAEFER has developed a warehousing system for **highly-dynamic tote processing**. The system is based on the goods-to-person principle and is designed for use as an intermediate or dispatch buffer for high performance order picking in an automatic Miniload.

The SQS is used wherever space is limited and high performance processes need a large number of standard totes in the shortest time possible.

Each SQS vehicle is equipped with **four load handling devices** and achieves a very high load changing velocity on account of the elimination of telescope movements. In connection with the flexible placement of the feeding and retrieving lifts and the alignment of multiple SQS vehicles on top of each other in a Miniload aisle, the SQS system offers a throughput 5–10 times higher than the conventional SRMs. Compared to shuttle systems, the SQS simultaneously serves multiple storage levels at comparable throughput performances. This makes the system the most dynamic while using the least amount of space.

Superior Performance – the SCS

The Schaefer Carousel System (SCS) stands for **high-speed order-picking with minimal use of space** using the goods-to-person principle. Up to 1,000 picks per hour, 50 percent higher storage density and a modular system concept make the SCS an intelligent solution for dynamic order picking at high proficiency and profitability levels.

Precise operator guidance confirms, directs and controls each transaction, resulting in errorless order-picking. The connection of high-capacity conveyors and the latest control technology also provide high storage and retrieval frequencies.

Result: fatigue free operation, continued high throughput and quick, economic order compilation and less than one sixth of the energy consumption of conventional systems.

A standard module consists of four rotating carousels with one decoupled, automatic stocking and picking unit each.
Space saving shelf arrangement results in a capacity of up to 6,000 totes with a standard 4 carousel system. Like building blocks, the units can be combined allowing them to be scaled to a specific project.

SCP
Schaefer Case Picking

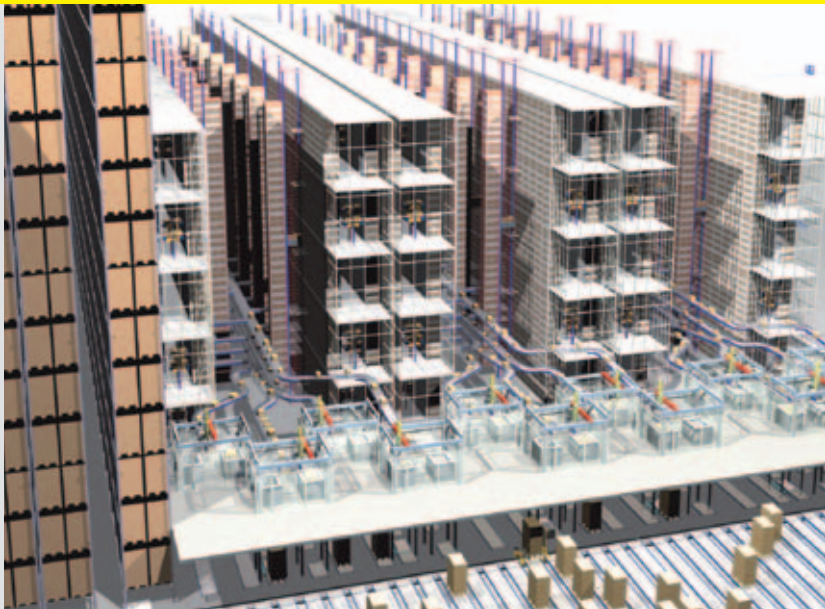
What is SCP?
SCP is an integrated concept for fully automated depalletizing of manufacturers' pallets, buffered, order picking and mixed palletizing.

Design of the SCP
- Handling of product loads of the manufacturer pallets on trays
- Interim storage of the loads in a highly dynamic tray buffer
- Provision of trays and automatic singling out of packages
- Store friendly sequencing
- Automatic palletizing and pallet protection

Objective of the SCP
- Packing software for volume-optimized, stable and store-specific formation of packages
- Efficient use of space and low energy consumption per unit
- Modularity and scalability regarding space and power requirements
- Flexibility for future growth and change of distribution structures
- Maximum range of items (6-packs, trays, etc.)
- Low costs per unit (full costs)

SCP is a modular, scalable and almost endlessly expandable system from 30,000 to 500,000 cases per day.

Laureate of the MM Logistik-Award 2008



Machine Vision Technology

Industrial image processing for automated order picking processes

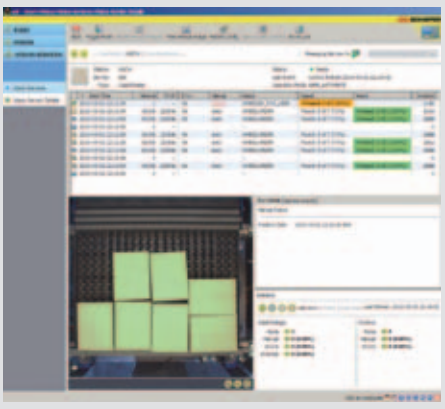
With the implementation of fully automated order picking systems, SSI SCHAEFER has consequently used and developed electronic image processing as a key technology for automation right from the beginning.

The Schaefer Case Picking (SCP), the Schaefer Order Verifier and the SSI Robo-Pick (SRP) are successful examples for the utilization of the innovative Machine Vision Technology.

In industrial production and intralogistics Machine Vision Technology offers potential capabilities from the fully-automated palletizing and depalletizing via the sequence, layer and orientation examination directly in the process up to the quality assurance including complete documentation and traceability.

Advantages and results

- Operation of distribution centers which automatically supply a customer-specific mix of products
- Efficiently automated and controlled production processes
- Integration of quality assurance and order picking with minimized error rates and significantly reduced personnel, energy and freight costs
- Technology advantages due to further reduction of interfaces
- Savings capacity which ensure a fast Return on Investment (ROI)
- Further developments of new plant functions with additional profit for the customer
- Fully-automated inspection and documentation of completely commissioned orders – also a retrofit option for existing distribution centers



Pick-by-Voice:
Voice-guided picking – advantage in comparison to Pick-by-Light: several pickers can work on a picking area in parallel.

RF-picking:
RF-picking (Radio Frequency) is a type of picking used in the manual area. An integrated scanner reduces the number of manual entries to a minimum.

Pick-by-Light:
Fast access to single products is controlled by light signals. This is one of the best known types of hands-free picking.

Order Picking

In many cases the key to efficient and optimal order picking is the adequate combination of automation and manpower. To guarantee the highest picking quality in semi-automated and paperless picking, we implemented a modern, **ergonomically designed technology** for perfect guiding of pickers, shortest warehouse accesses and reliable quality in delivery.

Due to the mobile user interface (UIM), SSI SCHAEFER can incorporate all standard systems available in the market for radio frequency transmission with user dialogues that are independent of hardware.

Pick-to-Tote:
This was especially designed for the picking of large, heavy or delicate articles that are picked directly into the order tote.

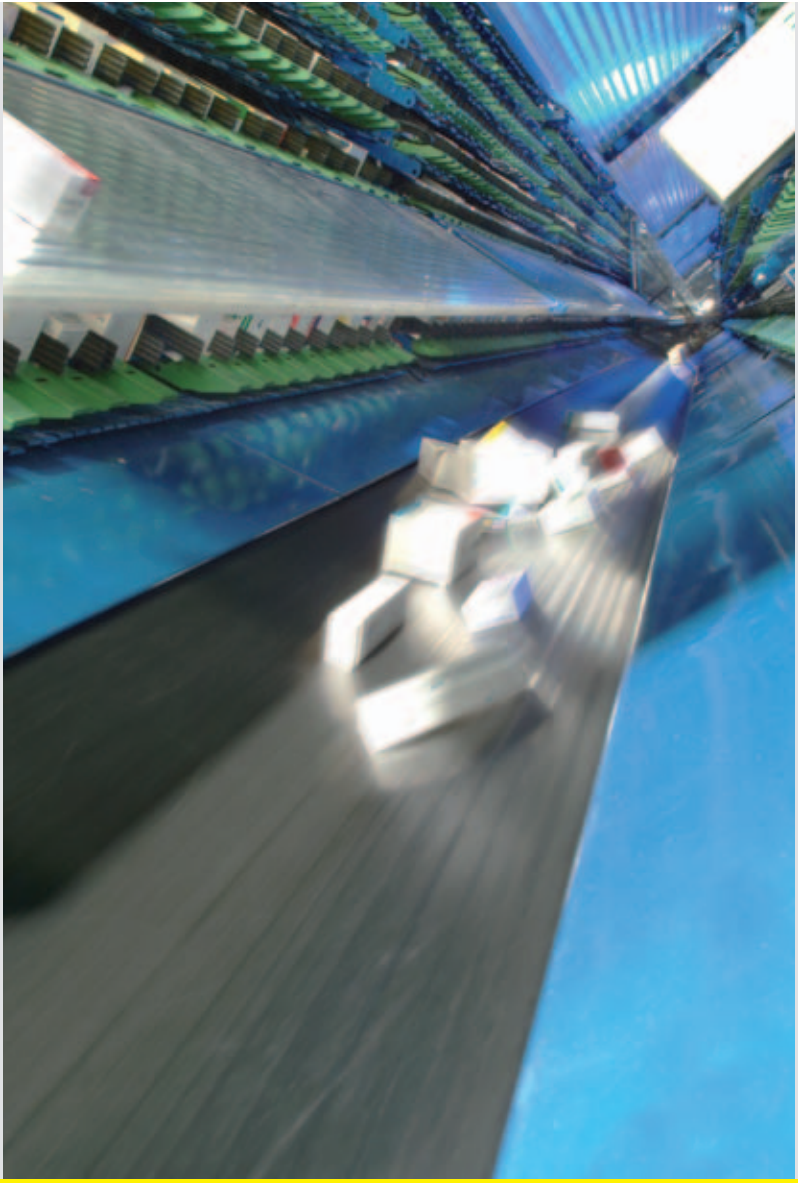
Pick-to-Bucket:
This is picking with the use of an independent collection bucket before it enters the order tote. Pick-to-Bucket workstations are designed for highest picking throughput rates. A combination of Pick–by-Light and Put-to-Light as well as a special buffer allow staff to have their hands free for the picking of lightweight and droppable products.

Automated Picking Systems

Automated Picking Systems consolidate all articles from individual orders with flexibility and at the highest throughput rates.

Permanent batch tracing is a fundamental principle of this concept.

The highest system reliability and quick access times as well as the combination of different types of systems allow the handling of nearly all product groups and goods.



SSI Robo-Pick

The SSI Robo-Pick (SRP) is the first fully-automatic picking system which can be integrated into an existing person-to-goods system. This system picks more than 95% of typical products found in mail-order business and achieves picking rates of up to **2,400 picks per hour** providing the highest picking quality.

The SSI Robo-Pick is supplied via an automatic storage system such as the Schaefer Carousel System, Schaefer Quad Shuttle or a Schaefer Miniload Crane with totes. The position of the products in the totes is identified by the two-stage, optical image recognition system. The optimal item focus for several products is simultaneously calculated by the system.

The special SSI Robo-Pick gripper then picks the needed amount. The system works entirely autonomic and service reduced. It is not necessary to record reference pictures of products to be able to pick them. Here it can directly be picked into the order tote or into a picking buffer.

The SSI Robo-Pick enables multi-order picking with unmatched picking performance and quality. It is especially economic for order structures such as e-commerce regarding purchase costs which are equivalent to conventional goods-to-person systems.

Pallet Conveying System

For the transport of pallets for repeat processes that always use the same sections, the conveying system of SSI SCHAEFER provides a quality, economic solution. Conveying system components provide excellent flexibility and are easy to assemble and maintain. Built-in modularity, a special support profile for chain conveyors and roller conveyors, driven or revolving conveyor elements, belt and telescopic conveyors, discharging chutes or cascades – these conveying system components include a wide range of accessories and offer limitless possibilities for the design of conveying systems.

Because we manufacture our own products, we continuously deliver quality, reliable components and systems to our customers.

Plastic Belt Conveying System

The innovative Plastic Belt Conveying System for the transport of any load carriers.
With the development of the Plastic Belt Conveying System, SSI SCHAEFER has developed a new technology which revolutionizes intralogistics and significantly reduces costs. The possibility to do this without conventional load carriers in the internal material flow has many advantages.

The return transport of empty pallets with the respective handling effort is not necessary. Furthermore, the load carriers can be recycled in terms of “Green Logistics”. This results in the optimization of existing capacities and storage.

Tote and Carton Conveying System

Individual solutions with perfectly combined components.
Modular designed standard components that can be arbitrarily associated and expanded offer SSI SCHAEFER a wide range of conveying systems for effective intra-logistics. The conveyors can transport standard totes or individually designed transport units.

The conveying system is always tailored to fit the type of tote and meet all business requirements. High efficiency and throughput of the system are guaranteed by perfectly interacting components, special machines to handle totes and an ergonomically stable profile.

Silent conveying system
Too noisy logistics workstations are a real cost factor as noise interferes with concentration and leads to more mistakes and lower quality. The “silent technology” of SSI SCHAEFER as an integral part of ergonomics@work® consists of a silent tote with patented running surface and noise-reduction fittings for the conveying system. The result is a conveying system which is nearly silent in a typical warehouse environment as its noise level is 10 dBA and more below the ambient noise.

Case Conveying System

To transport totes and cartons, SSI SCHAEFER offers individually tailored solutions for the complex and constantly changing challenges of intralogistics.

Due to the high flexibility of modular standard components, systems can be arbitrarily expanded, and the interacting components offer a silent functionality as well as simple maintenance.

Besides the popular standard totes, individual products can also be transported.

Tray Conveying System

The transport and buffering of full and empty trays and roller containers between depalletizing and separation is often needed by the Case Conveying System. Different conveying systems such as multiple-strand conveyors, roller conveyors, and lifting and rotary stations are available for this purpose. Further, system components such as a tray stacker, vertical conveyor, shuttle vehicle and other diverse accessories complete the range of products.

Extensive accessories offer limitless possibilities for the design of material flows.

Hanging Conveying System

The Hanging Conveying System building blocks of SSI SCHAEFER offer the ideal solution for hanging storage and distribution of goods for nearly all sectors. Furthermore, the competitive and nearly silent systems withstand the highest storage density and absolute ground clearance. Application areas that include the clothing and shoe retail market, the cosmetics and pharmaceutical industry and the electronic retail (e-commerce) market emphasize the versatile applications of the hanging conveying system.

This rich diversity is basically supported by three different systems:
The **SSI Translog Single**, the **SSI Translog Trolley** and the **SSI Translog Carrier**.
The automation level of these three systems is individually tailored to suite your requirements.

Schaefer Order Verifier

The Schaefer Order Verifier is a fully automated solution that verifies and documents orders prior to shipping. It entirely fulfills legal requirements regarding consistent documentation of shipped products including batch tracing. It also guarantees the highest possible dispatch quality in warehouse logistics with a throughput of up to 300 totes per hour.

Commissioned customer orders are discharged automatically and separated on special conveyor belts. Then the products are automatically and optically recorded. As the identification is carried out from all six sides, the position of the barcode or matrix code does not have to be considered.

The Schaefer Order Verifier can be equipped with following options:

- Automatic discharging of commissioned customer totes
- Product counting
- Identification of 1-D or 2-D barcodes
- RFID readout
- Photographic shipping documentation
- Semi- or fully automatic filling of the customer totes

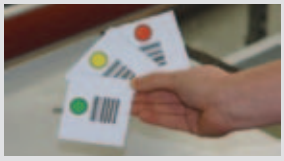
The Schaefer Order Verifier offers the highest dispatch quality and efficiency at a fraction of the operating costs in comparison to conventional dispatch controls. It is easily integrated into existing systems and is perfect for deliveries.

Schaefer Auto Cruiser

The Schaefer Auto Cruiser (SAC) is an extremely competitive and flexible transport system for low to average throughput. It was designed for loads of 1 g up to 30 kg, however, special designs for heavy loads are also possible.

The main components of the SAC are:

- Scales
- Rails
- Loading stations
- Curves
- Switches
- Turn tables



All components are pre-installed. Therefore, the Schaefer Auto Cruiser can immediately be put into operation. External infrastructure is not necessary. A domestic electricity socket is sufficient.
Due to its solid structure, integrated distance sensors and local control concept, the Schaefer Auto Cruiser operates entirely autonomic. The control of the system is carried out by destination cards which lead the vehicle to a preset station.

The Schaefer Auto Cruiser is the cost-efficient transport solution for your company in the area of 50 – 600 transports per hour. The system is completely modular, autonomic and safe in its daily utilization.

Customer Service and Support

High availability, durability, economic operation and quick response times (in case of malfunction) are some of the most critical components in a customer service and regular maintenance agreement of a newly installed device or system.

SSI SCHAEFER has met these challenges by establishing a service and maintenance network which is continuously on call worldwide. Constant availability by phone, internet or on site eliminates downtimes due to system malfunctions and provides preventive maintenance for mechanics. Control and IT-systems are included in the business activities of SSI SCHAEFER as part of the design of a perfect system.

With customer specific service and maintenance models, innovative spare parts concepts, individual support and training offers as well as the take over of the entire technical operation of the system, the service team keeps downtimes short, operations safe and customer satisfaction at a maximum.

With “Retrofit”-projects, automated systems can be updated with the newest technology. This can be done quickly and efficiently while operations continue to run. The business activities range from demand-oriented optimization concepts with investment cost calculations and implementation strategies up to energy-efficiency ideas and IT-solutions.

SSI SCHAEFER hotline – your direct contact 24/7.