

AUTOMATED MOBILE RACKING SYSTEMS

with laser-guided VNA truck



Automated mobile racking system components

The thoroughly planned layout of an automated mobile racking system gives an overview of the integration of all subsystems such as ...



Material flow and warehouse control:

User-oriented, modular, and individual: material flow and warehouse control systems from SSI Schaefer.

...Further information on page 6

**Mobile racking system:**

Modern mobile racking systems from SSI Schaefer: compact storage and maximum reliability.

...Further information on page 4

**Very Narrow Aisle (VNA) vehicle:**

Laser navigation including automatic changing of aisles and optical cargo recognition: these are the characteristics of automated VNA vehicles.

...Further information on page 5



An innovation that really works



The combination of optical vehicle navigation and the long-term, proven technology of mobile racking systems enables

the complete automation of mobile racking systems.

The most essential strong points of the integrative fully automated system in a nutshell:

- Maximum storage capacity in a given space
... or...
- Minimum use of space with given storage capacity
- Degree of area utilization: up to approximately 80 %
- Direct access to all pallet storage locations => no restorage operations
- **Reduction of labor costs**
- High throughput thanks to intelligent storage strategies
- Optimal adaptation to logistics processes
- **Maximum economic efficiency**
- Maximum system availability
- Modularly expandable by expansion of the VNA vehicle fleet
- Modularly expandable by expansion of automated racking blocks and/or VNA vehicle fleet
- Flexibly adaptable to currently required throughput

How does the system of automated mobile racks work?

A mobile racking system, which consists of one to several racking blocks and usually between four and eight moveable rack units per block, forms the central storage location. Movements of the stored goods in the individual racking blocks are carried out by one to two VNA trucks, which move fully automatically in the rack aisles and the aisle-changing zone using laser sensors.

Transfer positions for the pick-up/discharge of goods (pallets or skeleton containers) from/onto the VNA vehicles are located at the front end of each possible rack aisle. Consequently, the VNA vehicles leave the rack aisles only for aisle changes. Supply to and away from the transfer positions is carried out automatically using an adapted conveying system or, in case of minimal solutions, also using manually operated forklifts.

All elements are coordinated by a main computer. The functions of the main computer are project specific and depend on the functional scope of the customer's warehouse management system.

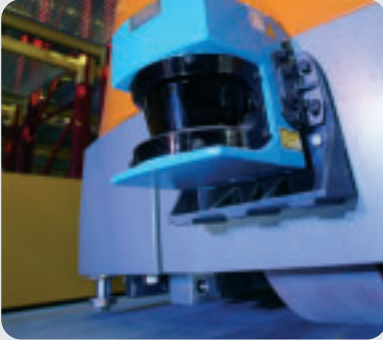
Areas of application

- Ambient-temperature warehouses
- Refrigerated and deep-freeze warehouses



Automated Very Narrow Aisle (VNA) vehicle

Laser navigated VNA vehicle(s) form(s) the core of the automated mobile racking system. Thanks to reference points (reflectors) in the rack aisles and aisle changing zones, the **unmanned** vehicles orient themselves in the area of the mobile racking system.

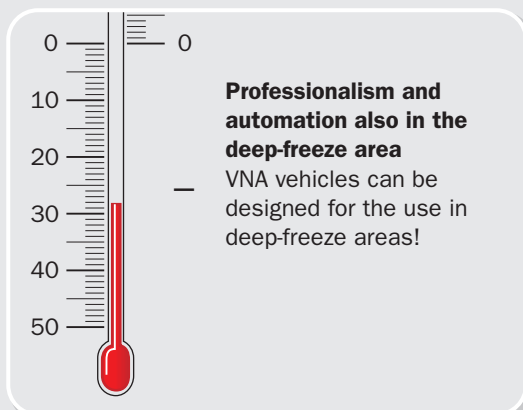
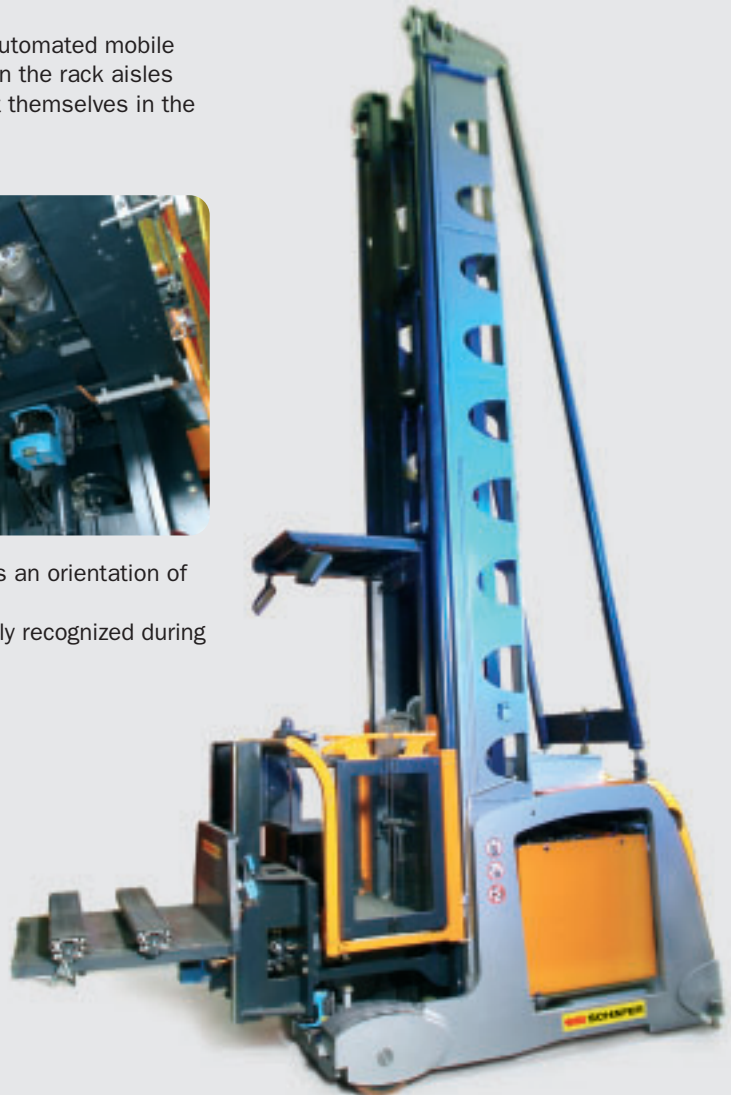


Scanning the environment, which is in real time, enables an orientation of the vehicle on the actual position of the mobile racks. Based on the same principle, the pallet shape is optically recognized during retrieval operations.

The extension length of the load-carrying device (telescopic fork or swivel fork) is precisely adjusted to the geometry of the rack. The number of VNA vehicles used is determined depending on the required performance of the overall system.

The performance of an individual vehicle is basically determined by means of the rack geometry itself and the number of aisle changes.

Due to the implementation of intelligent storage strategies, the number of aisle changes is minimized and thus the capacity of the overall system optimized.



Standard components of the automated mobile racking system

All standard components, which are used in an automated mobile racking system, are exclusively from SSI Schaefer production plants. The consolidation of individual interfaces at SSI Schaefer leads to a lean project organization and an optimal success of the project.

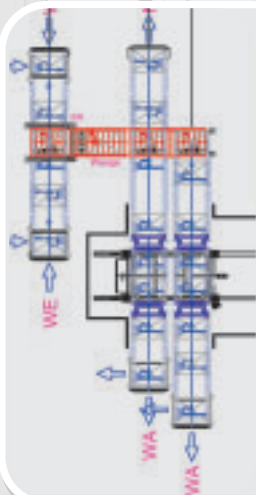


1. Mobile racking system

In accordance with the requirements on stored goods, storage capacity, and spatial conditions, SSI Schaefer plans and implements customized solutions.

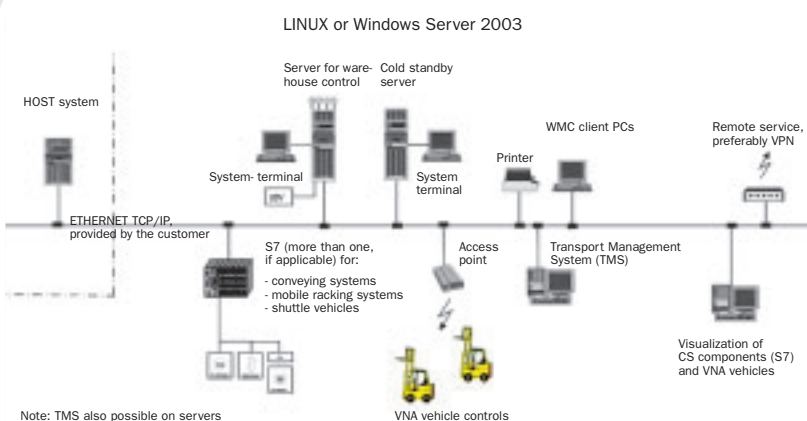
Determining the warehouse geometry as well as the number and type of mobile racking system blocks forms the basis for an optimal adaptation to logistics processes.

Maximum economic efficiency of the overall system is guaranteed.



2. Pallet conveying system

Supply of the unit loads from the goods receiving area to the transfer positions of the mobile racking system as well as re-feeding to the goods dispatch area can be effected through a standard pallet conveying system from SSI Schaefer. With regard to layout planning, a complete range of conveying elements such as roller conveyors, chain conveyors, lifting transfer units, shuttle vehicles, and vertical conveyors is available.



3. Control and material flow computer

Individually adjusted to a warehouse management system which may already be installed at the customer, the necessary functions of the material flow computer are determined. This computer assumes the control of the traffic management system, the coordination of transport orders of the conveying system and the VNA vehicle as well as the task of opening the aisles of the mobile racking system.

You will find further details on the products "mobile racking systems, pallet conveying systems, and IT" in the relevant trade brochures.

Technical key data

Overall system

Possible loading aids:	<div>Euro pallets 1,200 x 800 mm</div> <div>Industrial pallets 1,200 x 1,000 mm</div> <div>Skeleton containers 1,240 x 835 mm</div>
Pallet alignment:	<div>longitudinal / diagonal</div> <div>(depending on the load-carrying device of the vehicle)</div>
Maximum pallet weight:	1,500 kg
Quantity of storage locations per system:	variable; more than 30,000 possible
Quantity of VNA vehicles:	adapted to the overall throughput
Overall throughput:	corresponding to customer requirements



Laser-guided VNA vehicle

Basic characteristics:	<ul style="list-style-type: none"> - Modular design - Scalable dimensions and performance - High throughput - Low energy consumption - Low running costs - CAN bus technology for actuators and sensors
Maximum lifting height:	up to 13,500 mm
Mast height:	modular; adapted to the maximum lifting height
Kinematics:	<div>Traveling: up to 100 m/min</div> <div>Acceleration: up to 0.5 m/s²</div> <div>Lifting: up to 20 m/min</div> <div>Acceleration: up to 0.5 m/s²</div>
Required power:	Traveling: 7 kW / Lifting: 20 – 24 kW
Battery type, voltage, and capacity:	PzS, 80 V, 420 – 930 Ah
Sound level:	68 dB (A)
Vehicle capacity:	up to 35 SC and 20 DC per hour and vehicle



Mobile racking system

Moving speed:	4 m / min
Maximum load of the moveable rack unit:	500 tons
Maximum bay load:	24 tons
Length of the moveable rack unit:	up to 42,000 mm (84,000 mm)
Quantity of moveable rack units:	adapted to the specifications of the customer



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