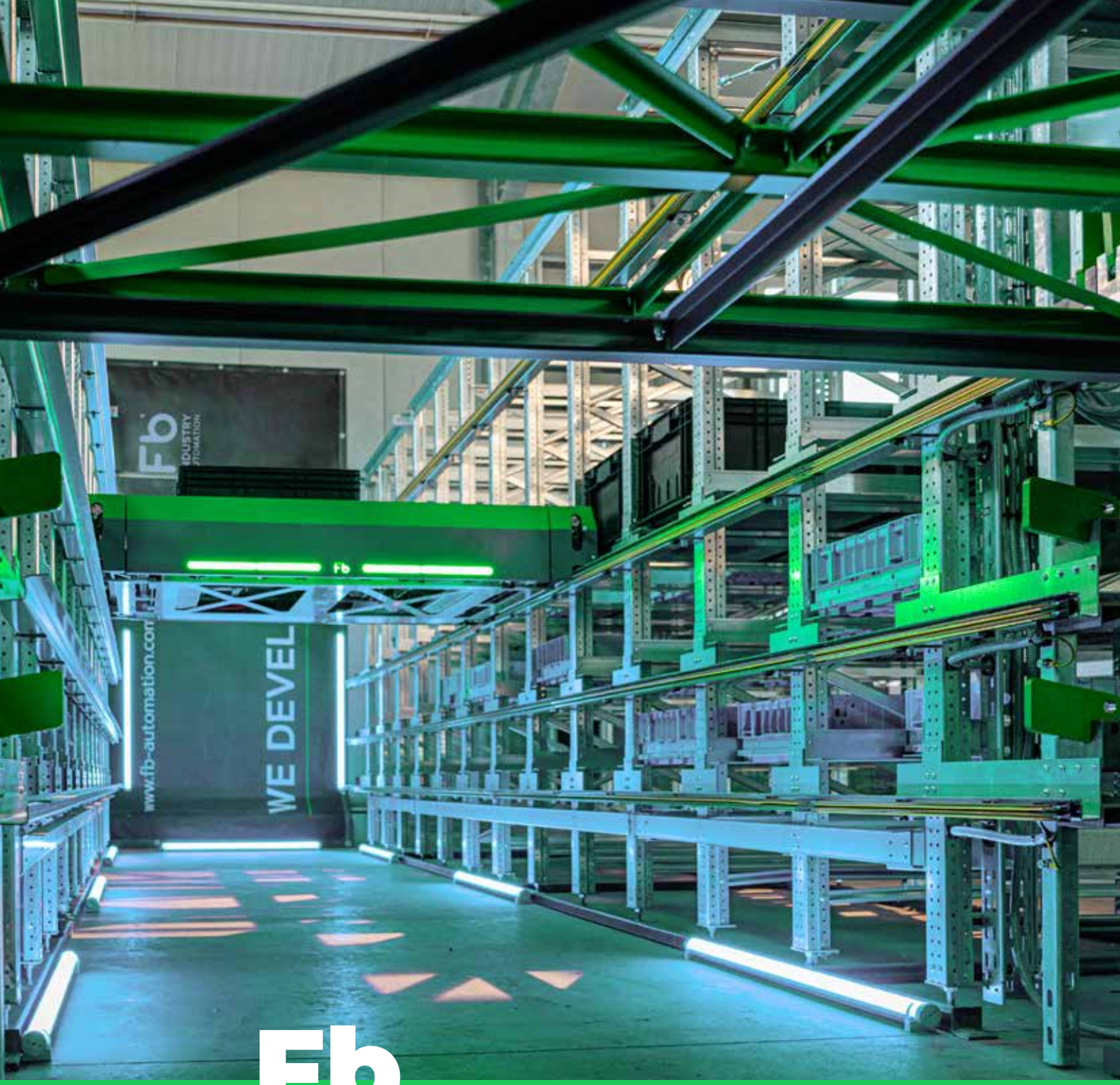
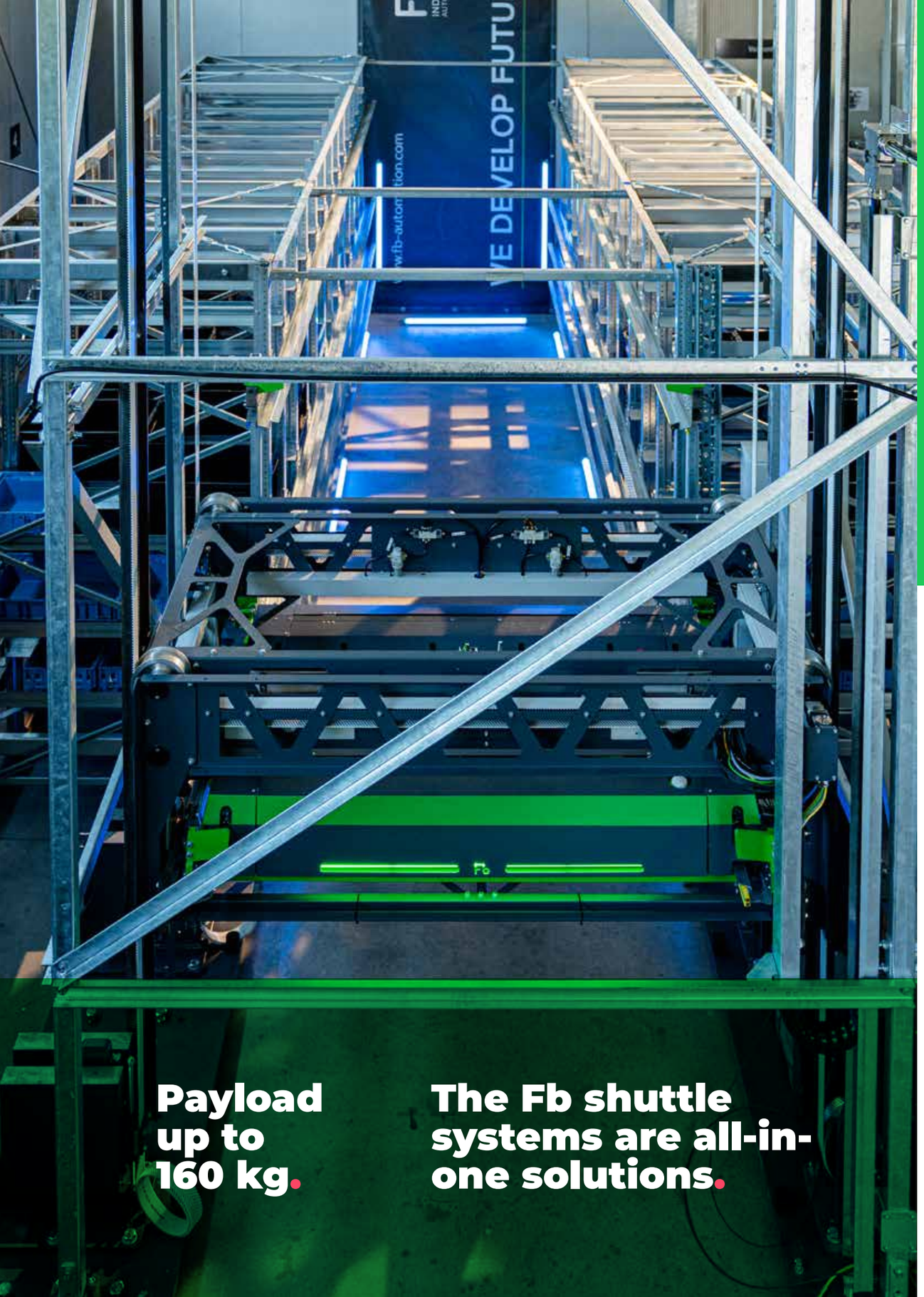


Fb®
INDUSTRY
AUTOMATION

Fb COMPACT WAREHOUSE.

AUTOMATED SMALL PARTS WAREHOUSE



Fb COMPACT SHUTTLE.

Fb Industry Automation's advanced shuttle warehouse systems define new standards in the design of logistics processes.

Our innovative products in warehousing, conveyor and order picking technology are individually adapted to your requirements and guarantee efficient, space-saving and – thanks to our specially developed material flow/warehouse management software Fb Stash – intelligent solutions for your intralogistics.

This is the only shuttle storage system on the market delivering dynamic transport and storage of up to 160 kg in up to 4-deep container storage. You can pick your goods directly at the rack, easily and with maximum efficiency, with no additional conveyor technology. Our smart shuttle systems are all-in-one solutions, meaning core processes are efficiently covered with one technology.

BENEFITS AT A GLANCE.

WAREHOUSING.
Our shuttle systems can also store up to 4-deep thanks to the optimised storage density.

ORDER PICKING.
Goods delivery is fully automated, and time and route optimised.

BUFFERING.
Intelligent decoupling of individual processes guarantees trouble-free handling.

REFILLING.
Manual picking areas or flow racks are supplied automatically and time-optimised from our shuttle warehouse.

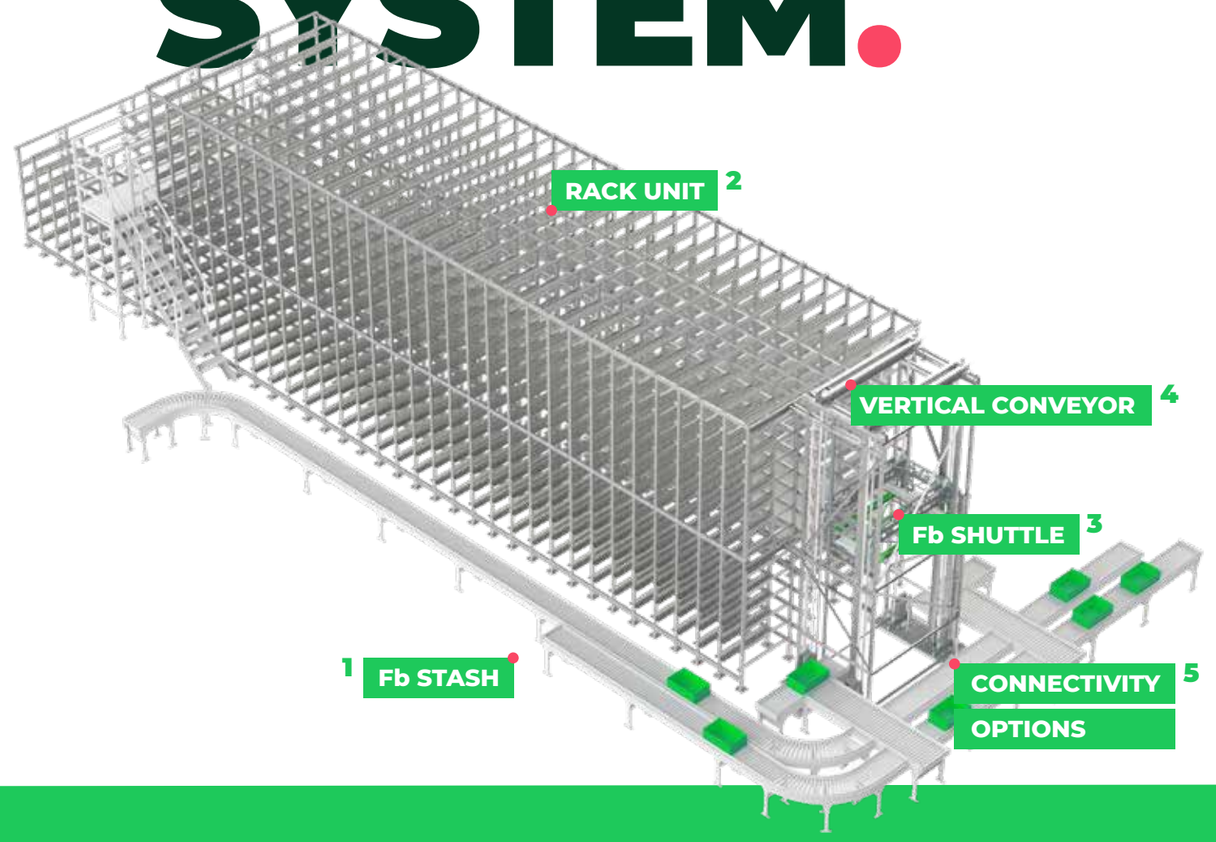
SEQUENCING.
Using our fully automated shuttles, the right product is provided at the right time, in the right quantity, at the right place.

SUPPLYING & INTERLINKING.
Production and assembly areas are supplied just in time and work steps thus efficiently interlinked.

OVERALL SYSTEM.

Fb INDUSTRY AUTOMATION

OVERALL SYSTEM.



CONSTRUCTION AND PROCESS DESCRIPTION

OVERALL SYSTEM.

The compact warehouse system is controlled by **Fb Stash (1)**. It controls the system's entire material flow and incorporates a machine control interface as well as an interface to the customer's higher-level ERP system. If a picking order is started by Fb Stash, the system requests the necessary containers from the **rack (2)**. These are transferred from the rack space via the **vertical conveyor (4)** to the corresponding **connectivity option (5)** by means of the **Fb shuttle (3)**. The employee can process and complete the order. Finished containers are transported further manually or automatically, the source containers can be returned to the system.

Fb COMPACT SHUTTLE.

Fb INDUSTRY AUTOMATION

Fb INDUSTRY AUTOMATION

Fb COMPACT SHUTTLE.

COMPONENT DESCRIPTION

Fb COMPACT SHUTTLE.

During the storage process, the task of the Fb Shuttle is to accept the containers at the transfer point and place them on the rack allocated by Fb Stash. By manipulating the shuttle using a vertical conveyor, you are not tied to one level. During the retrieval process, the container is collected from the rack space and brought back to the transfer point. To provide fail-safe performance, two Fb shuttles are installed in the system as standard. Of course, several Fb shuttles can also be planned for. This serves to increase the system's reliability and performance.

- GEOMETRY (L X W X H)
  1,100 mm x 1,580 mm x 255 mm
- WEIGHT
  approx. 240 kg unloaded
- MAX. LOAD
  160 kg
- VOLTAGE
  48 V DC
- MAX. SPEED
  2 m/s
- MAX. ACCELERATION
  1 m/s²

VERTICAL CONVEYOR.

Fb INDUSTRY AUTOMATION

COMPONENT DESCRIPTION

VERTICAL CONVEYOR.

The Fb Compact Shuttle is transported between the levels in the rack by the vertical conveyor connected directly to the rack. Fundamentally different options are available for integrating the vertical conveyor into the system; the type of access also changes here.

- COMPRISING THREE MAIN GROUPS
  Floor unit
  Nacelle
  Deflection unit
- MAX. LOAD
  approx. 400 kg (shuttle incl. max. load)
- MAX. HEIGHT
  approx. 18 m
- MAX. SPEED
  2 m/s
- MAX. ACCELERATION
  1 m/s²

RACK UNIT.

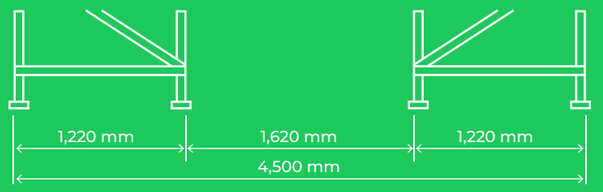
Fb INDUSTRY AUTOMATION

RACK UNIT.

COMPONENT DESCRIPTION

RACK UNIT.

The rack is one of the essential components in the system and reflects the parameters for the design of the system.



Level spacing relative to container height:

Container height in mm	Minimum level spacing normal in mm	Minimum level spacing for access level without sprinkler piping
120	275	400
147	300	425
160	325	450
180	350	475
220	375	500
280	450	575
400	550	675

- MAX. LENGTH **60 m**
- MAX. HEIGHT **18 m**
- RACK WIDTH **4,500 mm** Overall width **1,620 mm** Access aisle
- LOWER APPROACH DISTANCE **377 mm**

WORK STATION CONNEC-TIONS.

Fb INDUSTRY AUTOMATION

FLOW RACK UNIT.

CONNECTIVITY OPTIONS

FLOW RACK.

A popular type of connection to the rack is via flow racks, which are attached to the side of the rack as a workstation. The order is started via the ERP system.
The flow racks at the workstation are refilled automatically by the Fb Shuttle. A pick-to-light system is made available to the employee to support the picking process. The following illustration shows a workstation with flow racks.

Moreover, it is also possible to use a combination of these workstations in order to optimally adapt the system to the
customer's processes.

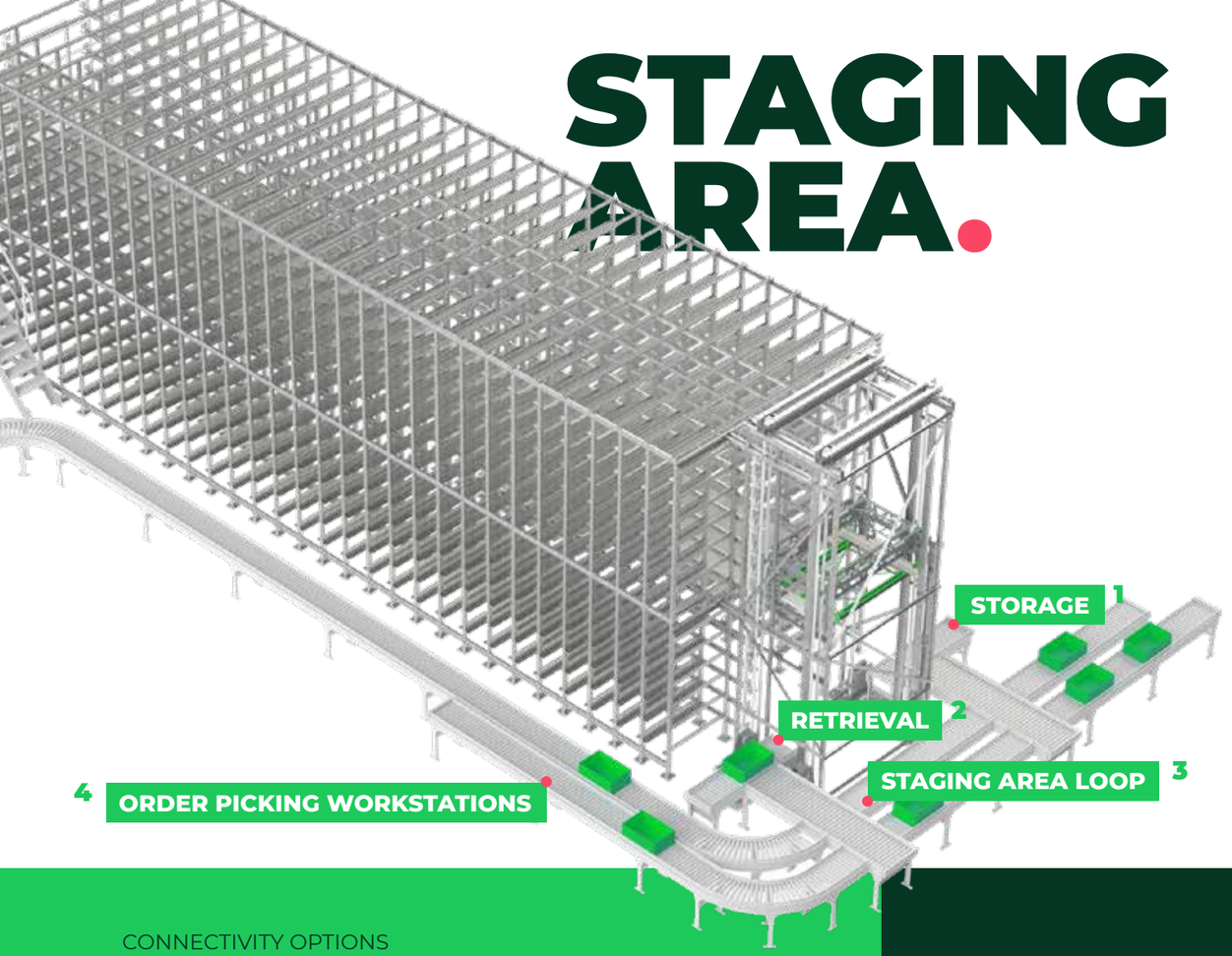
BENEFITS.

FAST ORDER PICKING FOR A SMALL RANGE OF ARTICLES

SIMPLE STRUCTURE OF THE WORK STATION

SIMPLE ORDER PICKING THANKS TO PICK-TO-LIGHT

STAGING AREA.



CONNECTIVITY OPTIONS

STAGING AREA WITH ORDER-PICKING WORKSTATION.

In the case of compact storage, an apron zone can be utilised as an option for delivering the containers for order processing. The apron zone consists of the following areas:

- **(1) STORAGE**
  CONTAINER TRANSFER INTO THE RACK
- **(2) RETRIEVAL**
  CONTAINER ACCEPTANCE FROM RACK
- **(3) STAGING AREA LOOP**
  INDIVIDUALLY DESIGNED CONVEYING TECHNOLOGY
- **(4) ORDER PICKING WORKSTATION**
  NUMBER AND SPECIFICATIONS ACCORDING TO CUSTOMER REQUIREMENTS

If an order is started by the system, the required containers are transferred from the rack via the Fb Shuttle to the **apron zone conveyor technology (2)** and transported via the **apron zone loop (3)** to the **picking workstation (4)**. Here, the order is processed and completed. Empty containers are removed from the system, containers with remaining materials are returned to the rack via the apron zone conveyor technology.

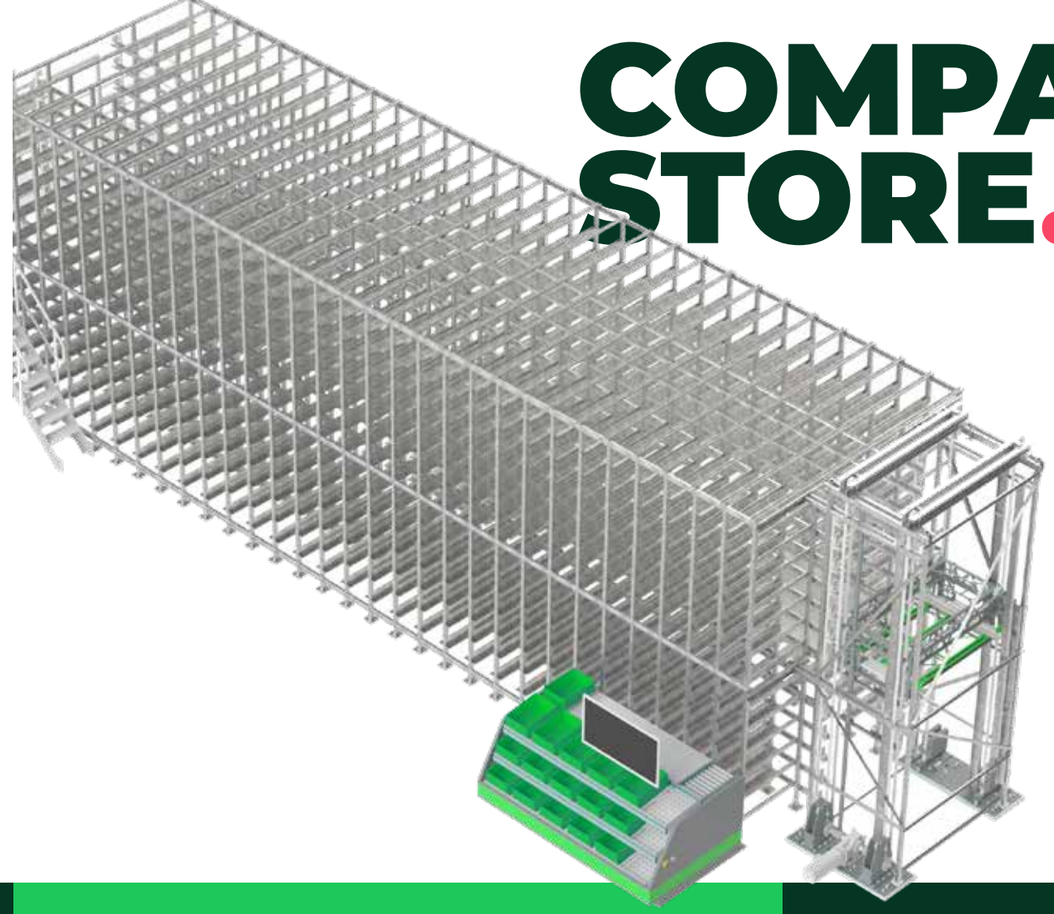
BENEFITS.

INDIVIDUAL APRON ZONE DESIGN, ADAPTED TO CUSTOMER REQUIREMENTS

HIGH THROUGH PUT

INTEGRATION OF VARIOUS PROCESSES

COMPACT STORE.



CONNECTIVITY OPTIONS

COMPACT STORE.

The Compact Store variant is a simplified variant in which the containers are delivered without additional conveyor technology. A workstation is integrated directly on the rack to facilitate order processing.

The order is started either via the ERP system or directly via the screen at the workstation, if a standalone solution is used. The containers are delivered with the articles to be picked on the upper level at the workstation (source). The order container is delivered to the lower level (target). The worker can now pick the articles from the source to the destination and process the orders. The source containers are returned to the system and the order containers can be used for further processing.

BENEFITS.

DIRECT INTEGRATION IN RACK

LOW SPACE REQUIREMENT

ERGONOMIC WORKSTATION DESIGN

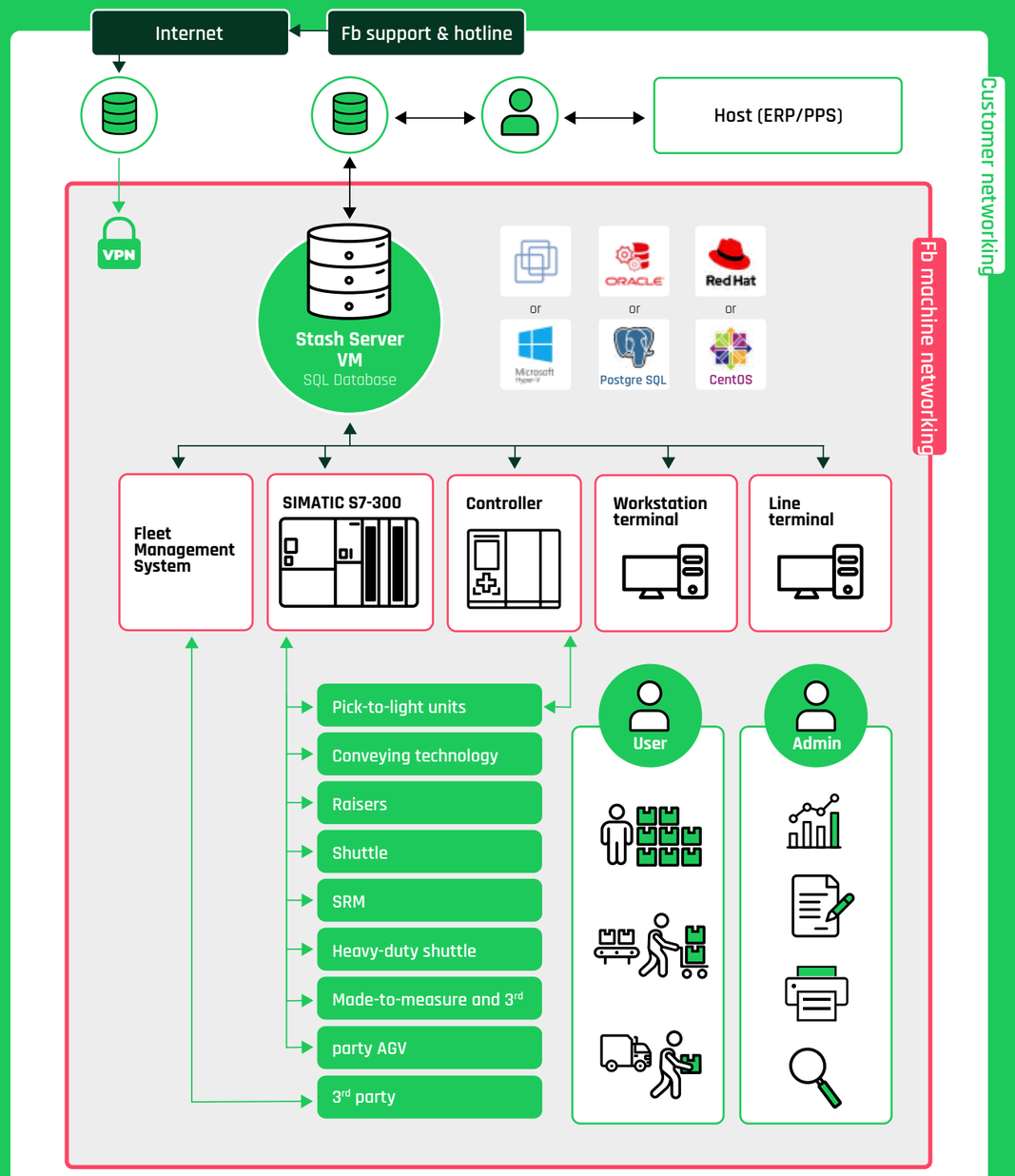
MULTIPLE WORKSTATIONS POSSIBLE ALONG RACK SCALABLE

Fb STASH.

SOFTWARE SYSTEM

Fb STASH.

Fb Stash is a modern software system for warehouse management, material flow management and warehouse automation. Fb Stash is located on the software level between the machine control (for example: PLC) and the Enterprise Resource Planning System (ERP), the Production Planning System (PPS) or the customer's own Warehouse Management System (WMS). Another special feature is that our software also integrates all third-party equipment. Fb Stash can therefore be used to manage entire systems in which the compact warehouse is only one of several system parts.



SOFTWARE SYSTEM.

HOST INTERFACE.

- Master data
- Inventory snapshot
- Stock corrections
- Storage orders
- Retrieval orders

USER APPLICATIONS.

- Order picking
- Kitting
- Control station
- Storage
- Dispatch preparation
- Admin
- Inventory
- Dispatch
- Reporting

WORKSTATION HARDWARE INTERFACES

- Barcode scanner
- Pick-to-light
- Printer
- Scales

LOGISTICS SERVICES.

- Order planning
- Order type
- Replenishment
- Empty container handling
- Reorganisation
- Internationalisation

STOCK MANAGEMENT.

- Inventory entries
- Inventory reservations
- Inventory history
- Storage
- Serial number acquisition
- Order history
- Inventory
- Order processing

TRANSPORTATION.

- Stock model
- Container management
- Storage management
- Transport orders
- Zone management
- Automatic fault handling

TRANSPORTATION PLANNING

- Route optimisation
- Storage strategy
- Order optimisation
- Retrieval strategy
- Dyn. routing

EQUIPMENT INTERFACES. (PHYSICAL OR EMULATED)

- Conveying technology
- Scales
- Raisers
- Third party vendors
- Shuttle
- SRM
- AGV/FTS

IT SERVICES

- Monitoring
- Logging
- Safety
- Back up

VER SION.

Fb INDUSTRY AUTOMATION

PERFORMANCE.

VERSION

PERFORMANCE DATA.

In principle, the following data can be adopted for a standard version.

VERSION TYPE	PERFORMANCE [DUAL CYCLES/
2 shuttles, 1 vertical conveyor	50–60 dual cycles/h
4 shuttles	Up to 300 dual cycles/h

Because the system is optimised to meet customer requirements, the performance data can be adapted to the respective needs.

CONNECTIVITY OPTIONS

ADDITIONAL SYSTEM REQUIREMENTS.

FLOOR REQUIREMENTS

A requirement for the safe and standard-conform installation of the rack system is a sufficiently load-bearing and standardised concrete floor. The floor may not contain magnesite and must correspond to FEM 9.832 in terms of quality, design and flatness.

CONDITIONS OF USE AND ENVIRONMENTAL CONDITIONS

- TEMPERATURE
  0 °C to 40 °C
- NON-CONDENSING HUMIDITY
  30% to 85%
- LOCATION
  Up to 1,000 m above sea level as standard

ALL-IN-ONE SOLUTION.

BENEFIT

Fb INDUSTRY AUTOMATION.

CONCEPT PHASE

- Data & process analysis
- Conceptual design & layout
- Budgeting

DETAIL PLANNING

- Project planning & layout
- Cost accounting
- Bid preparation
- Contract award

IMPLEMENTATION PHASE

- Specifications compiling
- Detailed planning Mechanics/electrics
- Delivery and installation on site
- Commissioning
- Go-live

CUSTOMER SERVICE

- Training & workshops
- 24/7 hotline
- Service
- Servicing

BENEFIT

CUSTOMER SERVICE.

ENGINEERING & CONSULTING

- Detailed analysis of existing processes
- Joint development of an overall solution
  taking into account the customer's corporate orientation (growth strategy, degree of automation, investment budget)

PROJECT CONCEPTUAL DESIGN

- Growth and future throughput calculations
- Material flow compilation
- Layout Design
- Cost estimation & concept presentation

TRAINING & WORKSHOPS

- Training for customer personnel

SERVICING & MAINTENANCE

- Commissioning, go-live & hotline 24/7

ADDITIONAL SHUTTLE TYPES.

Fb® INDUSTRY AUTOMATION

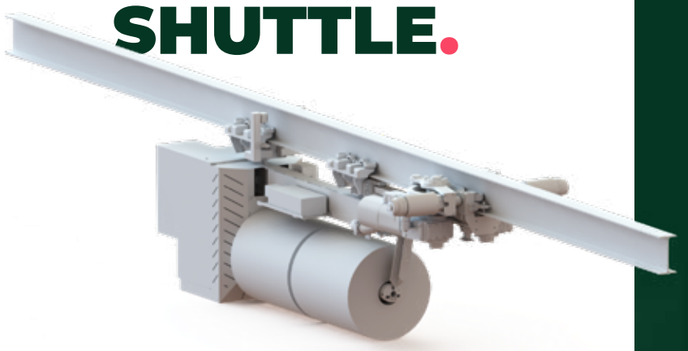
SORTER SHUTTLE.

Fb SHUTTLE
SORTER SHUTTLE.

- MAX. SPEED
  4 m/s
- MAX. ACCELERATION
  2 m/s²
- SHUTTLE WEIGHT
  90 kg
- CONTAINER SIZES
  1 box at 600 x 400 mm
  2 boxes at 300 x 400 mm

APPLICATIONS
Accepts sorting functions for increased efficiency in your small parts picking warehouse.

OVERHEAD SHUTTLE.

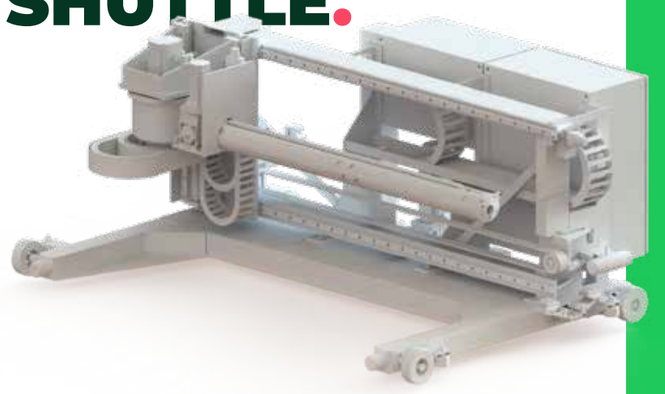


Fb SHUTTLE
OVERHEAD SHUTTLE.

- Can be installed on the ceiling or on the floor
- Workstations can be positioned beneath
- Climbs, slopes and curves can be implemented
- Fully automated pick-up and delivery of the products
- Measurement using a laser system
- Decoupling of material flow paths and work processes

APPLICATIONS
Your space-saving conveyor technology beneath the ceiling for industries with high payloads, such as the mining, wood or paper industries.

ROLLER SHUTTLE.



Fb SHUTTLE
ROLLER SHUTTLE.

- Climbs, slopes and curves can be implemented
- Measurement using a laser system
- Shuttle is not bound to one level
- Rolls remain intact due to pick-up from inside the roll
- Wide range of different load handling devices possible

APPLICATIONS
All industries with loads in roll format, such as weaving mills, paper and wood industries.

YOUR SHUTTLE TO THE FUTURE.

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