

APOSTORE Automatic Storage and Retrieval Systems



APOSTORE 2000/3000

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1 Introduction

APOSTORE commissioning robots are the outcome of many years of experience in the field of commissioning technology for pharmacies. As a result of our close ties with this particular field and our technical competence, we have been able to develop a system that will fulfil the most discerning future demands of pharmacies. These commissioning robots are characterised by the following features:

- Minimum space requirements
- High packing density
- High commissioning speed
- High reliability by a redundancy concept
- Convenient and safe storage
- Modular flexibility
- Simple individual connection with the pharmacy's EDP system and stocks management systems

Right from the outset **APOSTORE** provides an all-embracing after-sales services for pharmacies, and this is maintained for many years after the actual purchase. Opting to co-operation with **APOSTORE** incurs a complete range of services, including:

- Economic efficiency analyses
- Finance planning
- Leasing offer
- Connection to the pharmacy's EDP system and/or stocks management system
- Staff training
- Integration consulting
- Individual installation planning
- Full-service maintenance agreements

The modular extendable **APOSTORE** commissioning system is individually adapted to the requirements of your pharmacy.

Point-of-sale counters are either located on a different floor or far away from the **APOSTORE** automatic commissioning system, will be interlinked by conveyors, lifts and chutes. Careful, individual planning ensures that the conveying facilities are routed in keeping with the space conditions in the given pharmacy.

The **APOSTORE** project engineer records detailed measures of the automatic commissioning robot's location and the connection with the sales counters.

2 Functional description

The basic equipment of an **APOSTORE** pharmaceuticals store with commissioning robot for pharmacies consists of

- An acquisition station with intake desk
- A handling robot fitted with 4 servo-axes
- A shelving system for three-dimensional storage of packs, tubes and containers.

2.1 Manual Input

The articles are identified by manual scanning and in a further step they are placed on a buffer belt, which is located outside the machine. Precise pack orientation or depositing at marked points is not necessary. If there are several identical packs, it is enough to scan only the first one and to enter the given number of packs. Then all packs can be placed on a buffer belt. The colour of the display screen changes when a use-by date has to be entered in the database. Then the expire date has to be entered in the terminal, thereby the work for the operator ends.



Manual Input station

While the operator places the packs on the intake desk in a quasi one-second beat, the simultaneous automatic storage commences without requiring any support by the operator. The transfer unit at the end of the outer buffer belt aligns the packs so that they can be taken over to internal buffer trays by the handling device. The packs are measured in all 3 dimensions and the results are compared with the data held in the database. If something is not plausible, the camera located at the transfer unit transmits a picture of the question pack to the operator's display screen. The pack is immediately returned to the special discharge if the operator recognizes a fault or is uncertain.



Double deep storage at intake tray

With the transfer unit the packs will be placed double deep on internal buffer trays. Completed trays will be moved out of the transfer range and will be placed as a storage tray left or right beside the transfer unit.

Packs on buffer trays are immediately available for dispensing.

Due to the fact that packs are double deep on buffer trays, the robots are able to handle two packs within one operation. This increase input cycle clearly.

Safety operation by VIDCAP

During intake, all packs are identified by a camera. Uncertain packs (wrong dimensions or no bar code) are marked in the data base and locked for output operation. The locked packs are indicated at the terminal and the user confirms right packages. This function also increases input performance, because the input is not interrupted even when there are unknown packs. The non-confirmed packs are evacuated at the back office outlet.



Multipick-Function for intake

Due to the fact that filled buffer trays are fixed in the shelf the robot can unload these trays while an active tray will be loaded by the transfer unit. The next empty tray will be moved to the loading position while a filled tray is transferred to the shelf position. This continuously process as well as unloading the trays with two parallel working robots the user time for filling the machine is minimized.

2.2 Automatic Scanning

As an option, the **APOSTORE** automatic commissioning robot can be equipped with an automatic scanning unit so that the articles only have to be placed on the belt. The transfer unit then aligns, measures and scans the packs in one operation. If the bar code is not legible, or if there is a use-by date for a given article, the pack concerned is discharged at the special discharge point underneath the transfer unit for subsequent manual scanning and storage in the afore-described manner.

No bar code search and a short visual expire date check save time against manual feeding. Manual expire date input is only necessary for packages which are not sold within a preselected time. This items are indicated at the terminal and can be dispensed on request to reload them with the individual expire date.

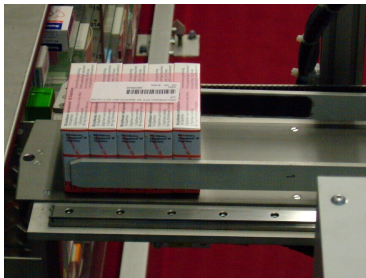
2.3 Fully automated intake station with Feed Hopper V-800

With the optional Feed Hopper V-800 there is a fully automated intake without man-power requirements. Delivered packs have to be poured on the buffer belt of the V-800 and will be transported in the right orientation to the Apostore intake belt. The transfer unit then aligns, measures and scans up to 500 packs per hour and these are put on the internal trays. If the bar code is not legible then the pack will be returned to the Feed Hopper by the robot via a circulation belt and in a second run the packs should finally be identified, because they are located in a different orientation.



2.4 Product range

With the Apostore gripper technique a large range of products can be handled. The more packs are in the machine, the more time is left for customer service.



Cellophane packs



large range of square packs



Round packs



glasses in separate packs

The robots are searching the best place to store the packages. To optimize the space equal and unequal packages are stored behind or next to each other.

The **APOSTORE** gripper allows direct dispensing of each package even the last package in the channel without time losses and package swap.

In case of many equal packages on stock the user can select if the articles should be stored in different channels (chaotic stock) or in sort clean shelf channels. With the multi pick operation many articles from sort clean channels can be dispensed in one movement. This decreases the movements and increase the output performance.

2.5 Dispensing



All packs, also those which are embossed, bundled and/or wrapped in film, are safely handled on both sides of the shelves by the commissioning robot grippers. The store is operated by the first-in/first-out principle. With multiple-depth storage, the gripper directly accesses the required pack and withdraws it as the first pack safely and quickly without any transfer operation.

The unmatched high packing density is achieved by several different packs behind each other without any loss of commissioning performance. The APOSTORE automatic commissioning system is the only one of its kind to feature a so-called multi-pick function, i.e. that one commissioning robot dispenses all packs in one movement if there is a request for several packs.

An additional feature of the APOSTORE 2000 commissioning device is the installation of a second commissioning robot. Because of the fact that both robots have access to all storage points, the security and reliability as well as the output performance increase. The operation of the equipment is guaranteed although one robot is defect.



2.6 Article transport

The packs are transported by conveying lines, lifts and chutes to the sales counter where they slide down to a convenient level for effortless removal.

APOSTORE produce a wide range of products for the article transport. The planning will be done in close cooperation with the pharmacist or his architect.

3 Technical data

3.1 Equipment dimensions

Installation length:	4,40 – 17,20 m (without housing) Modular extension within 50 cm modules
Installation width:	approx. 1.7 m 2.18 m within the intake belt area with the switch cabinets underneath
Installation height:	2 – 3.60 m Modular extension within 10 cm steps

3.2 Pack dimensions

Length:	min. 35 mm – max. 195 mm*
Width:	min. 15 mm – max. 140 mm
Height:	min. 15 mm – max. 120 mm
Weight:	max. 1.200 g

Note*: longer packs on request

Cubic packs, also if embossed, bundled and/or wrapped in film, Articles in other shapes are placed in external packs available from **APOSTORE** for automatic intake and withdrawal.

3.3 Storage capacity

Storage capacity is individual calculated by installation length and height of the equipment and will be adapted to the pharmacy requirements. For height numbers of capacity a double system can be delivered.

3.4 Dispensing capacity

The maximum intake performance to fill up the internal buffer trays at the intake station is 500 packs per hour. The average dispensing time for a pack is approx. 8 - 12 seconds, plus the transport time on the conveying equipment from the robot to the point of sales. With Multipick and combipick operation the dispensing performance can be increased depending on the number of packs within on movement.

3.5 Marginal conditions

Approvals

The **APOSTORE** commissioning robot fulfils the Machine Guideline 89/392/EEC. The CE Conformity Certificate gives you the certainty that all our equipment conforms to the requisite DIN and Accident Prevention Regulations. A TÜV approval certificate (official German inspectorate) of the installation is not required.

Ambient conditions

The **APOSTORE** commissioning robot is designed for operation under normal room conditions. The customer must install the corresponding ventilation equipment for the commissioning robots.

Electrical connection

The **APOSTORE** commissioning robot is operated by 3-phase 400 V alternating current.

Delivery time

Approx. 3 months after the order has been clarified

4 Installation components

4.1 Basic equipment

The basic equipment of an **APOSTORE** automatic commissioning system consists of the following components:

- a) Modular **shelving** consisting of two 40 cm rack bays with an 80 cm wide aisle. The shelf modules are 50 cm and 100 cm wide.
- b) **A commissioning robot** with swivelling two-jaw gripper ensures multiple-depth depositing on, and removal from, all shelf positions.
- c) **Intake station** with **scanner** and two terminals
- d) A **transfer station** with **colour-video camera** and **check measurement** for double deep packs placing on moveable buffer trays
- e) **Discharge stations** to transfer packs out of the machine to point of sales
- f) An integrated **discharge station** at the intake area for special outputs such as faulty packs (e.g. all expired use-by articles) and special orders (e.g. for deliveries to nursing homes, etc.)
- g) The electronic control and software consists of:
 - Installation control for parallel operation of two commissioning robots, with signal lamps, emergency off, main switch and circuit-breaker
 - Two **19" industrial PC computers** with software for hot-standby function
 - **Two touch-screen** operator terminals for order input/output and video display to monitor the incomings for storage
 - TCP/IP network connection for the stocks management system or couplers for serial connection to the stocks management system
 - ISDN interface for **remote access** and remote servicing
 - Software for dynamic store and access administration
 - Software for access to remote data transmission
 - Software for **Offline operation** of a separate remote terminal, e.g. to operate the installation in the event of a failure of the stocks administration system
 - **Multipick** software (when several packs are discharged with a single picking operation)
- h) **Illumination**
- i) **Electronic monitoring** of the access door

4.2 Additional equipment

The subsequently listed additional equipment of the Apostore automatic commissioning system can be used to customize the installation according to the specific requirements in individual pharmacies:

4.2.1 Improving performance

- a) An additional intake belt buffers the packs before they are stored, thereby relieving the operator of waiting times while the commissioning robot is dealing with storing and withdrawing operations.
- b) The 4 standard input buffer trays can be extended to 6 or 8 buffer trays to increase the intake performance without robot handling.
- c) The storing and withdrawing capacity can be significantly boosted, and operating safety increased, by operating a second commissioning robot parallel with the basic robot (4.1b).
- d) Automatic intake: The packs are placed on the intake belt. The transfer unit aligns the packs. The bar code is scanned in during transfer from the outer belt to the intake section of the commissioning robot(s). Fully automatic storage significantly shortens the amount of time needed for storing operations.
- e) The optional Feed Hopper V-800 in connection with the automatic intake is the maximum of fully automated intake by minimum of manpower requirements.

4.2.2 Improving convenience

- a) Up to four colour cameras for the entire installation and commissioning robots with square divider to display 4 camera pictures on one display screen + flat screen
- b) Further discharge stations according to existing requirements
- c) Enclosing the automatic commissioning system, with a sound-proofing wall and a safety-glass access door

4.2.3 Article transport from commissioning equipment to counters

A wide range of components are available for article transportation. Lifts, chutes and conveyors are individual planned according to the pharmacy requirements.

5 Scope of deliveries and services

- Pharmacy consultations to implement an automatic commissioning system with optimised flow of stocks
- Locating and installation plans (integration into the interior furnishing and planning, and execution of all construction measures by the client)
- Planning, co-ordination, installation and commissioning the mechanical and electrical equipment
- Packing and transporting the supplied equipment to the point of installation
- Planning the conveying equipment between the automatic commissioning system and the withdrawal point (without local building and cladding work, in so far as nothing else is offered)
- 2-day training and instruction of the operating personnel after the commissioning work has been completed
- Standby for 3 days by an **APOSTORE** service technician (optional)

6 Service and maintenance agreement

The conclusion of a service agreement is necessary for safety reasons and to ensure smooth operation.

This agreement covers the following aspects:




- Access to all resources of the **APOSTORE** After-Sales Service
- Inspections according to the check list (twice a year):
 - Maintenance of equipment
 - Adjustments and new settings
 - Diagnosis to optimise operation
- Maintenance work (once a year, possibly coupled with inspections)
Exchanging small and wearing parts in accordance with the maintenance plan
- Spare parts stocking
- Hotline to remedy faults and clarify technical questions or other matters during the service period.
- Guaranteed reaction time: In the event of orderly written or faxed notification of faults, **APOSTORE** guarantees that rectifying measures will be initiated locally within the shortest time possible, but at the latest within 24 hours.
- Computer maintenance (once a year) carried out in conjunction with inspection and/or maintenance work.
- Annual software updates to maintain and improve the functional performance of the contract object, possibly carried out in conjunction with inspections and/or maintenance work.
- All repair work arising within normal, orderly operation, and the elimination of faults.
- Travel expenses
- Small and wearing parts, as well as auxiliary and operating materials

The services are carried out by experienced **APOSTORE** personnel at the point of installation if this cannot be accomplished by remote servicing (by remote data transmission or over the telephone).

Wir hoffen, Ihnen hiermit einen Überblick über die hohe Leistungsfähigkeit der **APOSTORE** Kommissionierautomaten und unseres Kundenservices gegeben zu haben.

Für weitere Fragen steht Ihnen ein Mitarbeiter des Vertriebs jederzeit gerne unter der Rufnummer **0209/94117-0** zur Verfügung.

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