Operation

➔ Roll in and roll out

The control, operation and Emergency Off chaining is executed by the plant control. The storage is equipped with its own control panel from where the operator can roll in and roll out the parts into the storage, as required.

- Rolling in is done as per height level of the height category measured
- The operator can assign a product identification to each carrier
- Forward displacement for picking by robot as per work list
- Creation of work list by the operator depending on product identification or carrier number
- Distinction between raw part and finished part carriers and carriers with parts from aborted machining
- Raw part carriers are rolled in in accordance with the required minimum data input and the actuation of enable key for rolling in
- Finished parts are rolled out after the carriers to be rolled out or the products to be rolled out have been selected
- Display of storage occupancy
- The display function allows the transport of selected carriers into the storage zone, to be able to be checked by the operator (without rolling in or out)

Rotte
Anlagenbau & Fördertechnik GmbH

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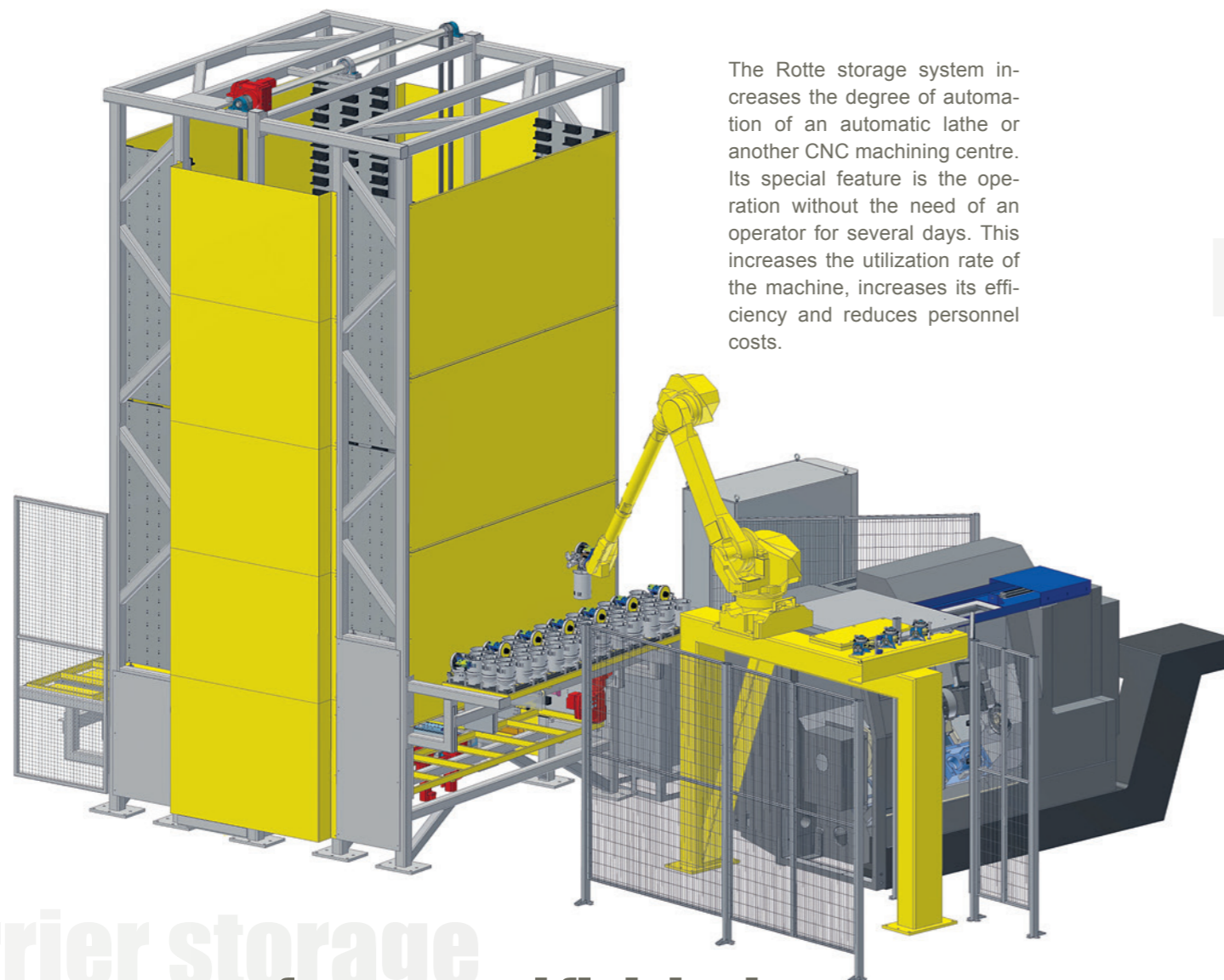Anlagenbau u. Fördertechnik GmbH
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Rotte
Anlagenbau & Fördertechnik GmbH

➔ Parts storage with robot handling

Your partner for innovative plant building, materials handling and automation

The Rotte storage system increases the degree of automation of an automatic lathe or another CNC machining centre. Its special feature is the operation without the need of an operator for several days. This increases the utilization rate of the machine, increases its efficiency and reduces personnel costs.

▸ Rolling in and out automated by robot

The task of the roll-in robot is it to take the finished workpieces out of the machine tool and to store them in a tray which is provided by the storage system. After the finished parts have been rolled in again, a new workpiece to be machined is taken out of the provided tray and inserted into the chuck jaws of the machining centre. A camera system is used to identify the workpieces to be machined. It identifies a barcode on the tray which stands for the parts to be recognized for gripping and with this, it initiates the selection of the gripper. Before it is gripped, an image is taken of the respective part to check the conformity with the barcode and to be able to determine the exact gripping position. For this purposethe trays are expected to deviate from the exact position within a range of maximum 10 mm.

The robot can be equipped with different grippers. The robot uses the appropriate gripper and takes the part to be machined out of the tray and places it in the machine, the part which was finished before is placed in a free place in the tray. Also when different parts are in a tray, the parts and their positions will be recognized by a vision system and positioned in the machining centre. Details and configuration of an application which has already been in use:

- robot with control
- 3,000 mm reach of action with control
- 20 kg handling weight
- camera system with basic software
- lighting for camera recognition
- base as bridge structure with horizontal connection to the lathe
- automated gripper change system and gripper holding area for four grippers, extensible
- double gripper for finished part and raw part
- gripping of parts with max. +/- 0.2 mm deviation in Z-direction, with max. +/- 0.5° deviation of angle
- moving, gripping programs and camera recognition programming for four products
- data interface to machine tool via Profibus or Profinet

Carrier storage

▸ Parts storage for raw and finished parts

The storage for raw and finished parts consists of a carrier storage with roll-in and roll-out position including control panel and storage management. The height query in the roll-in and roll-out position, the management of storage occupancy, the height level definition are done depending on the respective space requirements measured by a three-step height control. There is a protective fence around the storage that ensures the access protection required for the employees. The carriers are equipped with a positioning centering to place the trays on the carrier in a defined way. The roll-in/roll-out zones are extended out of the storage shelf to utilize the number of storage surfaces optimally. For rolling in, the operator puts trays with raw parts onto the empty carriers and for rolling out, trays with finished parts are taken out. Data as example for the storage displayed above which can be adapted in terms of dimensions and storage capacity:

■ Number of storage shelves	82 pcs.		■ Width of storage	3.000 mm
■ Width of storage carrier	2.400 mm		■ Depth incl. Roll-in / Roll-out zone	4.800 mm
■ Depth storage carrier	800 mm		■ Number of storage carriers	45 pcs.
■ Shelf height	100 mm			
■ Roll-in height	800 mm			
■ Roll-out height	1.500 mm			
■ Overall height of storage	5.800 mm			

A storage capacity of 2970 parts results from 15 carriers with parts of a maximum height of 30 mm, up to a height of 128 mm and up to 220 mm, 11 parts per tray, 6 trays per carrier.