AUTOMATION
FOR RÖDERS
HSC MACHINES

HIGH TECH IS OUR BUSINESS.

röders TEC

Handling for the
Automation

RC 1 + 2

	RC 1	RC 2
Machines	RXP 300, RXP 500, RXP 500 DS	all Röders HSC Machines
Pallet systems	Erowa, System 3R, others on request	
Maximum transfer load	Depending on the type of gripper, up to 100 kg with UPC or Dynafix, up to 25 kg with ITS or Macro Magnum	
Capacity	30 x ITS72 or Macro	45 x ITS72 or Macro
	13 x ITS148 or Macro Magnum	24 x ITS148 or Macro Magnum
	4 x UPC or 5 x Dynafix	8 x UPC or 9 x Dynafix
Gripper change	Not possible	
Options	2nd level for doubling the capacity, chip identification (in both levels)	
Dimensions in mm	W 1500 x L 1200 x H 1700	W 1700 x L 1700 x H 1700

Röders has over 10 years of experience in the automation of HSC machines. Own cost-effective solutions and robots are available.

Single machine automation with RC 1 or RC 2:

>> Very simple installation, reliable, robust and low-maintenance

>> Low space requirement and good accessibility

>> Loading may be performed during machining

>> Low-cost basic model

>> Directly connected to the machine control, no separate control

>> RMS Main for the job management is installed on the machine control

>> Loading with a crane is possible

>> Retrofittable

RC 3

all Röders HSC Machines

Erowa, System 3R, others on request

Depending on the type of gripper,
up to 30 kg with UPC or Dynafix,
up to 25 kg with ITS or Macro Magnum
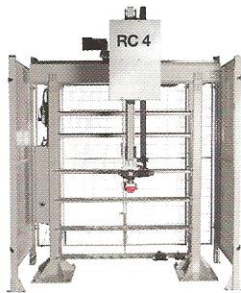
3 x UPC or Dynafix
7 x ITS148 or Macro Magnum
20 x ITS50 or Macro
27 x HSK 40 tool holders

Possible

Chip identification, magazine capacity only depending on its length

Height approx. 3000, W x L as shown in the individual installation diagram

RC 4

all Röders HSC Machines

Depending on the type of gripper,
up to 150 kg with UPC or Dynafix
up to 25 kg with ITS or Macro Magnum

RC 3 + 4

Machines

Pallet systems

Maximum transfer load

Capacity
per rack segment and level
(up to 8 levels are possible, each 200 mm,
clearance 1340 mm)

Gripper change

Options

Dimensions in mm

Multiple machine automation with RC3 or RC4:

>> Space-saving linear workpiece changer and optional tool changer

>> Gripper change for handling different types of pallets

>> Capacities for individual pallet types can be configured as desired

>> Tools are loaded directly into the spindle or, during machining operation, into the machine tool changer

>> Magazine and travel of the RC 3 and RC 4 almost infinitely expandable

>> Number of machines to be automated only limited by the length of the magazine

>> Integration of coordinate measuring machines (CMM) optional

>> No additional control necessary, RMS Main is installed on the machine control

>> For multi machine automation an extra terminal is provided for RMS Main

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Handling for the Automation

Automation with robot (stationary or linear robot on a rail):

>> Very quick and flexible automation

>> Robots available for various weight requirements up to 700 kg

>> Capacities for individual pallet types may be configured as desired

>> Multi-level rack systems can be used for particularly high capacity requirements

>> The rail can be extended to almost any length with linear arrangement

>> Rail may also be extended later

>> Number of machines that can be automated with stationary robot: three; with the rail, an almost unlimited number of machines can be automated (depending on the length of the rail)

>> Optional integration of coordinate measuring machines (CMM)

>> Loading of pallets in chucks arranged horizontally and vertically on the machine table (5-sided machining only by loading the pallets in different orientations)

>> Simple integration of auxiliary functions such as a cleaning station

>> Gripper change for handling different pallet types

>> Tool change directly into the spindle or, during machine operation, into the machine tool changer

>> Controlling the cell with RMS Main on a separate terminal

>> Many variants of chip identification are available, also "Flashident"
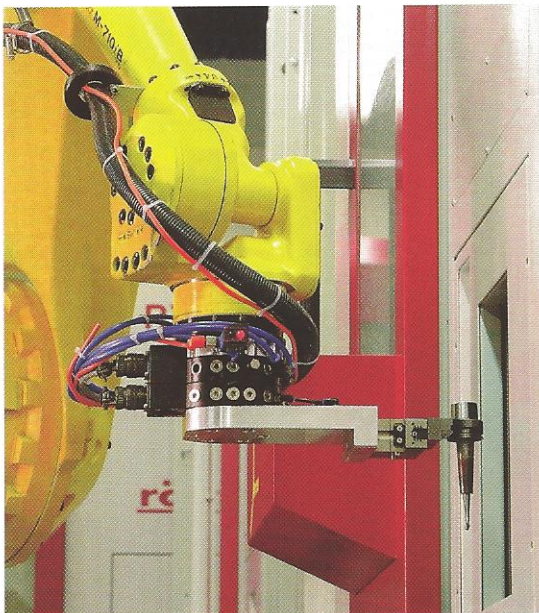
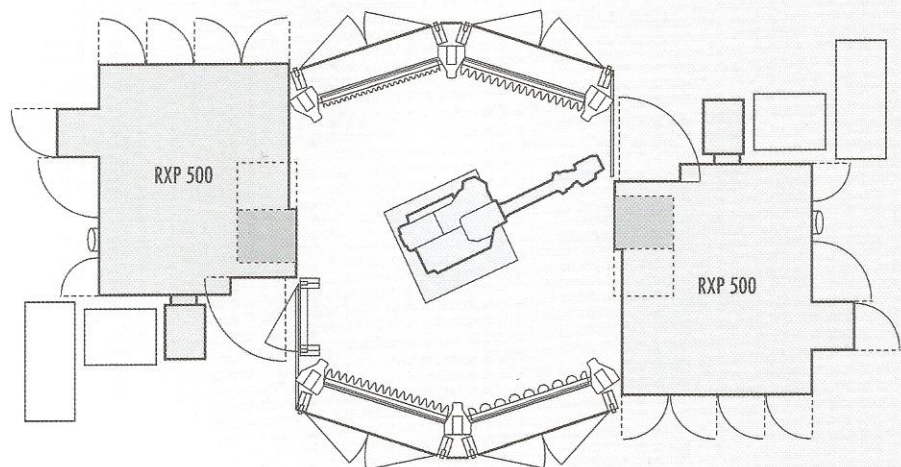Linear rack with Röders
RXP 800 HSC machine,
two Röders RXP 500 HSC
machines and coordinate
measuring machine

RXP 800

RXP 500

RXP 500

Coordinate
measuring machine
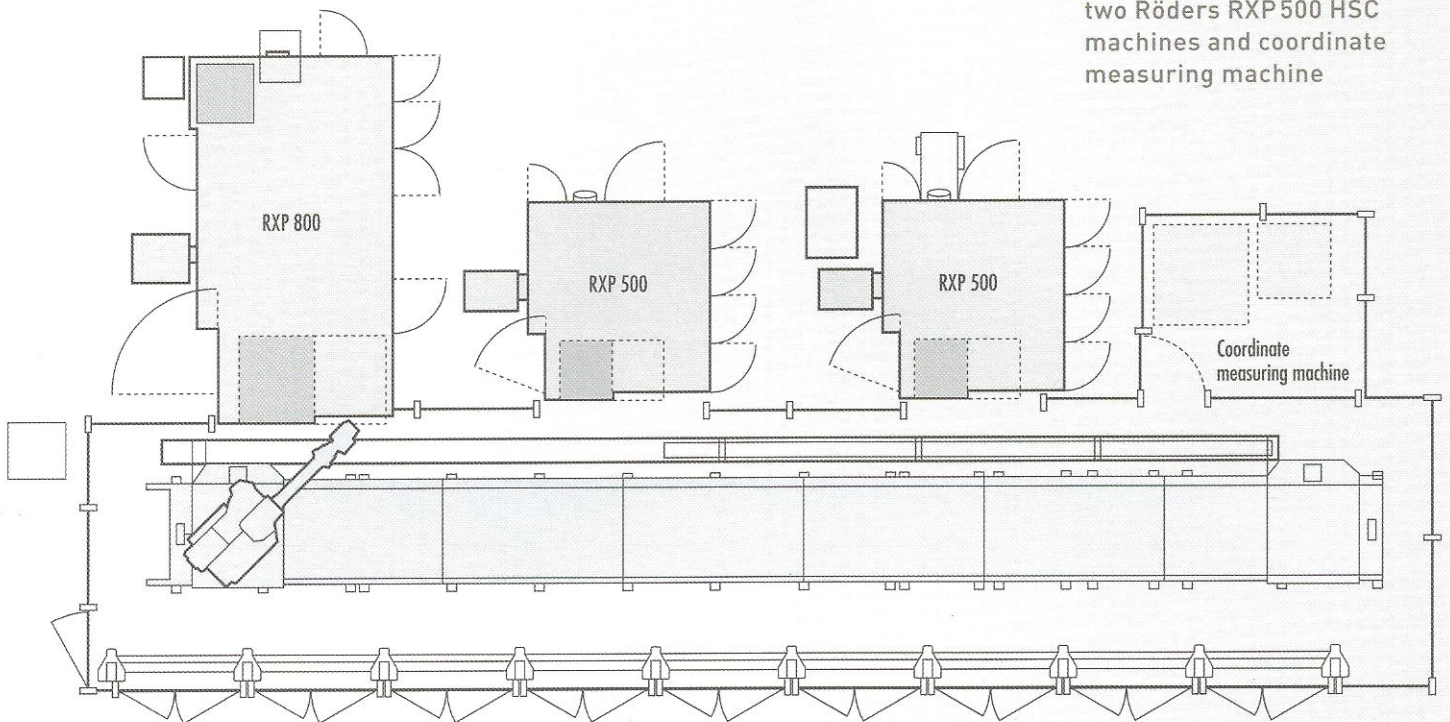
Facet rack with two
Röders RXP 500
HSC machines

RXP 500

RXP 500

RMS Main – Röders Cell Management

The efficiency and the cost savings resulting from automation in HSC machining processes significantly depend on the automation software, i.e. the cell management. Therefore, Röders has developed a cell management which is optimized for the automation of HSC machines and can be used for automating single machines or multiple machines.
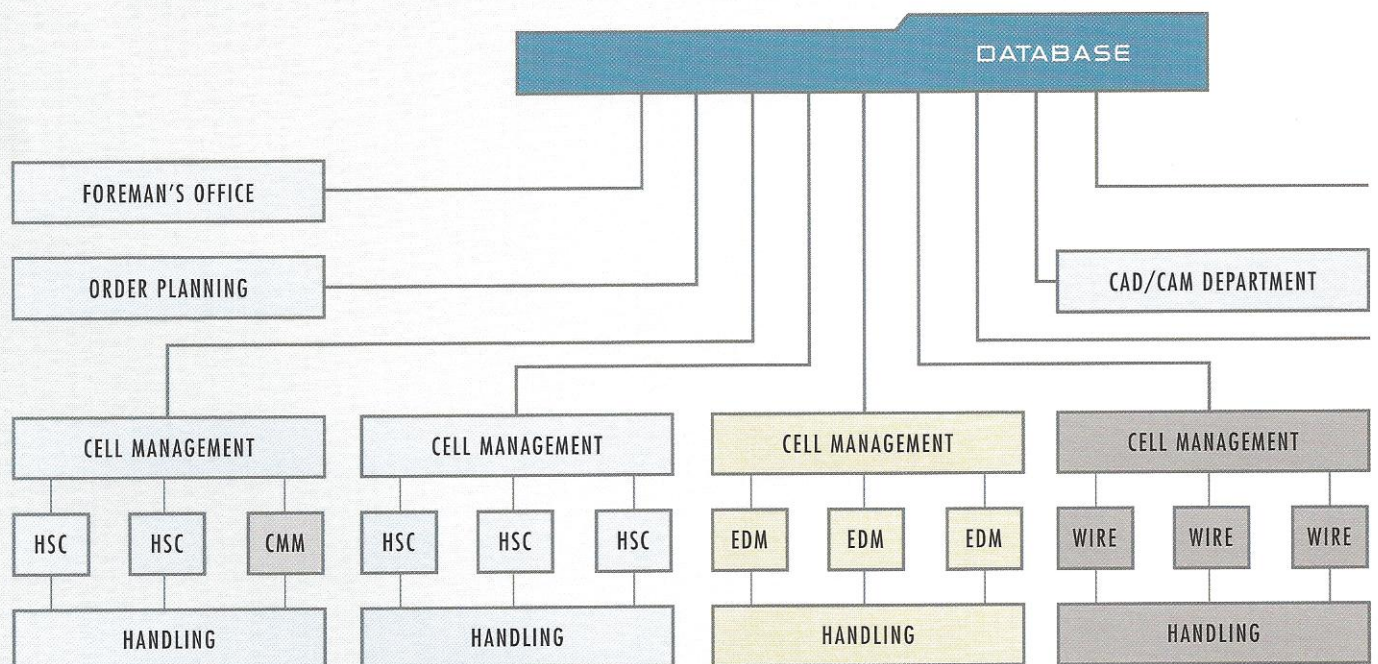
Röders offers HSC machines, handling and cell management from one source and takes the sole responsibility for a cell.

There are no interfaces to other suppliers within the cell. Therefore, compared to solutions in which automation (handling or cell management) and the machines in a cell are supplied by different suppliers, it is much easier to achieve high reliability and availability. Also, service costs are considerab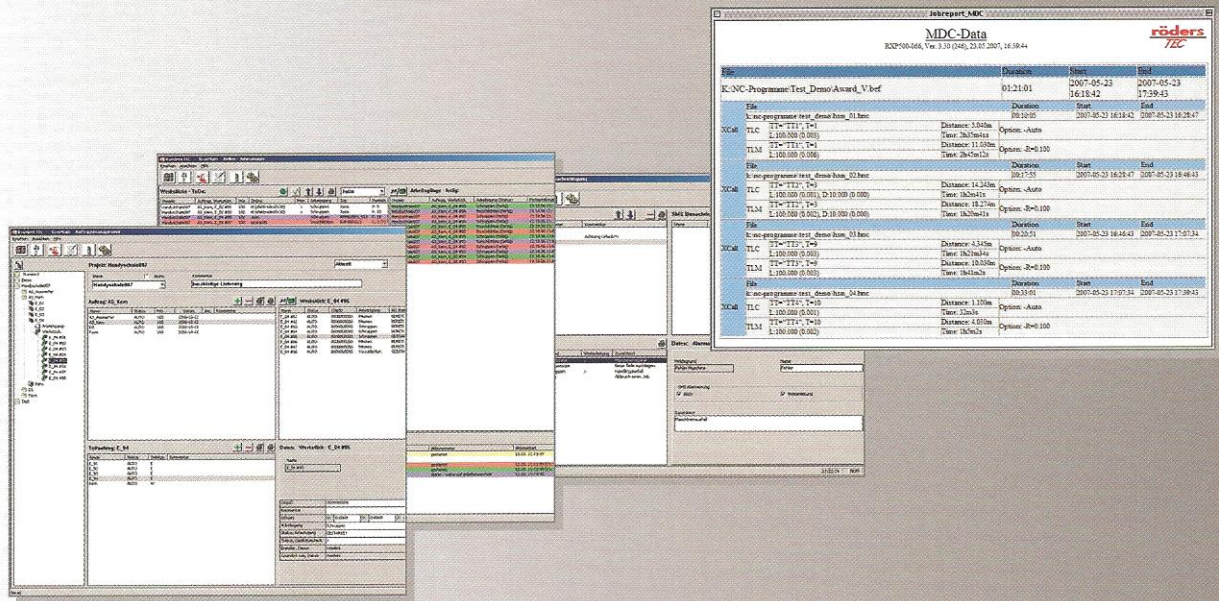ly lower. The cell management is connected via a standardized interface to any neutral database which should be neutral (for example Fauser) and which has interfaces to other known cell managers. This allows the workshop to work with different partners for the different cells and manufacturing technologies. The workshop remains flexible with regard to future investments.

Automation reduces the operating time and, consequently, saves costs

Operating time during normal operation consists of many small individual steps. Therefore, the list of details required for achieving an optimal automation solution is quite long. Only when all these features are combined the large cost savings feasible with modern automation are achieved and the operating times are reduced to a minimum.

DATABASE

FOREMAN'S OFFICE

ORDER PLANNING

CAD/CAM DEPARTMENT

CELL MANAGEMENT	CELL MANAGEMENT	CELL MANAGEMENT	CELL MANAGEMENT
HSC HSC CMM	HSC HSC HSC	EDM EDM EDM	WIRE WIRE WIRE
HANDLING	HANDLING	HANDLING	HANDLING

Advantages of the RMS Main Cell Management: Main features:

>> High cost-efficiency due to proven technology being integrated into a milling cell by a single supplier

>> Clear responsibility of only one supplier for the entire cell > no internal interfaces and no coordination between several partners for the cell
> quick elimination of faults or problems, high availability, low service costs

>> Very simple, comfortable and central operation of the Röders cell management with Windows platform
> short training period of only one day per integrated machine

>> Manual operation of the automated machines is not necessary!

>> No software-related waiting times between the individual jobs and actions

>> Optimized utilization of the machines in the cells with different types of machines, e.g. 3- axis and 5-axis machines

>> As an option, coordinate measuring machines for quality control may be fully integrated

Independent database

>> The neutral database (e.g. Fauser) allows the work shop to work with different partners for the different cells and manufacturing technologies. It remains completely open and flexible with regard to new investments or enhancements

>> The assignment of the machining programs to the individual work pieces, job sequence, zero point data, priorities and other important manufacturing data are centrally managed and stored in the database

>> Very simple interface (with detailed log, XML format) to the central database

>> Interfaces are available to all known databases, change of database is possible

>> Feedback of all machining results and PDA data to the central database or ERP system. Extensive machining logs in XML format may be configured as desired.
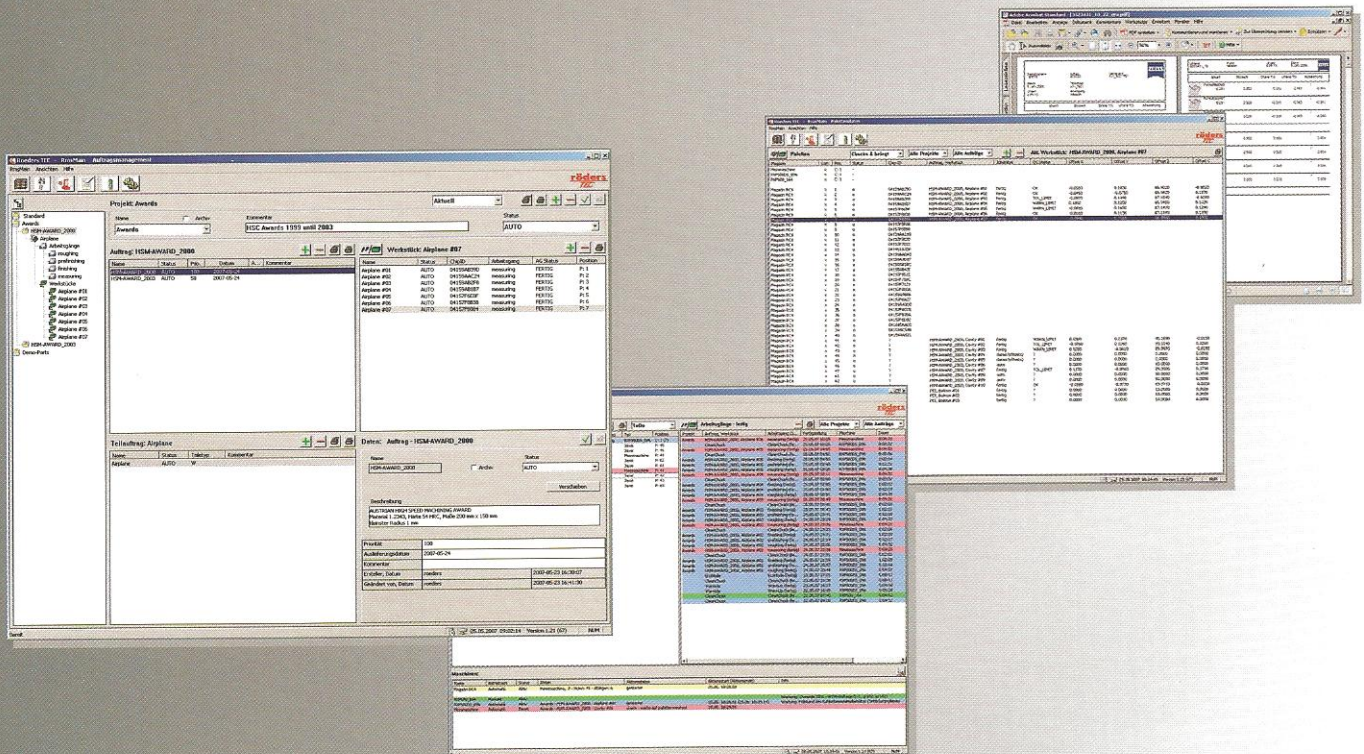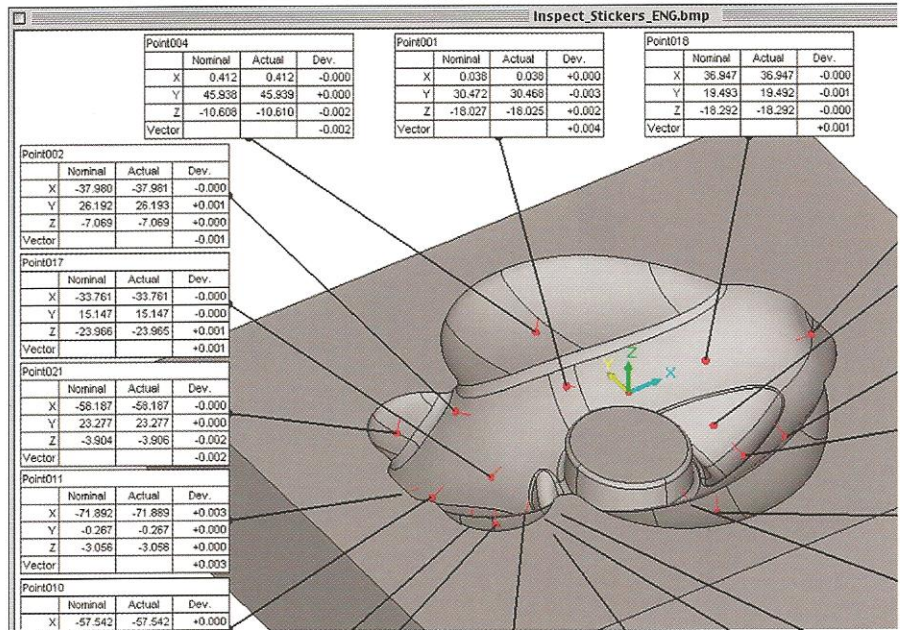
RMS Main – Röders Cell Management

Central control:

>> Any number of software copies of the cell manager with detailed information about machine status and work progress as well as setting of priorities, job creation, order management etc. may be installed in the foreman's offices, CAD/CAM department etc.

>> Central control is possible even for several cells (including manually operated machines with specification of the job sequence for the operator)

>> Maintenance requirements of all machines are displayed in the central cell management

>> It is possible to link several cells with a transfer station

Important options:

>> Chip identification is available for all variants (also mixed, including "Flashident")

>> Elimination of the work piece set up if standard blanks are defined (the required blank type is picked from the magazine through definition in the machining program)

>> Part flow, i.e., storage location of the work pieces in the magazine depending on and changing with the work progress

>> Work progress can be seen in the magazine itself

>> Multi-level racks are available for particularly high capacity requirements

Inspect_Stickers_ENG.bmp

Point004

	Nominal	Actual	Dev.
X	0.412	0.412	-0.000
Y	45.938	45.939	+0.000
Z	-10.608	-10.610	-0.002
Vector			-0.002

Point001

	Nominal	Actual	Dev.
X	0.038	0.038	+0.000
Y	30.472	30.468	-0.003
Z	-18.027	-18.025	+0.002
Vector			+0.004

Point018

	Nominal	Actual	Dev.
X	36.947	36.947	-0.000
Y	19.493	19.492	-0.001
Z	-18.292	-18.292	-0.000
Vector			+0.001

Point002

	Nominal	Actual	Dev.
X	-37.980	-37.981	-0.000
Y	26.192	26.193	+0.001
Z	-7.069	-7.069	+0.000
Vector			-0.001

Point017

	Nominal	Actual	Dev.
X	-33.761	-33.761	-0.000
Y	15.147	15.147	-0.000
Z	-23.966	-23.965	+0.001
Vector			+0.001

Point021

	Nominal	Actual	Dev.
X	-58.187	-58.187	-0.000
Y	23.277	23.277	+0.000
Z	-3.904	-3.906	-0.002
Vector			-0.002

Point011

	Nominal	Actual	Dev.
X	-71.892	-71.889	+0.003
Y	-0.267	-0.267	+0.000
Z	-3.056	-3.058	+0.000
Vector			+0.003

Point010

	Nominal	Actual	Dev.
X	-57.542	-57.542	+0.000

Robust, optimal response to errors:

>> Information on errors is sent via SMS or e-mail, automatic forwarding to other addresses if the message is not acknowledged (broadcast functionality)

>> High interference resistance if there are network problems – connection is automatically restored

>> Sophisticated error handling with re-winding of individual jobs and return transport of the pallet; automatic operation is not interrupted if individual errors occur

>> In case of malfunctioning of individual machines, the jobs are automatically redistributed among the remaining machines in the cell, respecting the priorities

Additional functions for directly controlling the HSC machines

>> Machines are automatically switched off after the last job

>> It is possible to specify warm-up phases after long breaks in production

>> Chuck cleaning cycles can be programmed between pallet changes

>> Automatic engraving of part names, series numbers or data matrix codes

>> Control measurements on the workpiece (also 3D) through the machine

>> If there are exceptionally high accuracy requirements, the machine may perform self-checks in the measuring laser or with the 3D probe on the calibrating geometry after every work step, with automatic generation of logs

>> Further functions are available on request

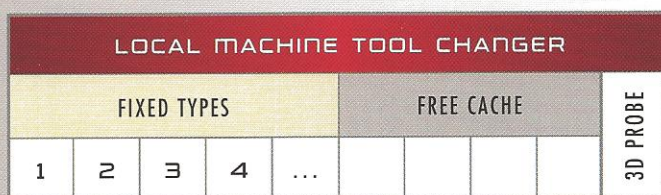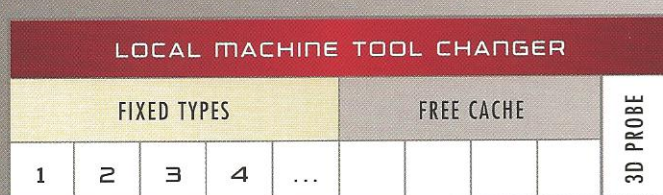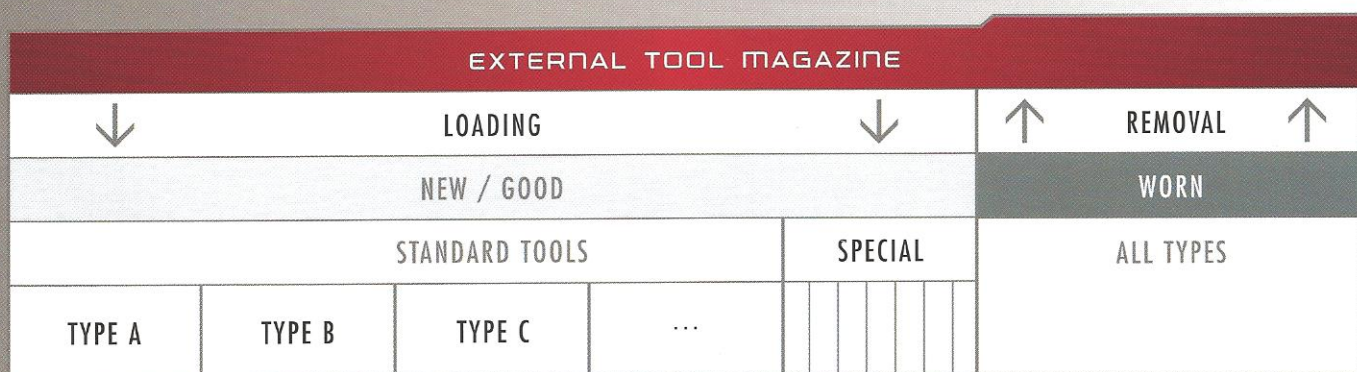>> **The well known Röders update service is also available for the cell management**

RMS Tool – Röders Tool Management

Röders Tool Management minimizes the times required for providing tools to the HSC machines. The operator provides tools to a cell centrally at only one location in the magazine. The local tool changers of the machines are automatically loaded and unloaded by the handling system. It is so simple to operate this system that it can be operated by staff without knowledge of computers.

Advantages of the RMS Tool Tool Management:

Operation procedure:

>> Use of standardized tools by a one-time definition of fixed tool types for all machining tasks of the work shop or cell (in some cases there are 200 tool types or more)

>> Assignment of fixed places in the magazine for the individual tool types, including a sufficient number of places for sister tools, one-time magazine setup for all tool types

>> Complete loading of the large magazine in the automated cell with all tool types that have been defined > every tool type is available at any time for any machine
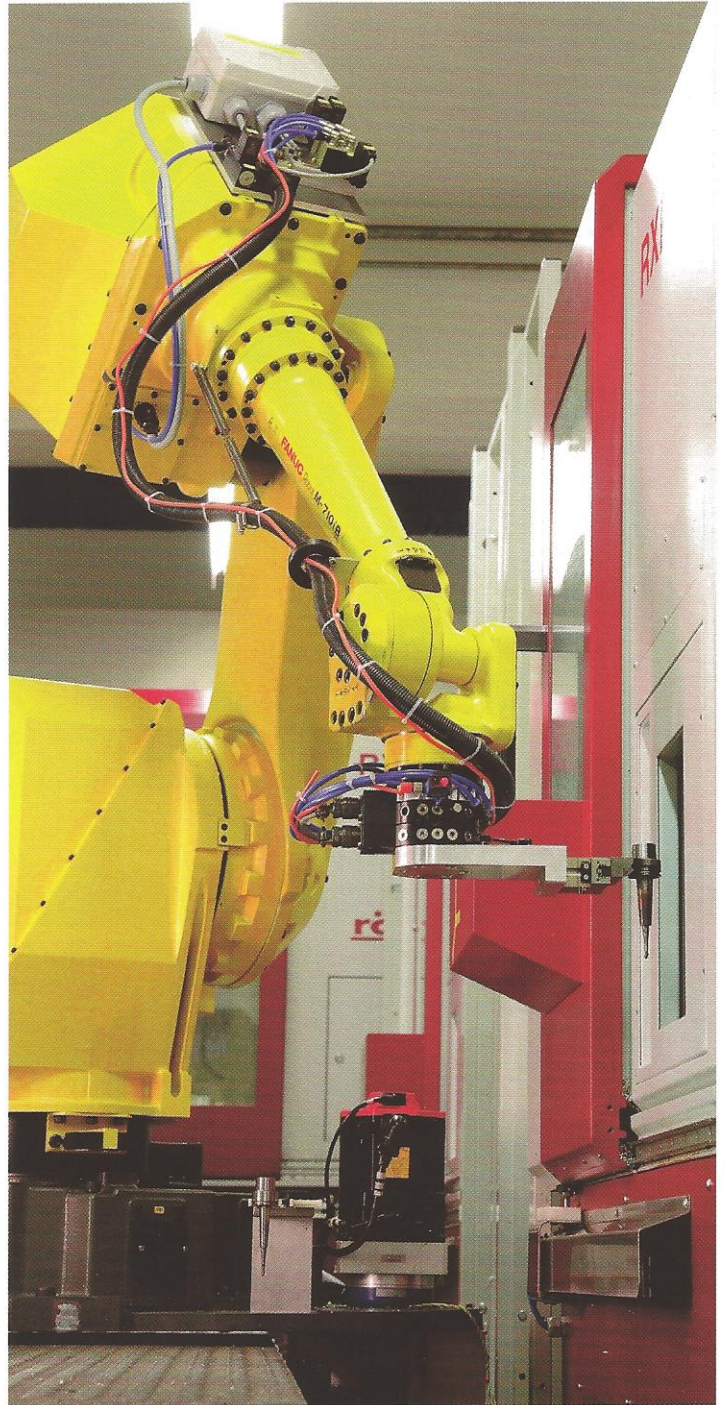
EXTERNAL TOOL MAGAZINE						
↓	LOADING			↓	↑ REMOVAL ↑	
NEW / GOOD					WORN	
STANDARD TOOLS				SPECIAL	ALL TYPES	
TYPE A	TYPE B	TYPE C	...			

LOCAL MACHINE TOOL CHANGER			
FIXED TYPES		FREE CACHE	3D PROBE
1 2 3 4 ...			

LOCAL MACHINE TOOL CHANGER			
FIXED TYPES		FREE CACHE	3D PROBE
1 2 3 4 ...			

>> Tools are called from the milling program only by tool type, regardless of their actual storage location > it is not necessary to program and load fixed tool places for individual machining operations

>> All machines share all tools available in the magazine of a cell > a smaller stock of tools is required

>> Worn tools are stored in a separate area dedicated to worn tools only > very simple tool supply of the cell, because worn tools are identified by the storage location

Cache functionality:

>> The local machine tool changer is operated like a "cache" and automatically loaded and unloaded by the handling system during machining; it contains the tools that are often required and the tools that are necessary for the next machining operation to be performed > shorter change times

>> The local machine tool changers are not manually operated!

>> The control automatically checks whether all tool types are available before starting a job, and the local tool changer/cache is loaded before each respective tool is needed

>> If a tool type is not available in the cell, the related job is skipped and operation is automatically continued with the next job

>> The tool history for every single tool with different wear criteria "moves" with the tool – from the magazine to the local tool changer and vice versa

>> Extensive sister tool functionalities

>> It is not necessary to invest in large tool changers for the machines!
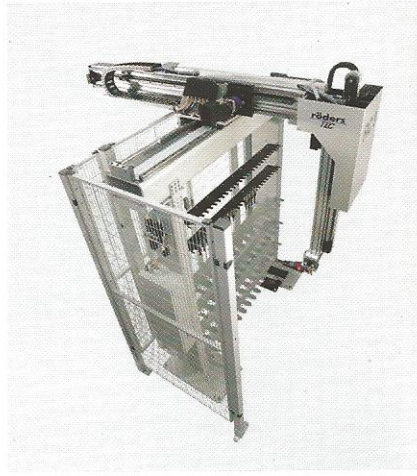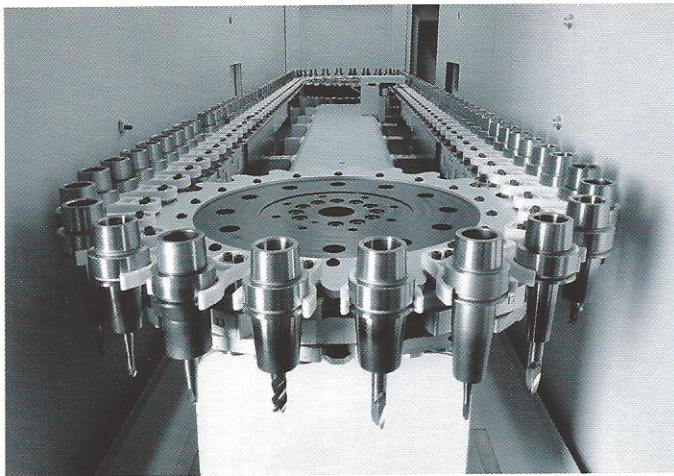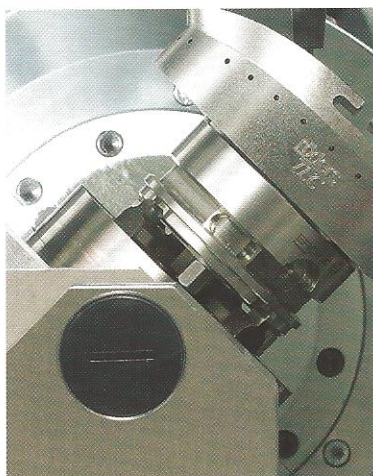
Central management and storage:

>> Central, independent tool database for managing all available tools including machining history, can also be used for central management of several cells

>> Central and only one-time definition and management of tool types, for example in the CAM department, also for several cells

>> Almost any number of tool types may be defined

>> Tool places quickly and flexibly reconfigured