



## **TRANSFER CENTER**

## FM SMART



## APPLICATION

#### Highly productive and flexible multispindle machining in a new design

Since many years ELHA-MASCHINENBAU is the market leader for highly productive transfer centers which are mainly utilized for mass production of automotive parts. More than 350 installed units including process are proof for the great success of this concept.

With the new **FM** *SMART* Series ELHA launches a great and so far unknown flexibility for multispindle machining on transfer centers. Therefore it provides a real alternative to conventional machining centers.

## PLANETARY CARRIER steel complete machining in one fixture position 4 workpieces

simultaneous



- WHEEL HUB
- casting material
- partial machining in one fixture position
- 2 workpieces simultaneous



- TURBOCHARGER CENTER HOUSING • cast iron
- partial machining in one fixture position







#### Best machining concept for:

**()** 

 $\checkmark$ 

Medium up to big lots

Small and midsize workpieces

Fast work set up and retooling

Light metals, (stainless) steels, forging and casting materials

#### JOINT FLANGE

• casting material GGG 70

• complete machining in one fixture position

• 2 workpieces simultaneous

#### PUMP HOUSING

• die cast aluminium

• complete machining in one fixture position

 3 workpieces simultaneous

#### CYLINDER HEAD

forged steel

• complete machining in two fixture positions

• 4 workpieces simultaneous

## **FM** SMART CONCEPT

#### **FM** *SMART* | Common Features

- Workpieces are moving in the space of the machining area
- Multispindle machining with one active spindle line
- Direct drive for each of the cutting tools
- Interface for manual and hydraulic fixtures
- 4- and/or 5-axes machining possible



#### FM SMART Series 1

- Basic ELHA production module FM 3+X with casting machine frame, linear guided 4-axes work unit and ball screw drives
- Max. 2 turret (SRR) or magazine (SRM) units with each 8 tools in double spindle arrangement
- Spindle distance 160 mm



#### FM SMART Series 2

- Basic ELHA production module FM 3+X hd with casting machine frame and linear guided X- and Z-axes
- Hydrostatic ram (Y- and B-axes)
- Double ball screw drives in all linear axes
- Basic version with 2 units (max. 4 units as an option) with 8 spindle lines each in 2-, 3- or 4spindle arrangement for up to 32 different tools
- Spindle distance 160 mm or 320 mm

## **SPECIFICATIONS**





		FINI SIVIANT Series I	FIVI SIVIANT SETTES Z
TRAVELS			
X-axis (cross)	mm	400	500
Y-axis (vertical)	mm	1000	1200
Z-axis (lengthwise)	mm	500	400
FEEDS			
Speed	m/min	40	60
Acceleration (max.)	m/s²	6	6

	FM SMAR	FM SMART Series			es 2	
CONFIGURATION SRR / SRM	1	2	1	2	3	4
8 tools unit	•	•	$\bullet$	$\bullet$	0	0
2 spindles in line (A = 160mm)	•	•	•	•	0	0
2 spindles in line (A = 320mm)	-	-	0	0	0	0
3 spindles in line (A = 160mm)	-	-	0	0	0	0
4 spindles in line (A = 160mm)	-	-	0	0	0	0
Spindle speed 16.000 rpm	•	•	•	•	0	0
Spindle speed 8.000 rpm	0	0	0	0	0	0

#### Work Fixture

The FM SMART concept offers the possibility to mount your own manual or automatic (hydraulic) work fixtures.

Alternatively ELHA can supply customized work fixtures upon request due to many years of experience in design and manufacturing of such components.







 $\bullet$  = standard  $\bigcirc$  = option - = not available



Work fixture for 4 spindle machining

## **DRUM TYPE TURRET**

# **DRUM TYPE MAGAZIN**



## **SRR**

#### Drum Type Turret | Characteristics

- Complete spindles are swivelled into position
- Fixation via serration
- Fine adjustable spindle in the range of  $\pm 10 \ \mu m$
- Freely selectable spindle design

## **SRR & SRM**

#### **Common characteristics**

- Device for placing 8 rows of tools in only one position within the machine
- Separate drive motor for each tool within the active spindle row
- Manual tool change at end of tool life from outside of the machine
- Tool monitoring by motor current and vibration sensors

## **SRM**

#### Drum Type Magazine | Characteristics

- Classic motor spindles in a common housing
- Closed magazine drum with adapter rows
- Adapter change in always the same spindle (fine adjustment not necessary)
- Option: Automatic tool change via ELHA robot cell with control functions

	SRR	SRM
Tool holder	HSK 63	HSK 63
Max. power	29 kW (S6)	20 kW (S1)
Max. torque	62 Nm (S6)	57 Nm (S1)
Max. speed	16.000 min <sup>-1</sup>	16.000 min <sup>-1</sup>
Indexing time (station-station)	0,8 s	1,5 s
Water-cooled direct drives	yes	yes





## AUTOMATION

## SERVICE

#### FM SMART Series 1 | Automation Step 1



FM SMART Series 2 | Automation Step 2



General front view



Top view with automation Step 1 (semi automatic loading) Step 2 (pallet conveyor system with buffer)







#### Fast, flexible ELHA service\*





Electrical cabinet

Easily accessible and clearly arranged work unit area





Our highly qualified and motivated team for field service and back office ensures shortest reaction time in order to prevent or reduce machine down to a minimum.

#### ELHA customers also benefit from further services such as:

- Preventive maintenance
- Machine retrofit
- Training
- \* Please ask for available service point in your region

## Clear machine layout, optimized accessibility

ELHA emphasizes highest priority on accessibility to the **FM** *SMART* concept to reduce time requirements for regular maintenance or repair to a minimum.





Integrated fluid cabinet (external access)

## PERIPHERALS

# **CONTROL / OPTIONS**

ELHA offers a great variety of peripheral equipment to optimize the FM SMART for the specific machining tasks.



Fixture change support unit





Chip conveyor & high pressure coolant/filtering unit



Exhausting unit



#### **CNC control SIEMENS 840D sl**

The standard CNC for highly productive machining solutions.



#### **Virtual Machine**

The ELHA virtual machine is a productive simulation tool, which connects all relevant machine parameters with the process data from customers CAD/ CAM system. Therefore it is possible to generate very precise process studies and simulations incl. 3D collision control. This solution helps to evaluate and improve machining processes and to reduce time for machine setup.



Interface Virtual Machine

Measuring probe

2 axis work loading robot system



EM SMART Series	1	2
COOLANT / CHIP DIPOSAL		
Coolant system, water based	0	0
Coolant system, oil based	0	0
High pressure pump size   or	0	0
Duplex filter	0	0
Chip convevor	0	0
Coolant gun	0	0
MECHANICS		
Exhausting unit	0	0
Fixture change support unit	0	0
Preparation for additional unit	-	0
Cone cleaning	0	0
High dynamic package	-	0
AUTOMATION		
Level I	•	•
Level II (with pallet conveyor)	0	0
ELECTRIC / CNC		
Remote diagnosis	0	0
Load monitoring	0	0
Shop mill	0	0
Virtual machine	0	0
Measuring probe	0	0
PROCESS ENGINEERING		
Geometry approval	0	0
Tool scheme	0	0
NC-programming	0	0
Work fixture design	0	0
SERVICES		
Simulation	0	0
Cycle time calculation	0	0
Transport	0	0
Reassembly and commissioning	0	0
Production support	0	0
TRAINING		
Mechanics / Hydraulics	0	0
Electrics / Electronics	0	0
Operation / Programming	0	0
Work fixture	0	0

 $\bullet$  = standard  $\bigcirc$  = option - = not available



#### Industries & Products



Automotive



FM **Production Modules** 



FM SMART Transfer Centers



Energy

Large bearings



VTM Vertical Turn-Milling Centers



RTX Rotary Table Machining Centers



Aerospace

General machining



SMX Special Machining Centers



SPX Special Purpose Machines

### **ELHA-MASCHINENBAU** Liemke KG

ELHA is a family-owned company known for customized machine tools and process solutions. Many industries in the metalworking industry trust ELHA's experience and competence in the development and realisation of highly productive machining processes as well as the design and manufacture of cutting machine tools and turn-key solutions.

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Verband der VDA Automobilindustrie





## **FM PRODUCTION MODULES**

FM 3+X FM 3+X hd FM 4+X hd



# CONCEPT

#### **Development background**

From the early days of mass production for metal cutting workpieces until now there were a lot of improvements in production technology to maximize profitability. New work materials and optimized tool technology led to a dramatic reduction of cutting times over the years.

There was also a significant reduction of non-productive idle times in recent years due to improved machine tool technologies, but it didn't keep pace at all with reduction of productive times. Especially for mass production parts which require a lot of different tools with short cutting times, such as for drilling or threading, this means a huge leak of total productivity.

This was a good reason for ELHA to work hard on a solution. As a result ELHA developed and established a brilliant machining concept which has sustainably revolutionized the metal cutting industry, especially for mass production applications.

#### **Conventional machining**

on a machining center

- Tool spindle changes tools for each different process
- Tool spindle moves from/toward the workpiece

#### Ideal machining concept for:



High number of different workpieces and work setup





#### Paradigm change

#### with a FM production module

- All required process tools are arranged inside the machining area at a fixed position
- Each tool has it's own specific, optimized spindle size and drive by using multi spindle heads or turrets
- The worktable with clamped workpiece(s) moves from tool to tool; shortest chip-to-chip times
- No tool change within the process; no inaccuracy due to tool change
- Single/multiple part clamping & single/multiple spindle machining possible (depending on application)

#### Ideal machining concept for:



Mass production of more than 100k of same or similar workpieces per year



Limited quantity of various workpiece types



Moderate number of different tools and clampings



Optimal for light metals, steel, forging and casting materials

## **MACHINE DESIGN**

### 

#### Multi spindle heads

Multi spindle heads are the process specific key components for maximum productivity

#### Drum type turret

Higher flexibility due to increased capacity of different tools up to max.128 direct driven tools

### Hydrostatic ram

The hydrostatic ram ensures highest rigidity and damping to achieve best performance and accuracy even for heavy cutting operations



#### **Double feed drives**

For powerful, highly accurate and dynamic feeds as well as for fast rapids to reduce idle times



### Work fixture

Process specific, hydraulic automatic fixtures for single or multiple workpiece clamping, designed by ELHA

### Spindle fine adjustment

Easy, quick and highly accurate adjustment of the spindles for highest work precision



## Machine Design FM 3+X hd

### productivity

#### Customized components for:

flexibility

#### Maximum productivity

...by utilization of process optimized multi spindle heads only

#### Maxiumum flexibility

...by utilization of up to four drum type turrets and 128 direct driven tools

#### Optimized productivity and flexibility

...by combination of multi spindle heads and drum type turrets

## **APPLICATIONS**





- · die cast aluminium
- complete machining in two fixture positions with 2 FM 3+X
- 2 workpieces simultaneously



fixture position with 1 FM 3+X • 3 workpieces simultaneously





- die cast aluminium
- complete machining in one fixture position with 1 FM 3+X
- 2 workpieces simultaneously
- forged steel
- - complete machining in two fixture positions with 3 FM 3+X
  - 4 workpieces simultaneously





- complete machining in two fixture positions with 2 FM 3+X
- 2 workpieces simultaneously
- casting
- complete machining in two fixture pos. with 2 FM 4+X hd
- 2 workpieces simultaneously



• steel casting 1.4848

· complete machining in three

positions on 3 FM 3+X hd



- die cast aluminium
- complete machining in one position on 1 FM 3+X
- 2 workpieces simultaneously

FM Production Module view machine in operation







- chilled aluminium casting
- complete machining in two fixture positions with 2 FM 3+X
- 2 workpieces simultaneously



- steel casting
- · partial machining in one fixture position
- 3 workpieces simultaneously



- cast iron
- partial machining in one fixture position with 1 FM 3+X
- 2 workpieces simultaneously



- GGG 70
- complete machining in one fixture position with 1 FM 3+X
- 2 workpieces simultaneously



- GGG 40
- · partial machining in two fixture positions with 2 FM 4+X hd
- 2 workpieces simultaneously



- casting
- complete machining in three positions on 3 FM 4+X hd
- 2 workpieces simultaneously



- die cast aluminium
- complete machining in two fixture positions on 2 FM 3+X



- steel
- complete machining in one position on 3 FM 3+X hd
- 4 workpieces simultaneously

## **MACHINE TYPES**

### FM 3+X

our bestseller



The FM 3+X is the most popular model and first choice for small and midsize workpieces in light metals and steel materials

FM 3+X hd

for heavy machining

Due to double feed drives and hydrostatic ram the FM 3+X hd is the best solution for heavy cutting operations in steel, forging, casting or other tough materials

FM 4+X hd for large machining



The large and rigid machine design of the FM 4+X hd ensures best performance on midsize and large workpieces even for tough materials



Convincing by quality

More than 350 sold units are the impressive proof for highest customer satisfaction, best reliability and outstanding performance in automotive mass production

# **SPECIFICATIONS**

(i) Machine model recommendation/selection by ELHA according to customers requirements

TRAVELS	
X-axis (cross)	mm
Y-axis (vertical)	mm
Z-axis (ram)	mm
FEEDS	
Speed	m/min
Acceleration (max.)	m/s²
Feed force X / Y / Z (max.)	kN
ROTARY TABLE	
Diameter	mm
Rotational speed	rpm
Clamping torque	Nm
Positioning accuracy	arcsec
Indexing	degree
SPINDLES	
Max. power (\$1-100%)	kW
Max. power (S1-100%) Max. speed	kW rpm
Max. power (S1-100%) Max. speed Max. torque	kW rpm Nm
Max. power (S1-100%) Max. speed Max. torque CONNECTED POWER	kW rpm Nm
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz)	kW rpm Nm kVA
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air	kW rpm Nm kVA bar
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS	kW rpm Nm kVA bar
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS Width	kW rpm Nm kVA kVA bar
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS Width Depth	kW rpm Nm kVA kVA bar mm
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS Width Depth Height	kW rpm Nm KVA bar mm mm
Max. power (S1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS Width Depth Height Transportation height	kW rpm kW rpm kVA kVA bar kVA mm kVA
Max. power (\$1-100%) Max. speed Max. torque CONNECTED POWER Power requirement (3 AC 400V / 50Hz) Power requirement (3 AC 400V / 50Hz) Compressed air DIMENSIONS Width Depth Uidth Depth Height Height Workpiece loading height	kW rpm kW rpm k kV kVA kVA bar kVA



FM 3+X	FM 3+X hd	FM 4+X hd			
400	500	800			
1000	1200	1400			
500	400	800			
40	60	48			
8	8	6			
15	20	40 / 20 / 20			
300	300	400			
60	80	80			
1500	2100	4000			
±5	±5	±5			
0.001	0.001	0.001			
20	37	50			
20000	20000	20000			
200	200	800			
60	60	80			
5	5	5			
3050	3000	3500			
3500	3570	4525			
3950	3500	3950			
3200	3150	3400			
1100	1100	1100			
14.5	18.5	30			



#### Industries & Products



Automotive



FM **Production Modules** 



FM SMART Transfer Centers



Energy

Large bearings



VTM Vertical Turn-Milling Centers



RTX Rotary Table Machining Centers



Aerospace

General machining



SMX Special Machining Centers



SPX Special Purpose Machines

### **ELHA-MASCHINENBAU** Liemke KG

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## VERTICAL TURN-MILLING CENTERS

VTM

## VTM

## **Precise Combined Machining** for Large Workpieces

With the vertical turning-milling machining centers of the VTM series ELHA sets a new standard for multi-tasking machining of large rotary and cubic workpieces with respect to precision, dynamics and flexibility as well as space and energy efficiency thanks to the use of innovative technologies.

The VTM machine is the ideal problem solver for demanding machining tasks with a broad application range and therefore interesting for job-shops as well as OEM users.

Convince yourself on the following pages of the new dimension for highly productive machining of large workpieces.



## **VTM Highlights**

The VTM series presents a range of highlights, which directly translate into productivity, flexibility and reliability advantages for your production:

- ELHA SDD the patented table segment direct drive with the highest positional accuracy and dynamics
- Rigid, FEM-optimized and space efficient machine foundation made from composite material
- Hydrostatic guides and bearings on all linear and rotational axes
- Consequent modular system with flexible and individual configuration possibilities









### Industries





Large bearings



Mechanical engineering



Aerospace

### **Processes and Interchangeable Heads**



Turning

Drilling, tapping



- Strong and powerful RAM concept with innovative drive and interchangeable head interface technology
- Large variety of tool and interchangeable head magazines
- Precise 5-sides/5-axes simultaneous machining with the double C-axes function
- High thermal stability and energy efficiency with a new cooling concept using controlled heat dissipation and the possibility of thermal energy reuse



Milling, gear cutting



Grinding

# VTM

## The Modular System

The VTM modules enable the configuration of the machine into a multi-functional turning-milling machining center for economical combined machining with a rotary table range from 2500 - 8000 mm and workpiece heights up to 5000 mm. All machines are equipped with two columns and one or two RAM work units. All sizes can be delivered with an adjustable cross-rail (W-axis). Additional advantages of this concept are its reliability and availability combined with cost advantages of proven and standardized machine components.

### **ELHA SDD Table as a Retrofit-Set**

Because of the modular character of the VTM the ELHA SDD rotary table can be used as a stand-alone unit, for example as part of a retrofit or maintenance of existing machines. This presents the possibility to use the extraordinary precision, dynamics and technology of this rotary table design in your existing machine park to achieve significant quality and productivity improvements.



VTM base type		25	30	35	40	45	50	55	60	70	80
table diameter	mm	2500	3000	3500	4000	4500	5000	5500	6000	7000	8000
swing diameter	mm	2800	3300	3800	4300	4800	5500	6000	6500	7500	8500
max. workpiece weight	t	15	20	30	40	50	60	70	85	110	140
max. turning height	mm	5000									
tool spindle drive	kW		37 / 60 / 70								
ram size	mm		360x400 / 500x500 / 600x600								
power table drive (S1)	kW	100	120	150	180	210	240	240	240	240	240
table torque (S1)	kNm	31	44	70	100	130	177	185	233	296	333
max. table speed	min-1	175	145	115	100	85	70	70	60	55	50

## ELHA Segment Direct Drive (SDD) **Patented Rotary Table Direct Drive**

The table drive is the heart of the vertical multi-tasking machine and its performance in machining quality and dynamics directly influences the ultimate workpiece quality and economy of the machine. ELHA sets new standard with the patented SDD (Segment Direct Drive) table direct drive using the following features:

- Extremely high control stiffness and positional accuracy of approx. ± 1"
- High acceleration and positioning dynamics (VTM 402: 0 – 80 min<sup>-1</sup> in 6 sec with approx. 40 t moving mass)
- Optimal machining quality without any influence of engaging gear frequencies
- Broad power-, torque- and rpm spectrum with proven standard components based on linear drive technology



### Hydrostatic Guides for all Linear and Rotary Axes



Rotary table radial bearing

Rotary table axial bearing



- Optimal run-out because of elimination of radial drive forces and use of a radial hydrostatic bearing
- Very low noise emission
- No wear of drive components with minimal maintenance, continued use of the rotary table after failure of individual motor segments
- Excellent thermo-symmetrical temperature control of the entire rotary table foundation with minimal deformation



- [1] Stator segment
- (primary part)
- [2] Permanent magnet (secondary part)
- $\sim$  Magnetic field





Hydrostatic X/Z-axes

# VTM

## **Powerful RAM Concept**

The RAM work units of the VTM series offer a range of innovative technologies for robust and accurate high precision machining as well as very flexible options for the different requirements in turning, drilling and milling operations.

Broad selection of configurations for power, cross section and RAM length:

RAM	pow	power / kW (S1) RAM stroke / mm				RAM stroke / mm				
mm	37	60	70	1250	1600	2000	2500	3000		
360x400										
500x500										
600x600										

- Spindle drive with 2-stage transmission integrated in the RAM
- CFK shaft minimize drive wear and optimize dynamics
- Electrically braced master-slave rack&pinion drive with high dynamics and positional accuracy in the X-axis for fast drilling and tapping
- Rigid interface with Hirth coupling and energy supply to adapt different interchangeable heads including self recognition



### **Tool and Interchangeable Head Magazines**

Next to standard magazines for tools and interchangeable heads ELHA offers individual solutions for your manufacturing needs in a variety of sizes. Additionally a wide range of compatible interchangeable heads is available for various machining applications.



Tool Arena with tool change robot



ELHA standard magazine

### 5-sides/5-axes Simultaneous Machining

The VTM machine is characterized by an additional unique technology: The double C-axes interpolation. Using this technology a linear Y-axis functionality is realized by the simultaneous interpolation of the rotary table C-axis and an axis-parallel CY-axis integrated in the tool adapter of the RAM unit. This technology has the following advantages:

- Flexible 5-sides/5-axes machining in combination with an ELHA HV swivel milling head
- Extremely space efficient because of the elimination of an Y-axis
- Extremely accurate with the precise SDD rotary table C-axis drive and the CY-axis drive directly integrated into the RAM.

### **HV Swivel Milling Head**

For the VTM series ELHA offers a horizontal-vertical swivel head with modern drive technology. The two available sizes can be used for various applications:

- 500x500 for light- and medium-duty cubic machining
- 600x600 for heavy-duty cubic machining

RAM	power	spindle speed	spindle torque
mm	kW (S1)	min <sup>-1</sup>	Nm
500x500	37	8000	875
600x600	37	8000	875
600x600	60	4000	2000

### **Applications**



Vertical surface machining with horizontal milling head



Sloping surface machining with HV milling head, fixed B-axis







5-axes simultaneous machining with HV head, dynamic B-axis



#### Industries & Products



Automotive



FM **Production Modules** 



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#### **ELHA-MASCHINENBAU**

The company ELHA-MASCHINENBAU Liemke KG is a mid-size family business with 240 employees.

Many industries such as largescale bearing manufacturers, automotive OEM's and their TIER 1/2 suppliers rely on our experience and technological expertise for developing and realizing of highly productive metal cutting processes as well as our competence for design and production of metal cutting machine tools and turn key solutions.

Machining facility ELHA-MASCHINENBAU

#### **Quality & Environment Management**

Since 2005 the company is certified according to DIN EN ISO 9001 and DIN EN ISO 14001, VDA 6.4 for Production Modules since 2012.

#### **Capabilities**

In the Manufacturing Systems division ELHA-MASCHINENBAU develops and produces special machining centers and special purpose machines mainly for large scale workpieces with the VTM-, RTX-, SMX- and SPX-series.

In the Production Modules division special solutions and processes for automotive workpieces are developed and realized based on the transfer center concept by the production module types FM 3+X and FM 4+X.

- Complete metal cutting solutions including the integration of special manufacturing processes
- Integration of automatic loading/unloading and other peripheral systems
- Delivery of production-ready turn-key solutions



Example for complete ELHA turn-key solution

ELHA-MASCHINENBAU offers competent aftersales service to ensure high machine availability. All system can be equipped with remote diagnosis capabilities.

### **SPX Special Purpose Machines**



#### Turn-Mill Machining Center SPX 5111

- For machining of printing cylinder with max. diameter 800 mm and length of 2000 mm
- Highly productive turn-milling of cylinder envelope with HSK 160 spindle
- Precise slot machining with HSK 100 ram spindle
- 2 automatic tool changers
- Optimal damping by composite material components
- High thermal stability by optimized coolant system





SMX 6100 Double Vario Module with tool storage



5 Station Planetary Table Machine



RTX 5130 Rotary Table Machining Center



SPX 5120 5 Station Linear Transfer Machine



printing cylinder



SPX 5128 Work area with clamped

Machining Center





#### **Horizontal Machining Center SPX 5176**

- Highly productive machining of large scale drums by two simultaneous working spindles HSK 100
- High dynamics and stability of the milling unit in spite of large travel with a "box-in-box" design
- Full NC rotary table designed for high loads
- Use of 2-spindle drill heads in both units doubling the machining performance
- Structural composite material components
- 2-piece machine base with high rigidity





SPX 5207 6 Spindle Deep Hole Drilling Machine



SPX 5134 Rail Drilling Machine

### **VTM Vertical Turning Milling**





### VTM ht (special type for hardturning)



Vertical turning milling center VTM 402 ht

### **RTX Rotary Table Machining Center**



Rotary table machining center RTX 5211

Standard RAW Unit

#### Features

- Table diameter 2500 8000 mm and workpiece height up to 5000 mm
- Highly precise and dynamic segmented rotary table direct drive ELHA SDD
- Designed for soft- and hardturning as well as drilling, milling, grinding and 5-sides/5-axes simultaneous machining
- With fixed or movable crossbeam
- Table base and columns made from optimal damping composite material
- Hydrostatically guided linear and rotary axes
- RAM units with three different cross sections and stroke up to 3000 mm
- Exchangeable work units with tool spindle power up to 70 kW



ELHA SDD - Segment Direct Drive



Vertical surface machining: 3-axes interpolation with vertical milling head



4-axes interpolation with horizontal milling head



Sloping surface machining 4 (5)-axes interpolation with HV milling head, fixed B-axes



Free form shape machining 5-axes simultaneous machining with HV head, dynamic B-axes



Optimized for hardturning opera-



RTX 5280 Vertical 2 spindle machining of perforated discs



- Budget optimized version of VTM turning and milling center
- VTM ht is optimally designed for finish operations by hardturning, grinding, drilling, milling and threading
- Optimized work area for large diameter bearings, flanges and gear box parts
- Linear roller guide systems for X-/Z-axes
- Separated turning tool interface and tool spindle
- Powerful direct drive for tool spindle

- Precise drilling and threading for ring shaped workpieces up to Ø 6000 mm
- Main machine components made from composite material
- 2 turn-slide tables for cycle-time-parallel loading and unloading and set-up of the fixture
- Workpiece clamping with automatic 6-jaw force chuck
- Tools driven by powerful motor spindles
- Automatic exchangeable drilling heads



RTX 5211 Vertical 2 spindle machining of large scale bearing rings



RTX 5135 Vertical 2 spindle machining with H/V-milling head

### **SMX Special Machining Centers**



#### Horizontal Special Machining Center with H/Vmilling head SMX 5181

- Designed for high precision machining of large structural steel and aluminum workpieces
- High dynamics due to small moving masses
- Newly developed fork-type milling head with powerful motor spindle
- Precise round table with automatic pallet clamping device
- Automatic pallet changer with 4 pallet storage positions and separate setup station



#### Horizontal 5-Axes-Machining Center SMX 5224

- Powerful machine with excellent rigidity and damping
- Outstanding performance for machining of heavy cutting materials like titanium or inconel
- Hydrostatically guided RAM with Ø 450 mm
- 60 tools magazine with double gripper unit
- Massive swivel work table with integrated NC rotary table of Ø 1000 mm

### **Production Modules Division**



- Excellent for mass production of automotive workpieces
- No idle times for tool changing
- Chip-to-chip time approx. 0.5-1.5 sec.
- Every tool has it's own spindle
- Tools driven with optimized size, speed and power for applied machining process
- Angle machining possible by utilizing angle positioning spindles and interpolation
- Great variety of automation solutions available







SMX 5181 Automatic tool change by robot





SMX 5224 Accessible work area for convenient handling



SMX 5224 Integrated, space saving 60 tools magazine







- Dynamic 4-axis work-holding unit for all feed and rapid movements
- Special tooling devices like special milling units or turrets available
- Short set up time and high accuracy by only one work-holding unit per machine
- Optimal balance between productivity and space requirement
- Hermetical separation of work area and machine area



More information available in ELHA brochure "Production Modules" or on website www.elha.de



#### Industries & Products



Automotive



FM **Production Modules** 



FM SMART Transfer Centers



Energy

Large bearings



VTM Vertical Turn-Milling Centers



RTX Rotary Table Machining Centers



Aerospace

General machining



SMX Special Machining Centers



SPX Special Purpose Machines

### **ELHA-MASCHINENBAU** Liemke KG

ELHA is a family-owned company known for customized machine tools and process solutions. Many industries in the metalworking industry trust ELHA's experience and competence in the development and realisation of highly productive machining processes as well as the design and manufacture of cutting machine tools and turn-key solutions.

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