TRANSFER CENTER

FM $MART
Highly productive and flexible multi-spindle 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 multisindle machining on transfer centers. Therefore it provides a real alternative to conventional machining centers.

Best machining concept for:
- Medium up to big lots
- Small and midsize workpieces
- Fast work set up and retooling
- Light metals, (stainless) steels, forging and casting materials

Materials and Machining Details:
- **Planetary Carrier**
  - Material: Steel
  - Machining: Complete in one fixture position, 4 workpieces simultaneous

- **Joint Flange**
  - Material: Casting, GGG 70
  - Machining: Complete in one fixture position, 2 workpieces simultaneous

- **Wheel Hub**
  - Material: Die cast aluminum
  - Machining: Complete in one fixture position, 3 workpieces simultaneous

- **Pump Housing**
  - Material: Cast iron
  - Machining: Partial in one fixture position, 4 workpieces simultaneous

- **Turbocharger Center Housing**
  - Material: Forged steel
  - Machining: Complete in two fixture positions, 4 workpieces simultaneous

- **Cylinder Head**
  - Material: Forged steel
  - Machining: Partial in one fixture position, 3 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 4-spindle arrangement for up to 32 different tools
- Spindle distance 160 mm or 320 mm

**SPECIFICATIONS**

**Machine type**
1 = Series 1  
2 = Series 2

**Number of units**
2-4

**Number of spindles per line**
2-4

**FM SMART Series 1**
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**FM SMART Series 2**
- Basic ELHA production module FM 3+X hd with casting machine frame and linear guided X- and Z-axes
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- 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 4-spindle arrangement for up to 32 different tools
- Spindle distance 160 mm or 320 mm

**TRAVELS**

<table>
<thead>
<tr>
<th></th>
<th>X-axis (cross)</th>
<th>Y-axis (vertical)</th>
<th>Z-axis (lengthwise)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM SMART Series 1</td>
<td>400 mm</td>
<td>1000 mm</td>
<td>500 mm</td>
</tr>
<tr>
<td>FM SMART Series 2</td>
<td>500 mm</td>
<td>1200 mm</td>
<td>400 mm</td>
</tr>
</tbody>
</table>

**FEEDS**

<table>
<thead>
<tr>
<th></th>
<th>Speed m/min</th>
<th>Acceleration (max.) m/s²</th>
</tr>
</thead>
<tbody>
<tr>
<td>FM SMART Series 1</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>FM SMART Series 2</td>
<td>60</td>
<td>6</td>
</tr>
</tbody>
</table>

**CONFIGURATION SRR / SRM**

- 8 tools unit
- 2 spindles in line (A = 160mm)
- 2 spindles in line (A = 320mm)
- 3 spindles in line (A = 160mm)
- 4 spindles in line (A = 160mm)
- Spindle speed 16,000 rpm
- Spindle speed 8,000 rpm

= standard  ○ = option  = not available

**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.

![Work fixture for 4 spindle machining](image)
Choose the optimum spindle configuration for your production from a large number of possible variations!

**SRR**
Drum Type Turret | Characteristics
- Complete spindles are swivelled into position
- Fixation via serration
- Fine adjustable spindle in the range of ±10 µm
- 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

<table>
<thead>
<tr>
<th></th>
<th>SRR</th>
<th>SRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tool holder</td>
<td>HSK 63</td>
<td>HSK 63</td>
</tr>
<tr>
<td>Max. power</td>
<td>29 kW (S6)</td>
<td>20 kW (S1)</td>
</tr>
<tr>
<td>Max. torque</td>
<td>62 Nm (S6)</td>
<td>57 Nm (S1)</td>
</tr>
<tr>
<td>Max. speed</td>
<td>16,000 min⁻¹</td>
<td>16,000 min⁻¹</td>
</tr>
<tr>
<td>Indexing time (station-station)</td>
<td>0.8 s</td>
<td>1.5 s</td>
</tr>
<tr>
<td>Water-cooled direct drives</td>
<td>yes</td>
<td>yes</td>
</tr>
</tbody>
</table>
ELHA emphasizes highest priority on accessibility to the FM SMART concept to reduce time requirements for regular maintenance or repair 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
ELHA offers a great variety of peripheral equipment to optimize the FM SMART for the specific machining tasks.

**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.

**CNC control SIEMENS 840D sl**

The standard CNC for highly productive machining solutions.

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**PERIPHERALS**

**MECHANICS**
- Exhausting unit
- Fixture change support unit
- Preparation for additional unit
- Cone cleaning
- High dynamic package

**COOLANT / CHIP DISPOSAL**
- Coolant system, water based
- Coolant system, oil based
- High pressure pump size I or II
- Duplex filter
- Chip conveyor
- Coolant gun

**AUTOMATION**
- Level I
- Level II (with pallet conveyor)

**ELECTRIC / CNC**
- Remote diagnosis
- Load monitoring
- Shop mill
- Virtual machine
- Measuring probe

**PROCESS ENGINEERING**
- Geometry approval
- Tool scheme
- NC-programming
- Work fixture design

**SERVICES**
- Simulation
- Cycle time calculation
- Transport
- Reassembly and commissioning
- Production support

**TRAINING**
- Mechanics / Hydraulics
- Electrics / Electronics
- Operation / Programming
- Work fixture

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* = standard  ○ = option  - = not available
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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