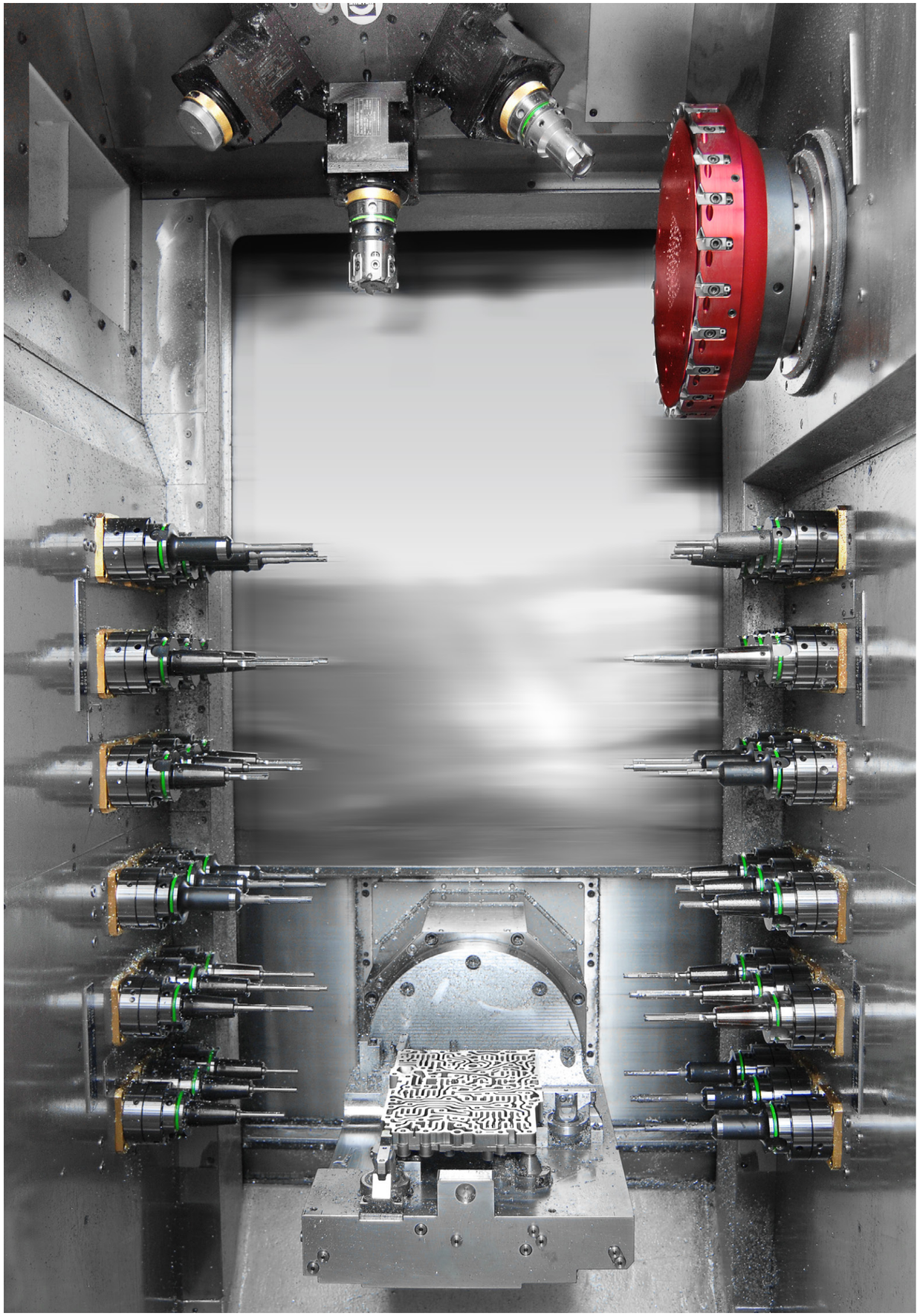
ELHA MASCHINENBAU

FM PRODUCTION MODULES

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



CONCEPT

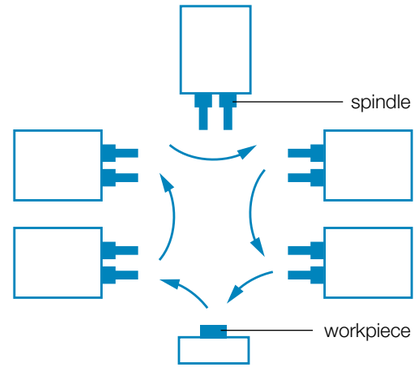
ELHA MASCHINENBAU

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:

- Small and mid lot sizes
- 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
- Small & midsize workpieces
- 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

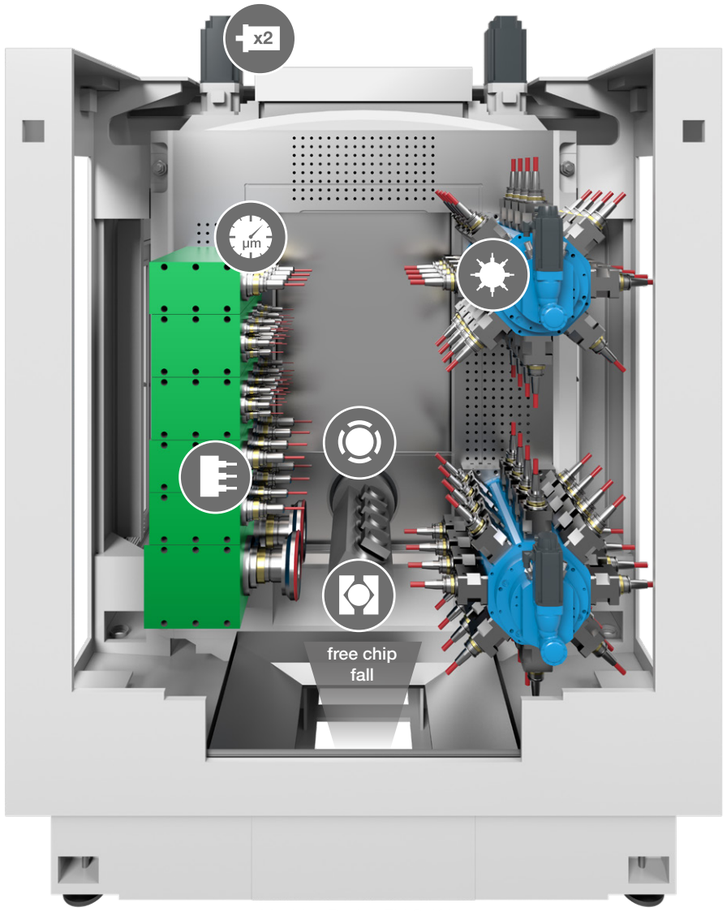
For powerful, highly accurate and dynamic feeds as well as for fast rapids to reduce idle times

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 — flexibility

Customized components for:

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

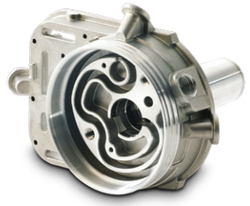
Optimized productivity and flexibility

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

FM Production Module
view machine in operation

APPLICATIONS

ELHA MASCHINENBAU



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

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

- 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

- 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

- 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

- extruded aluminium
- 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

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

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

- 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

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

- 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

ELHA MASCHINENBAU

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

		FM 3+X	FM 3+X *hd*	FM 4+X *hd*
TRAVELS				
X-axis (cross)	mm	400	500	800
Y-axis (vertical)	mm	1000	1200	1400
Z-axis (ram)	mm	500	400	800
FEEDS				
Speed	m/min	40	60	48
Acceleration (max.)	m/s²	8	8	6
Feed force X / Y / Z (max.)	kN	15	20	40 / 20 / 20
ROTARY TABLE				
Diameter	mm	300	300	400
Rotational speed	rpm	60	80	80
Clamping torque	Nm	1500	2100	4000
Positioning accuracy	arcsec	±5	±5	±5
Indexing	degree	0.001	0.001	0.001
SPINDLES				
Max. power (S1-100%)	kW	20	37	50
Max. speed	rpm	20000	20000	20000
Max. torque	Nm	200	200	800
CONNECTED POWER				
Power requirement (3 AC 400V / 50Hz)	kVA	60	60	80
Compressed air	bar	5	5	5
DIMENSIONS				
Width	mm	3050	3000	3500
Depth	mm	3500	3570	4525
Height	mm	3950	3500	3950
Transportation height	mm	3200	3150	3400
Workpiece loading height	mm	1100	1100	1100
Weight incl. peripheral equipment	ca. t	14.5	18.5	30

Industries & Products

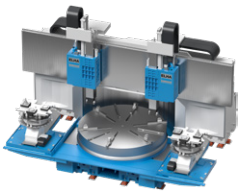
Automotive

FM
Production Modules

FM *SMART*
Transfer Centers

Energy

Large bearings

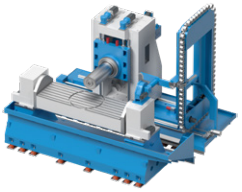


VTM
Vertical Turn-Milling Centers

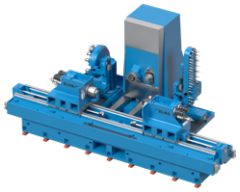
RTX
Rotary Table Machining Centers

Aerospace

General machining



SMX
Special Machining Centers



SPX
Special Purpose Machines

ELHA-MASCHINENBAU Liemke KG

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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