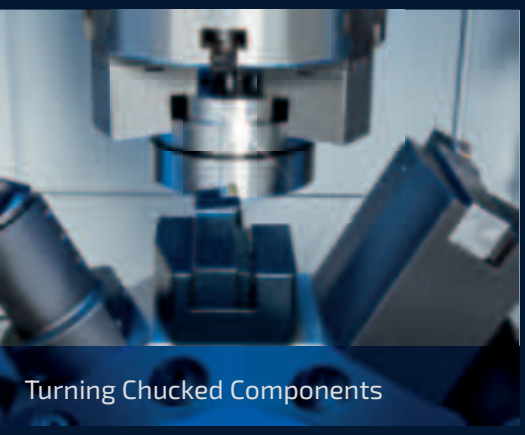
PRODUCT SUMMARY
of the EMAG Group


Turning Chucked Components


Turning Shafts

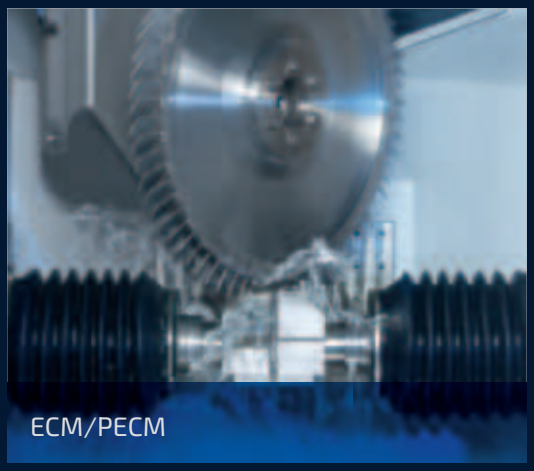

Milling

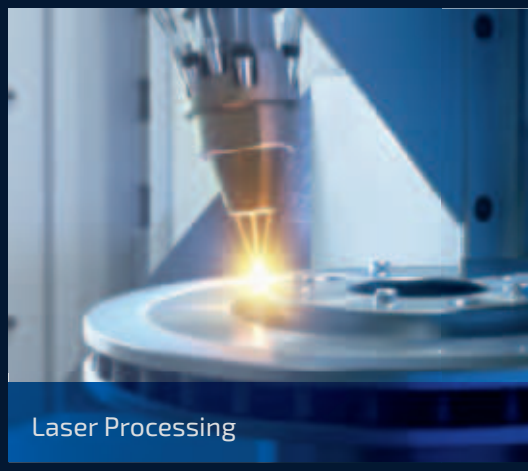

Gear Hobbing


Gear Grinding


Cylindrical Grinding


Out-of-round Grinding


ECM/PECM


Laser Processing

TECHNOLOGY. CONNECTED.

EMAG

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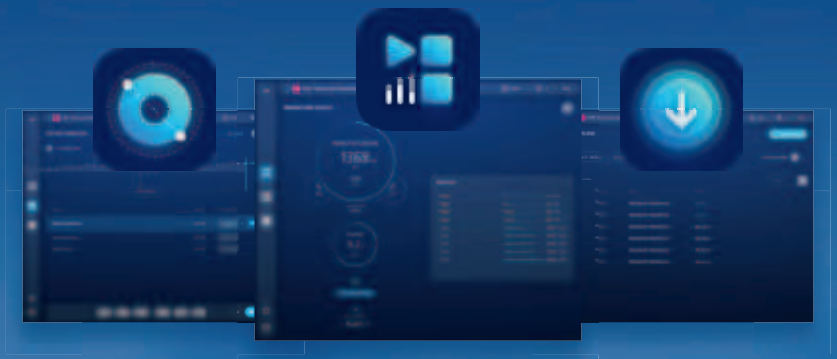
» HARD GEAR CUTTING BUSINESS UNIT

» LASERTEC BUSINESS UNIT

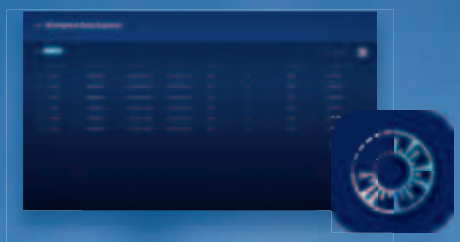
» ECM BUSINESS UNIT

» AUTOMATION BUSINESS UNIT



EDNA ONE

Transparency of current production output, feature correction and download area



EDNA Workpiece Data Recorder

Workpiece-related data acquisition

EDNA Health Check

Higher availability through predictive servicing and lower service costs

EDNA Services (excerpt)

- Process support
- Data-driven line optimization
- Downtime avoidance
- Identification of potentials & development of measures with the customer

EDNA
Edge Cloud

umati
MQTT OPC UA
{ REST:API }

Centralized edge storage, recording of all machines and data

EDNA ONE PRODUCT SUMMARY (from EDNA IoT Core to EDNA Cloud)

EDNA products

(outside the customer network)

EDNA Cloud

EDNA Health Check
Vorausschauende Wartung

Secure EMAG network

Transmission of measurement data Process data remain in the customer plant

Internet

Customer network or a separate machine network

EDNA products

(within the customer network)

EDNA Edge Cloud
Server

Workpiece Data Recorder

Customer network

EDNA Apps

Fanuc from V16

EDNA Production Status

EDNA Feature Correction

EDNA Download

EDNA IoT Ready[1)]

EDNA IoT Basic Interface[2)]

EDNA IoT Core
Industrial PC[1)2)]

EDNA Cortex
Software licence[1)2)]

EDNA Senses
Additional sensors[1)]

EDNA Health Check Lite
Health status (semi-automatic)[1)]

EDNA Senses Additional sensors[1)]

Records, analyses and evaluates the vibrations of the X, Y, Z and C axes, for example.

EDNA IoT Core Industrial PC[1)2)]

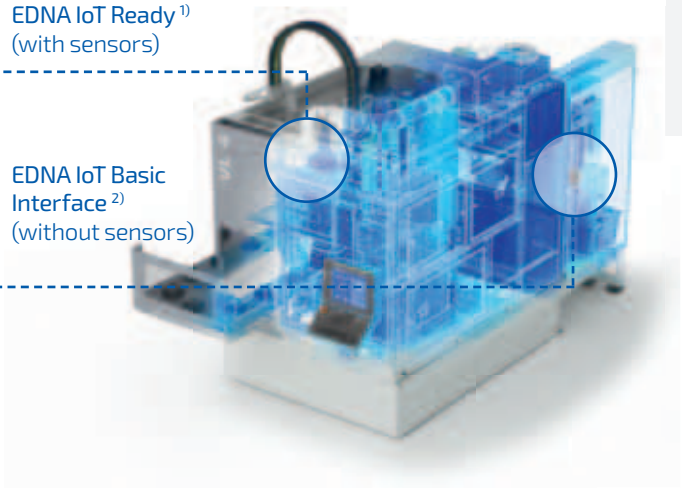
Saves the data from the PLC and makes it available for other services.

Uninterruptible power supply

Enables a clean shutdown of the operating software, e.g. in the event of a power failure.

EDNA IoT Ready [1)] (with sensors)

EDNA IoT Basic Interface [2)] (without sensors)



EDNA ONE EMAG IoT PRODUCTS

EDNA ONE FOR MODULAR STANDARD MACHINES

Process monitoring & intuitive operating support for FANUC V16 and higher

EDNA CORTEX

Optimised production process thanks to effortless access to all machine process data

- Secure, quick and easy access to all your machine data
- Central data interface to all data sources
- Capture of historical data
- Standardised data format
- Our database for EDNA ONE IoT applications
- Interfaces: MQTT, REST, OPC-UA, CSV export
- Limit value monitoring

PROCESS CONSULTING

EMAG service for data-based OEE increase

By effectively using the expertise of EMAG experts and the precision data from our machines, OEE is optimised based solely on facts.

- Prerequisite: EDNA IoT Ready or Basic Interface; No further installations required

Features

- Cycle time analysis
- Timeline visualisation
- OEE analysis
- Tool change potential check
- Bottleneck calculation

EDNA WORKPIECE DATA

Workpiece-related data collection and analysis

- Workpiece-related data is available directly from the machine
- Comparison of available workpieces and process variables
- Provision of process parameters over the course of time

- Workpiece-related data is available directly from the machine
- Comparison of available workpieces and process variables
- Provision of process parameters over the course of time

EDNA EDGE CLOUD

Centralised edge storage for recording all machines and data

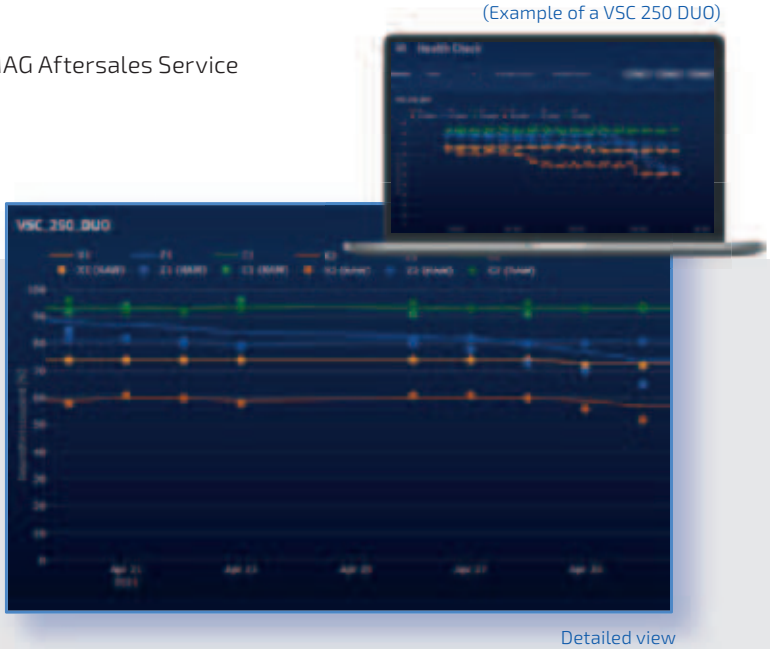
- Data is stored at a central location in the customer network
- More storage space and computing power
- Comparison of multiple machines or lines possible
- Interfaces: MQTT, REST, OPC-UA, CSV export
- The data does not leave the customer network
- Optional: Supports the automatic health check

EDNA HEALTH CHECK

Higher availability through predictive servicing and lower service costs

- Predictive servicing: early detection of negative trends or spontaneous changes in the condition of machine components
- Reduction of unplanned downtimes
- Proactive spare parts planning - coordinated by EMAG Aftersales Service
- Health history as a diagram
- Detailed report of the analyses

Health Line Chart
(Example of a VSC 250 DUO)



Detailed view

EDNA EDGE Cloud
Server

EDNA Health Check

EMAG VL 2 · VL 4 · VL 6 · VL 8

VL 2 VL 4 VL 6 VL 8

BENEFITS OF THE VL SERIES

» The machines of the VL Series are space-saving vertical turning machines with integrated automation. They deliver maximum performance and low costs per piece. This performance is based on high-quality components. The machine body is made of MINERALIT® polymer concrete with damping properties.

» A pick-up working spindle moves in the X- and Z-axes with minimum response times and the tool turret guarantees short swiveling times.

» Furthermore, the machines can be fitted with a Y-axis in the turret to allow for the machining of complex geometries. The possible fields of applications for the machines are thus increased massively.

TECHNICAL DATA		VL 2	VL 4	VL 6	VL 8
Max. chuck diameter	mm in	160 6.5	260 10	400 15.5	500 19.5
Swing diameter	mm in	210 8.5	280 11	420 16.5	520 20.5
Max. workpiece diameter	mm in	100 4	200 8	300 12	400 15.5
Max. workpiece length	mm in	150 6	200 8	250 10	300 12
X-axis travel	mm in	640 25	740 29	885 35	1,110 44
Y-axis travel	mm in	±50 ±2	±30 ±1	±30 ±1	±30 ±1
Z-axis travel	mm in	375 15	415 16.5	495 19.5	595 23.5
Power rating (40%/100% duty cycle)	kW hp	18.1/13.9 24/19	25/18 34/24	39/28 52/38	47.6/34.6 64/46
Torque (40%/100% duty cycle)	Nm ft-lb	77/59 57/44	280/202 207/149	460/340 339/251	780/600 575/443
Speed	rpm	6,000	4,500	3,100	2,850

EMAG VL 3 DUO

VL 3 DUO

EMAG has extended the product range of the extremely successful VL Series in the form of the VL 3 DUO, a twin-spindle machine solution for the highly productive manufacturing of chucked parts with a diameter of up to 150 mm.

The VL 3 DUO integrates all of the most recent EMAG technological developments (including self-loading spindle, the TrackMotion automation system and the modular design of the machine) to create a highly productive manufacturing system with a minimum footprint.

TECHNICAL DATA		VL 3 DUO
Max. workpiece diameter	mm in	150 6
Chuck diameter	mm in	210 8
Max. workpiece length	mm in	110 4.5
X-axis travel (machining)	mm in	505 19.5
Y-axis travel (optional)	mm in	±30 ±1
Z-axis travel	mm in	250 10
Power rating (40%/100% duty cycle)	kW hp	17.9/15.5 24/21
Torque (40%/100% duty cycle)	Nm ft-lb	144/98 106/72
Speed	rpm	5,000

EMAG VLC 100 · VLC 200 · VLC 300 · VLC 400

VLC 100 VLC 200 VLC 300 VLC 400

BENEFITS OF THE VLC SERIES

» Individual manufacturing solution: The VLC Series machines can be adjusted individually to the machining requirement.

» Turning tools, milling spindles, and multi-spindle drill head modules are available.

TECHNICAL DATA		VLC 100	VLC 200	VLC 300	VLC 400
Max. chuck diameter	mm in	160 6.5	260 10	400 15.5	500 19.5
Swing diameter	mm in	210 8.5	280 11	420 16.5	520 20.5
Max. workpiece diameter	mm in	100 4	200 8	300 12	400 15.5
Max. workpiece length	mm in	150 6	200 8	250 10	300 12
X-axis travel	mm in	650 26	760 30	900 35	1,010 40
Y-axis travel	mm in	±50 ±2	±30 ±1	±30 ±1	±30 ±1
Z-axis travel	mm in	375 15	415 16	495 19	595 23

EMAG
VT 2 · VT 4 · VTC 100 · VTC 200 CUSTOMIZED

VT 2/VT 4

Four axes, short distances, and a powerful main spindle – these are the strengths of the VT Series. Fast processes are required for machining large quantities of shafts. Both the machining process and the loading and unloading processes must be completed extremely quickly. VT 2 and VT 4 machines guarantee the high performance you require.

The benefits of the VT Series come to light in particular where high numbers of parts are involved. A key factor here is the machining of parts from two sides. This greatly reduces the machining time. Two tool turrets, each with eleven tool positions that can be equipped with turning tools or driven tools, ensure machine flexibility.

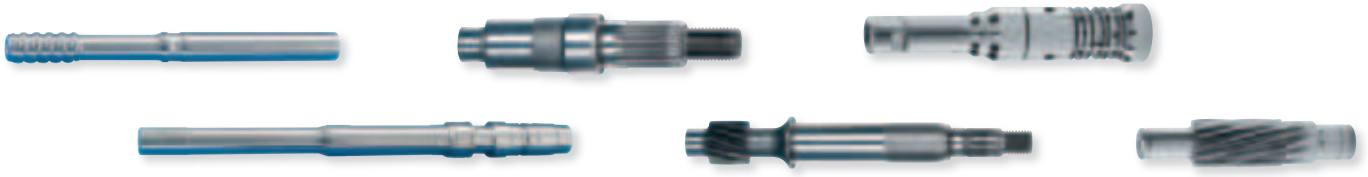
TECHNICAL DATA		VT 2	VT 4
Chuck diameter	mm in	160 6.5	250 10
Swing diameter	mm in	210 8.5	270 10.5
Max. part diameter			
» Gripper diameter	mm in	63 2.5	133 5
» Workpiece diameter	mm in	100 4	200 8
Max. workpiece length	mm in	400 15.5	630 25
X/Z-axis travel	mm in	332/625 13/24.5	395/810 15.5/32
Power rating (40%/100% duty cycle)	kW hp	21/14.1 28/19	38/29 51/39
Torque (40%/100% duty cycle)	Nm ft-lb	130/90 96/66	250/200 184/148
Speed	rpm	6,000	4,500

VTC 100/VTC 200

The strength of the VTC Series machines is their 4-axis machining of large quantities of shafts up to 400 mm in length. Since the machine concept comprises a fully integrated automated loading and unloading system, a manufacturing system can be created, which features very short transport distances. The machines are loaded and unloaded by the two turrets, which ensures that the process is fast and straightforward.

In addition, it has a powerful main spindle. For the machining process, there are two turrets with eleven tool positions, which can be equipped with either turning tools or driven tools. The 12th station is for the gripper which handles the parts in the machine. There are endless transport belts on both sides of the machining area. This is where the raw and finished parts are stored.

TECHNICAL DATA		VTC 100	VTC 200
Chuck diameter	mm in	160 6.5	250 10
Swing diameter	mm in	210 8.5	270 10.5
Max. part diameter			
» Gripper diameter	mm in	63 2.5	133 5
» Workpiece diameter	mm in	100 4	200 8
Max. workpiece length	mm in	400 15.5	630 25
X-axis travel	mm in	332 13	395 15.5
Y-axis travel	mm in	±25 ±1	±25 ±1
Z-axis travel	mm in	625 24.5	810 32



EMAG VTC 250/VTC 250 DUO

VTC 250/VTC 250 DUO

Completely machine shafts and shaft-type workpieces on a single machine, including automation.

As a result of their high drive rating and robust components, the machines in the VTC Series are highly productive turning centers. In the form of the VTC 250 DUO DD/ED, the machine can be fitted with two machining stations and three tool turrets. One special feature is the simple, low-cost workpiece transport completed by the turrets.

TECHNICAL DATA	VTC 250/VTC 250 DUO
Chuck diameter	mm 250 in 10
Max. workpiece diameter	mm 140 in 5.5
Max. workpiece length	mm 630/1,000* in 25/39.5*
X-axis travel	mm 300 in 12
Z-axis travel	mm 740/1,100* in 29/43.5*

*Special length

EMAG
VSC 250/400/450/500 · VSC 250/400/450/500 DUO

VSC 250/400/450/500

Vertical pick-up turning machine for chucked parts with a diameter of up to 440 mm. Excellent use of the VSC Series by technology integration for both soft and hard machining.

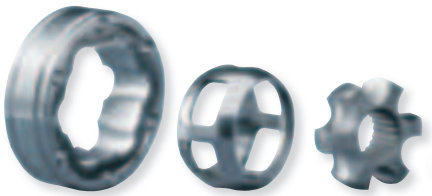
Turning, drilling, grinding, milling, gear cutting and honing – all in one machine. The workpiece is measured precisely, quickly and without delays in the machining position by a measuring probe or measuring mandrel.

VSC 250/400/450/500 DUO

The low-cost solution for machining small and medium workpieces in two operations. The DUO design has two separate machining areas, which means that it has overhead slides that can be programmed independently.

Each machining area has an EMAG disk-type tool turret at the end that can be independently programmed.

TECHNICAL DATA		VSC 250 DUO	VSC 400 DUO	VSC 450 DUO	VSC 500 DUO
Workpiece diameter (nominal)	mm inch	250 10	340 13.5	400 16	440 17.5
Chuck diameter	mm inch	315 12.5	400 16	460 18	500 20
Swing diameter	mm inch	330 13	420 16.5	520 21	520 21
X-axis travel	mm inch	900 35.5	860 34	935 37	935 37
Z-axis travel	mm inch	300 12	315 12.5	315 12.5	400 16



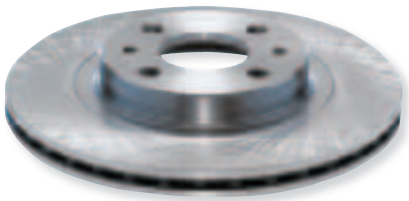
EMAG VSC 160 TWIN

VSC 160 TWIN

The ideal machines for high performance, high accuracy, and large series – the vertical multi-spindle machines for the simultaneous machining of two workpieces.

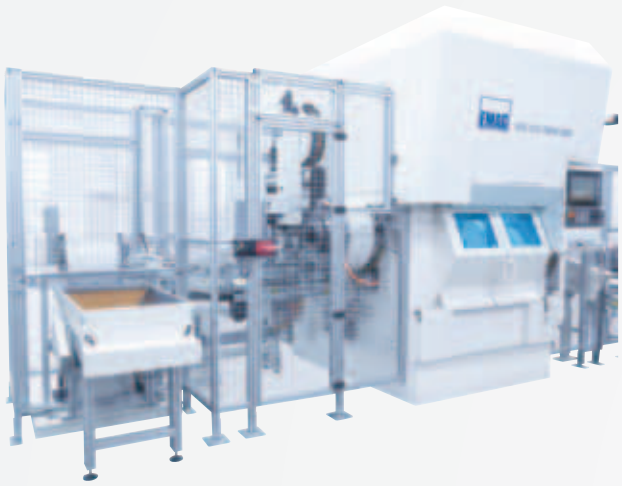
The VSC TWIN Series combines highly productive output with a minimal footprint.

TECHNICAL DATA		VSC 160 TWIN
Workpiece diameter (nominal)	mm in	130 5
Chuck diameter	mm in	130/160 5/6.5
Swing diameter	mm in	180 7
X-axis travel	mm in	860 34
Z-axis travel	mm in	160 6.5



MACHINES FOR MACHINING HOMOKINETIC JOINTS

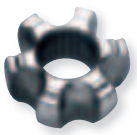
VSC 315 TWIN KBG



VSC 315 KBU/VSC 315 DUO KBU

TECHNICAL DATA		VSC 315 TWIN KBG
Chuck diameter	mm in	250 10
Swing diameter	mm in	260 10
X-axis travel	mm in	850 33.5
Z-axis travel	mm in	320 12.5
Main spindle	#	2
Spindle flange to DIN 55026	Size	8
Spindle bearing diameter, front	mm in	140 5.5
Max. speed	rpm	3,000
Spindle distance	mm in	500 20
Main drive unit	#	2
AC asynchronous motor, 60%/100% duty cycle	kW hp	58/45 78/60
Maximum power	kW hp	58 78
Full performance from spindle speed	rpm	900
Torque, 60%/100% duty cycle	Nm ft-lb	620/480 457/354
Maximum torque	Nm ft-lb	620 457

TECHNICAL DATA		VSC 315 KBU/VSC 315 DUO KBU
Chuck diameter	mm in	250/250 10/10
Swing diameter	mm in	260/260 10/10
X-axis travel	mm in	900/900 35.5/35.5
Y-axis travel	mm in	315/315 12.5/12.5
Z-axis travel	mm in	300/300 12/12
Main drive unit	#	1/2
Spindle flange to DIN 55026	Size	8/8
Spindle bearing diameter, front	mm in	140/140 5.5/5.5
Max. speed	rpm	3,000/3,000
AC synchronous motor, 40%/100% duty cycle	kW hp	28.5/27.5/28.5/27.5 1/0.5/1/0.5
Maximum power	kW hp	28.5/28.5 1/1
Full performance from spindle speed	rpm	700/700
Torque, 40%/100% duty cycle	Nm ft-lb	590/375/590/375 23/15/23/14.5
Maximum torque	Nm ft-lb	590/590 23/23



KBG Straight ball raceways

KBU Universal ball raceways

HCM 110

TECHNICAL DATA		HCM 110
Max. workpiece diameter	mm in	110 4
Min. workpiece diameter	mm in	30 1
Max. workpiece height	mm in	60 2
Min. workpiece height	mm in	15 0.6
Max. workpiece weight	kg lbs	1 2
Spindle flange to DIN 55026		Size 5
Machine weight	t lbs	8 18,000

EMAG VSC 400 PS

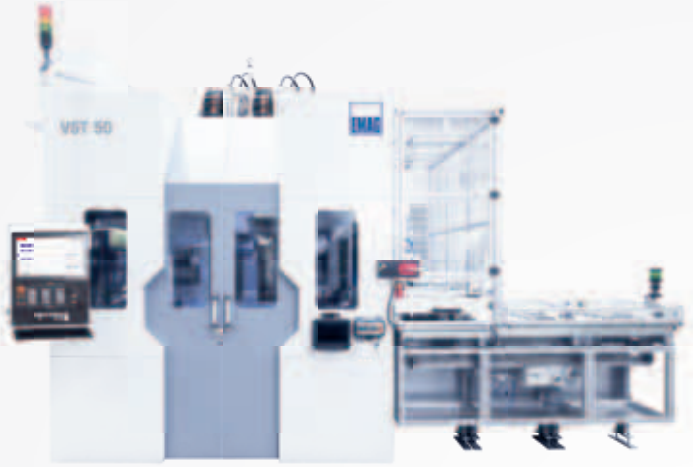
VSC 400 PS

Fast, precise and easy to operate: power skiving has been turned into a highly effi cient process for the production of internal and external gear teeth by the VSC 400 PS machine.

TECHNICAL DATA		VSC 400 PS
Max. chuck diameter	mm in	400 16
Swing diameter	mm in	420 17
Workpiece diameter	mm in	340 (400) 13 (16)
X-axis travel	mm in	935 37
Z-axis travel	mm in	315 12
Y-axis travel	mm in	280 11

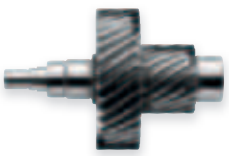
EMAG VST 50

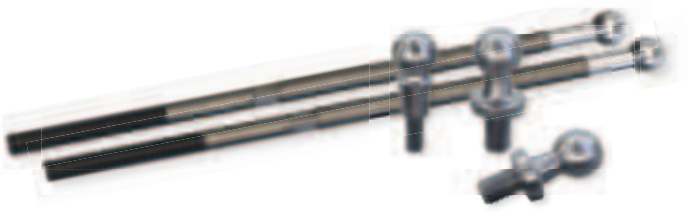
VST 50



Precision, speed and process reliability for the production of ball pins: with its intelligent machine concept - including robot loading - the new VST 50 from EMAG ensures lower unit production costs for this safety-critical component.

TECHNICAL DATA		VST 50
Max. workpiece diameter	mm in	40 1.5
Max. workpiece height	mm in	450 17.5



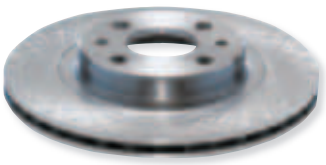


EMAG VM 9

VM 9

The vertical turning centers in the VM Series are designed for the highly productive manufacturing of workpiece families with a wide range of parts. A tool turret with twelve tool positions, depending on the required tool interface in a BMT or VDI version, is available for machining. The turret can be equipped with driven tools to carry out drilling operations, for example.

TECHNICAL DATA		VM 9
Max. chuck diameter	mm in	450 17.5
Swing diameter	mm in	700 27.5
X-axis travel	mm in	375 14.5
Z-axis travel	mm in	500 19.5



EMAG VSC 250 DS · VSC 400 DS/DDS · VSC 250 DUO DS · VSC 400 DUO DS

VLC 250 DS
VSC 400 DS/DDS

VSC 250 DUO DS/VSC 400 DUO DS

The combined turning and grinding centers combine the benefits of vertical hard turning with those of grinding – on a single machine and in a single clamping operation.

The optimum, most economical machining process is used, depending on the workpiece and the quality requirements. The benefit for the customer is the flexibility of selecting the best technology for each machining process – hard turning, scroll-free turning, and grinding on a single machine.

This machine reduces the process chain and delivers a whole series of benefits for the user: lower investment costs and costs per piece, shorter throughput times and higher workpiece quality with greater process reliability.

The twin-spindle turning and grinding machines of the DUO Series are a very economical solution for the machining of larger batches for small and medium-sized workpieces. The DUO has the smallest footprint of the machines for the machining of components in first and second operation. The machines have two separate machining areas which means that they have overhead slides which can be programmed independently.

TECHNICAL DATA		VSC 250 DS	VSC 400 DS/DDS	VSC 250 DUO DS	VSC 400 DUO DS
Max. chuck diameter	mm	250/315	400	250/315	400
	in	10/12.5	15.5	10/12.5	15.5
Max. swing diameter	mm	330	420	330	420
	in	13	16.5	13	16.5
X-axis travel	mm	900	850	900	850
	in	35.5	33.5	35.5	33.5
Z-axis travel	mm	300	315	300	315
	in	12	12.5	12	12.5
Y-axis travel (optional)	mm	± 50/100	315	± 50/100	315
	in	2/4	12.5	2/4	12.5

EMAG VLC 200 GT · VLC 350 GT

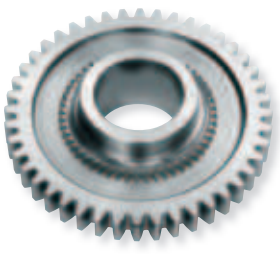
VLC 200 GT

VLC 350 GT

Too often, finishing processes are thought of in multi-machine concepts – in the end, people rely entirely on the grinding process. Optimization potential is wasted here because those who feed parts with a large oversize to the grinding process pay for the high surface quality with long process times and higher tool costs.

With our machines from the VLC GT Series, we regularly prove to our customers that there is another way to make the combination machining of components possible. In short, where turning is possible, turning is done and where grinding is necessary, grinding is done. The time savings with the combination of turning + grinding works much faster, as there is much less excess material left after turning. The optimally adaptable machining area offers a lot of freedom in process design; even components with non-round contours can be processed in this way.

TECHNICAL DATA		VLC 200 GT	VLC 350 GT
Chuck diameter	mm	260	400
	in	10	16
Max. machining diameter (grinding)	mm	60 to 160	350
	in	2.5 to 6.5	14
Max. workpiece length	mm	100	200
	in	4	8
X-axis travel	mm	1,700	2,390
	in	67	94
Z-axis travel	mm	250	350
	in	10	14




EMAG

EMAG VTC 100 GT · VTC 315 DS

VTC 100 GT

Versatile solutions for shafts: The VTC 100 GT ensures a quick process for hard turning and grinding. The tool turret completes all turning operations and the workpiece loading work. A powerful grinding spindle is available for precision external cylindrical machining. This can be fitted with both CBN and aluminum oxide grinding wheels.

TECHNICAL DATA		VTC 100 GT
Max. chuck diameter	mm in	180 7
Max. workpiece diameter	mm in	100 4
Max. workpiece length	mm in	400 15.5
X-axis travel	mm in	150 6
Z-axis travel	mm in	660 26

VTC 315 DS

The perfect machine for machining demanding shaft-type workpieces – vertical turning and/or grinding.

Whether it is turning, drilling, milling, simultaneous grinding, synchronous support grinding, or combined turning & grinding – the VTC is suitable for all variants of process integration for shaft parts.

TECHNICAL DATA		VTC 315 DS
Chuck diameter	mm in	315 12.5
Max. workpiece diameter	mm in	240 9.5
Max. workpiece length including clamping device	mm in	700 27.5
X-axis travel	mm in	390 15.5
Z-axis travel	mm in	950 37.5

EMAG VG 110

VG 110

The VG 110 is a high-precision grinding machine designed for internal and external out-of-round machining of chucked parts.

The machine is typically fitted with two high-speed grinding spindles and is ideal for CBN use.

As an option, the machine can also be fitted with a combination of an internal grinding spindle and a tool block holder for combination machining.

TECHNICAL DATA				VG 110
Chuck diameter	mm in	100 4	to to	190 7.5
Max. internal machining diameter	mm in			60 2.5
Max. grinding length	mm in			40 1.5
X-axis travel	mm in			460 18
Z-axis travel	mm in			225 9

EMAG WEISS W 11 CNC · W 11-EVO

W 11 CNC

If a high-end CNC machine is too much and a conventional machine too little, then the solution is the EMAG WEISS W 11 CNC. Workpieces with a diameter of up to 350 mm and a length of up to 2,000 mm can be machined with this CNC cylindrical grinding machine.

The W 11 CNC is designed for the production of single parts and prototypes. This cylindrical grinding machine is also used for small series with only small diameters, for pair grinding, for sample production, and in the areas of training and maintenance.

TECHNICAL DATA		W 11 CNC
Max. grinding length	mm in	650/2,000 25.5/78.5
Center height	mm in	180/320 7/12.5
External grinding diameter	mm in	1/350 0/14
Max. on-the-fly workpiece weight, MK4	kg lb	100/250 220.5/551
Max. workpiece weight between centers	kg lb	250/450 551/992

W 11-EVO

The basis for the EMAG Weiss W 11-EVO is the time-tested KARSTENS cylindrical grinding machine concept.

Since 2010, we have been offering our customers W 11-EVO cylindrical grinding machines either in new condition or in retrofit form. The technology has been steadily developed and improved over the years and all the components comply with the current machinery directives.

TECHNICAL DATA		W 11-EVO
Max. grinding length	mm in	650/2,000 25.5/78.5
Center height	mm in	180 (up to 320 as an option) 7 (up to 12.5 as an option)
External grinding diameter	mm in	1/350 0/14

EMAG WEISS WPG 7 · ECO 200

WPG 7

Machine workpieces up to 250 mm in length and with a maximum diameter of 200 mm extremely efficiently with the WPG 7 from EMAG Weiss.

This is made possible by a rigid machine design, very dynamic axes, a powerful grinding wheel drive unit, and an extremely small footprint. Overall, the WPG 7 only requires around four square meters of space!

TECHNICAL DATA		WPG 7
Center height	mm in	100/125 4/5
Distance between centers	mm in	280 11
Longitudinal axis (Z), longitudinal travel	mm in	390 15.5
Longitudinal axis (Z), feed rate	m/min ipm	15 590.5
Longitudinal axis (Z), table adjustment	°	8
Lateral axis (X), lateral travel	mm in	190 7.5
Lateral axis (X), feed rate	m/min ipm	10 394
Grinding wheel diameter	mm in	400/500 15.5/19.5
Max. grinding wheel width	mm in	80 3
Grinding wheel bore	mm in	127/203 5/8
Grinding wheel peripheral speed	m/s	50
Workpiece headstock – mounting taper		W20 (W25 or MK4, MK 5)
Workpiece headstock – speed	m/s	0 – 2,000

ECO 200

The ECO 200 conventional cylindrical grinding machines deliver grinding quality from EMAG Weiss for minimal investment costs. These precision cylindrical grinding machines are particularly aimed at users, who do not require a CNC control system but, nevertheless, want top machining quality.

TECHNICAL DATA		ECO 200
Grinding length	mm in	400 15.5
Center height	mm in	100 4
External grinding diameter	mm in	1/100 0/4
Internal grinding diameter	mm in	- -
Max. on-the-fly workpiece weight, MK4	kg lb	30 66
Max. workpiece weight between centers	kg lb	50 110

EMAG
HG 2 · HG 204 · HG 208 · H 208 CD/DW

HG 2 · HG 204 · HG 208

The ideal machine system for the external cylindrical grinding of shaft-type precision parts.

The HG Series is specially designed for the highly productive mass production of shafts. The series of machines features a wide range of possible automation options and can be easily integrated in production lines.

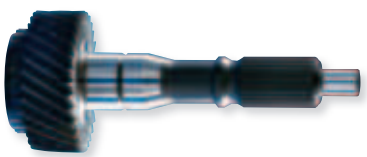
TECHNICAL DATA		HG 2	HG 204	HG 208
Max. workpiece diameter	mm	200	200	200
	in	8	8	8
Max. workpiece length	mm	400	650	1,200
	in	15.5	25.5	47
X-axis travel	mm	360	360	360
	in	14	14	14
Z-axis travel	mm	1,000	1,000	1,600
	in	39.5	39.5	63

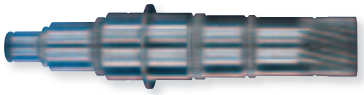
HG 208 CD

Hollow shafts and similar parts on which internal boreholes and external diameters must be produced with high precision relative to each other in other words machined ready for installation can be produced on the HG 208 CD center drive grinding machine.

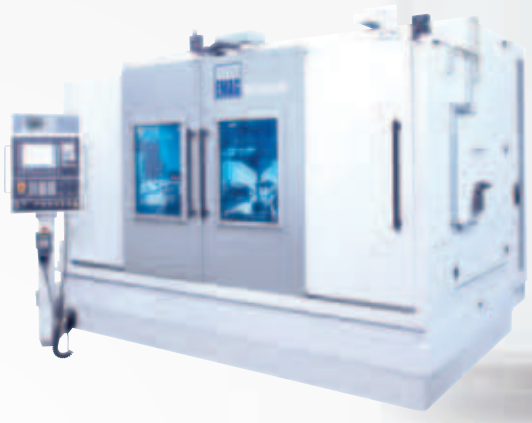
These parts include transmission shafts, which are often used in modern manual transmissions in cars. The external cylindrical grinding machine machines the hollow shafts inside and outside simultaneously in a single clamping operation. This production method is significantly more precise than production on two separate machines.

TECHNICAL DATA		HG 208 CD
Max. workpiece diameter	mm	100
	in	4
Max. workpiece length	mm	400
	in	15.5
X-axis travel	mm	360
	in	14
Z-axis travel	mm	600
	in	23.5





HG 208 DW



The HG 208 DW four-axis grinding machine for simultaneous machining can complete two external grinding operations on shaft-type workpieces at the same time.

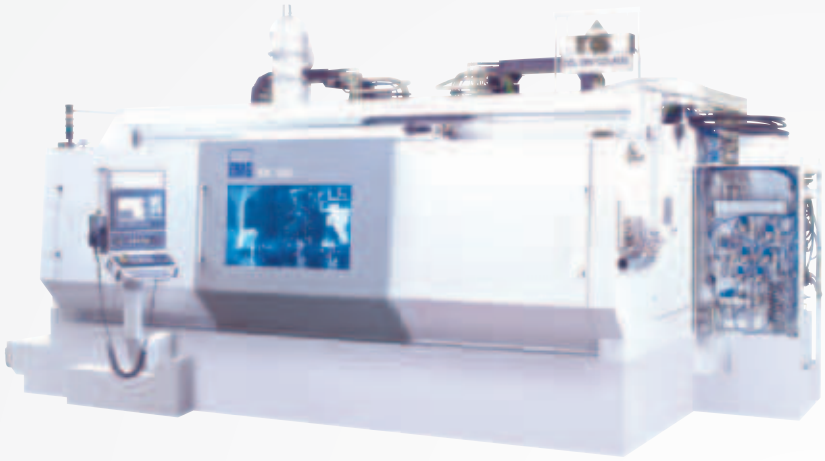
This process is ideal for workpiece families that always involve the same machining operations, but are located at different intervals from each other. These include steering pinions, transmission shafts, engine shafts and compressor shafts, for example.

TECHNICAL DATA		HG 208 DW
Max. workpiece diameter	mm in	200 8
Max. workpiece length	mm in	600 23.5
X-axis travel	mm in	360 14
Z-axis travel	mm in	800 31.5

EMAG SN 204/208 · SN 310/320

SN 204/208

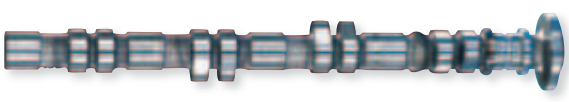
SN 310/320

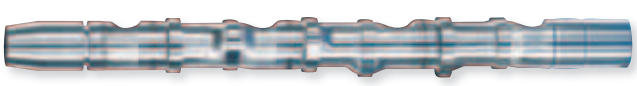


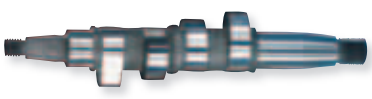
This series is designed for all out-of-round grinding tasks for camshafts, for grinding external contours for single part and series production.

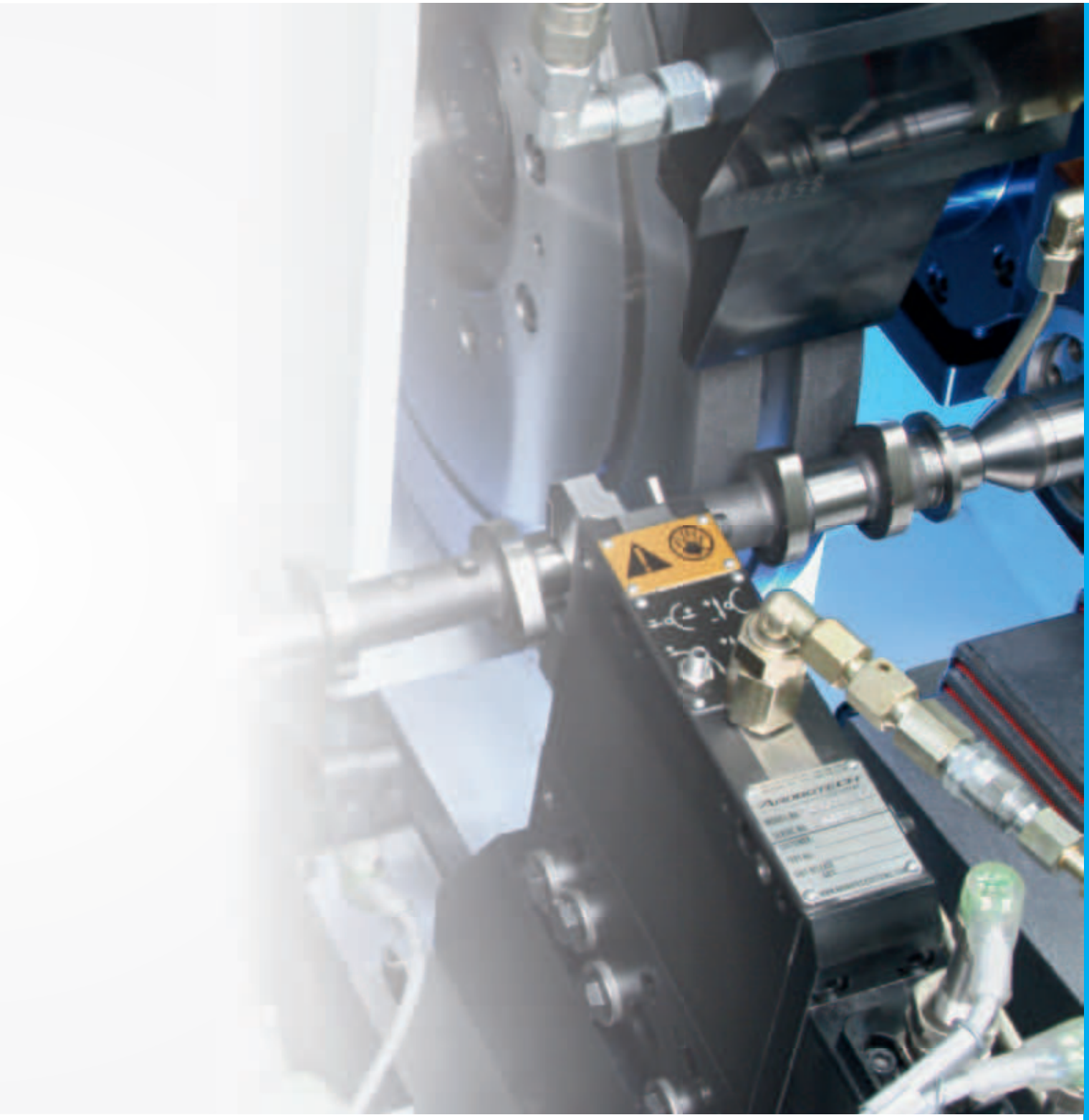
The machines in the SN Series are specially tailored to the part geometry as required and can be equipped with one, two, or three grinding wheels for external cylindrical and/or external out-of-round machining.

TECHNICAL DATA		SN 204	SN 208	SN 310	SN 320
Max. workpiece diameter	mm	380	380	380	620
	in	15	15	15	24.5
Max. workpiece length	mm	600	950	1,000	2,000
	in	23.5	37.5	39.5	78.5
X-axis travel	mm	360	360	500	500
	in	14	14	19.5	19.5
Z-axis travel	mm	1,000	1,600	1,700	2,700
	in	39.5	63	67	106.5









EMAG KOEPFER K 160 · K 300

K 160

The K 160 hobbing machine features the very latest generation of control systems and can provide high speeds at its milling head and main spindle.

In conjunction with a high-speed loading device, it can operate at high cutting speeds and correspondingly low cycle times, even on shafts and pinions with very low numbers of teeth.

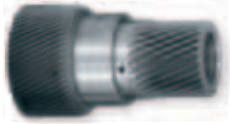
TECHNICAL DATA		K 160
Max. module		2.5
Max. workpiece diameter	mm in	100/140 3.9/5.5
Max. milling distance	mm in	200/480 8/19
Max. workpiece length	mm in	300/1,000 12/39.5
Max. cutter width	mm in	250 10
Shifting path	mm in	160 6.5
Main spindle speed	rpm	4,000
Cutter speed	rpm	5,000

K 300

The K 300 hobbing machine is a fully automatic machine with nine activated CNC axes to allow the flexible machining of gear wheels up to module 4.

The combination of an inclined base and closed frame design ensures maximum stability for both dry and wet machining.

TECHNICAL DATA		K 300
Max. module		4
Max. workpiece diameter	mm in	140/195 5.5/7.5
Max. milling distance	mm in	300 12
Max. workpiece length	mm in	300/800 12/31.5
Max. cutter width	mm in	200 8
Shifting path	mm in	160 6.5
Main spindle speed	rpm	800
Cutter speed	rpm	2,500/4,000



EMAG KOEPFER HLC 150 H

HLC 150 H

The HLC 150 H, the most modern horizontal hobbing machine available from EMAG KOEPFER, is a universal solution for hobbing and skiving, as well as worm milling and skiving processes, for components up to module 3.

The HLC 150 H features a large axis spacing of up to 130 mm, a milling head swivel angle of -45°/+135°, and a milling head with a rating of 28 kW.

TECHNICAL DATA		HLC 150 H
Max. module		3
Max. workpiece diameter (fully automatic)	mm in	150 6
Max. workpiece length	mm in	500 19.5
Max. shifting path	mm in	220 8.5
Max. cutter diameter	mm in	120 4.5
Max. torque	Nm ft/lb	140 103
Max. milling head drive rating	kW hp	28 38
Main spindle speed	rpm	4,000
Cutter speed	rpm	4,000 (up to 12,000 as an option)

EMAG SU VERTICAL AND HORIZONTAL HOBBING MACHINES

VERTICAL HOBBING MACHINES

HORIZONTAL HOBBING MACHINES

CLC SERIES

The hobbing machines are characterized by a stable structure with hand-scraped tangential axes. Both the table and the milling head are equipped with direct-drive axes. Processing can be done with oil, with emulsion, or dry. To order, a range of options can be installed in the machines, such as equipment for skiving, milling single parts, measuring on the machine, and a deburring and chamfering device. Shafts, worm wheels, and gear wheels can be manufactured on the machines, making the series an innovative solution for the hobbing process.

VERTICAL HOBBING MACHINES

The machines can be equipped with NC-controlled 2-station or 4-station ring loaders. Robotic loading and an optional deburring and chamfering unit are available. This means that these machines can be used to produce gear wheels, gear shafts and worm wheels economically.

HORIZONTAL HOBBING MACHINES

Gear wheels, worm wheels, and long toothed shafts can be machined on the horizontal hobbing machines with excellent results. Retooling for new workpieces can be completed quickly, which makes the machine very interesting for single parts and small series. Furthermore, an optional automation system is available. On the CLC 260 H, worm shafts can also be milled with a milling cutter. For this purpose, an attachment spindle is installed on the standard milling head.

Optionally, these machines can be equipped with a steady rest that can be moved to the appropriate position on an additional NC axis.

TECHNICAL DATA	Max. module range (mm/in)	Axial travel (mm/in)	Max. diameter (mm/in)
CLC 200	5 (7)	400 16	200 8
CLC 300	8	400 (600) 16 (24)	350 14
CLC 500	10	600 24	500 20
CLC 600 W	24	1,000 39	800 32
CLC 900 W	24	1,000 39	1,000 39

TECHNICAL DATA	Max. module range (mm/in)	Axial travel[2] (mm/in)	Max. diameter (mm/in)
CLC 260 H[1]	6	1,500/2,000 59/79	260 10
CLC 500 H	22/26/30	2,000/3,000[2] 79/118	500 20

1) Worm milling

2) Longer versions on request

EMAG SU GEAR SHAPING MACHINES

GEAR SHAPING MACHINE

CLC-SZ SERIES

Thanks to an innovative modular system, this series is extremely flexible and can be easily configured for any machining task involving gear wheels and shafts. A wide range of options is available for this purpose, such as an electronic inclined guideway for shaping gears with an angle of inclination, shuttle shaping, keyway shaping and the production of crowns/tapers using the CNC controller.

The machines are available with and without a retainer and with automation.

As an option, the machine can be equipped with a tool changer so that roughing and finishing tools can be exchanged, which means that process and tool costs can be reduced.

TECHNICAL DATA	Max. module range (mm/in)	Axial travel (mm/in)	Max. diameter (mm/in)	Gearing width (mm/in)
CLC 200 SZ	6	400 16	200 8	150 6
CLC 300 SZ	7	400 16	300 12	200 8
CLC 500 SZ	10	500 20	500 20	150 (200) 6 (8)
CLC 750 SZ	10	600 24	800 31	200 (250) 8 (10)
CLC 1000 SZ	12	600 24	1,000 39	250 (300) 10 (12)
CLC 1500 SZ	12	700 27	1,500 59	250 (300) 10 (12)

EMAG SU GEAR SHAVING MACHINES AND SHAVING CUTTER GRINDING MACHINES

GEAR SHAVING

RASO 200 – RASO 400

The entire manufacturing process must be considered for gear shaving: machines, cycles, tools that include a provision for the hardening process, fixtures, automation, etc. With our shaving machines, developed by the experts at EMAG SU, we can significantly improve the performance and quality of your shaving process.

Gear shaving takes place before the hardening process and produces low-noise gears. This makes it a cost-effective alternative to gear grinding. EMAG SU machines have a modular design and can be configured with three, four, or five NC axes.

Deburring, oil slinging, marking, and optical component recognition are available as options. All common shaving processes such as plunge, parallel, underpass, diagonal and combined cycles can be used.

TECHNICAL DATA		RASO 200	RASO 400
Max. external diameter	mm in	200 8	400 16
Module range		0.5/5	1/8
Max. face width (plunge)	mm in	100 (42) 4 (1.5)	160 6.5
Number of CNC axes (optional)		3 (5, 7)	5 (7)

GRINDING & SHARPENING SHAVING TOOLS

GS 400

The GS 400 tool grinding machine sets new standards in terms of accuracy, reliability and productivity when sharpening shaving cutters and grinding master wheels.

Shaving cutters or high-precision test wheels can be ground on the shaving cutter grinding machine. Through the point contact of the grinding wheel and the workpiece, all conceivable modifications can be made to the gear wheel. The machine concept, with its linear motors and direct drives, is state of the art and all axes are NC-controlled.

TECHNICAL DATA		GS 400
Min./Max. workpiece diameter	mm in	68 – 400 2 – 16
Max. module range		0.5/15
Max. face width	mm in	70 (90) 3 (3.5)

EMAG SU HORIZONTAL PROFILE GRINDING MACHINES

UNIVERSAL HORIZONTAL PROFILE GRINDING MACHINES

G SERIES

These highly flexible production machines from EMAG SU can be configured with or without a tangential axis (GP). Interchangeable spindles for different grinding wheel sizes mean that components with collision points can also be machined. Linear motors in the main axes ensure durable operation with a low wear.

The machines of the G Series are ideal for the profile grinding of straight and angled internal and external gears, trapezoidal screws, ball screws, crown wheels, extruder shafts, hydraulic pumps, worms, small rotors and screw-type workpieces. Optionally, straight or angled internal gears can also be ground with very small grinding wheels. The machine software is able to dress involute and non-involute profiles according to XY coordinates. The profile is automatically corrected by measuring in the machine or in a closed loop to an external measuring machine.

The profile grinding machines in the GW Series from EMAG SU have been specially developed for the high-precision grinding of long screw-type profiles, such as single-shaft extruders for plastic injection molding or recirculating ball screws. Optionally, these machines can be equipped with a tool changer (TC) and automatically moving steady rests.

TECHNICAL DATA		G 375 H	G 500 H/HL	GP 500 H/HL	GW 3600 H/TC
Max. workpiece diameter	mm in	375 15	500 20	500 20	500 20
Max. module range		15	0.5 – 22	0.5 – 15	10
Max. workpiece length	mm in	870 34	1,250 (2,100) 49 (83)	1,250 (2,100) 49 (83)	3,200 126
Dia. of vitrified-bonded grinding wheels	mm in	12/300 1/2 /12	12/360 1/2 /14	12/300 1/2 /12	240/360 9/14
Max. workpiece weight	kg lb	350 771.5	350 771.5	350 771.5	500 1,102
Number of axes		4	4	5	4 (5)
Internal grinding head		□	□	□	

EMAG SU GENERATING GRINDING MACHINES

VERTICAL GENERATING GRINDING MACHINES

G 160 – G 250 – G 400 – G 250 HS

EMAG SU offers a range of generating grinding machines for the machining of gears and shafts from small series to large series production. Customer-oriented solutions, such as topological grinding and fine or polishing grinding, are paramount.

Due to its innovative axis concept with a chip-to-chip time of less than 2 seconds, the G 160 is one of the fastest generating grinding machines on the market and is ideal for large series.

On the larger generating grinding machines (G 250/G 400), components can be profile-ground and generating-ground, which also makes them interesting for smaller series.

The G 250 HS is equipped with a high-speed head. This means that components with collision points can undergo profile and generating grinding on the main spindle using very small grinding wheels.

All machines can be operated using automation.

TECHNICAL DATA		G 160	G 250	G 400	G 250 HS
Max. workpiece diameter	mm in	160 6	250 10	400 16	250 10
Module range		0.5 – 3	0.5 – 7.0	0.5 – 7.0	0.5 – 5
Max. workpiece length	mm in	300 12	550 21	750 30	550 21
Max. face width	mm in	180 7	380 15	380 15	380 15
Max./Min. grinding wheel diameter	mm in	275/210 11/8	250/160 10/6	300/220 12/8	160/70 6/3
Number of workpiece tables		2	2	1	2
Profile grinding		□	□	□	□

EMAG SU MACHINING WORMS AND ROTORS

HORIZONTAL MILLING CUTTER FOR ROTORS AND WORMS

CLC 260 H-FR (W) – CLC 500 H-FR

The CLC milling cutters are heavy, powerful rotor milling machines. Rotors, rotary piston shafts, and worms can be machined with single-part cutters on these machines. The tool table is equipped with direct drives. Cutters with large diameters and lengths can be accommodated.

The machine can also be configured for dry milling and fitted with a measuring system.

TECHNICAL DATA		CLC 260 H-FR	CLC 500 H-FR
Max. profile height	mm	30	80
	in	1	2.3
Axial travel	mm	1,500/2,000	2,000/3,000
	in	59/79	79/118
Max. workpiece diameter	mm	200	500
	in	8	20
Swivel angle	°	+/- 60	+90/-60

PROFILE GRINDING OF ROTORS AND WORMS

G 375 H – GR 500 HL – GT 500 HL – GW 3600 HD

Profile grinding machines with four and five NC axes are available for profile grinding rotors and rotary pistons.

4-axis concept:

- These machines have a dressing device for grinding with vitrified-bonded grinding wheels (G 375 H, GR 500 HL, and GW 3600 HD).
- The 4-axis machines are suitable for a wide variety of individual parts and for medium batch sizes.

5-axis concept:

- Tangential axis for grinding with roughing (CBN) and finish grinding wheel (CBN or ceramic grinding wheel; GT 500 H and GW 3600 HD).
- The 5-axis machines are highly productive, but can also be used for prototypes or uncommon rotor types (optional dressing device).

CBN grinding wheels:

- EMAG SU can also supply CBN profile grinding wheels for grinding rotors, worms and gear wheels.

TECHNICAL DATA		G 375 H	GR 500 HL	GT 500 H	GW 3600 HD
Max. workpiece diameter	mm	250	400	350	500
	in	10	16	14	20
Max. profile height	mm	30	80	80 (100)	100
	in	1	3	3 (4)	4
Max. workpiece length	mm	870	1,300	1,600	2,500
	in	34	51	63	98
Number of axes		4	4	5	4 (5)
CBN		X	X	✓	✓
Ceramic grinding wheel		✓	✓	✓ (optional)	✓ (optional)

EMAG SU HIGHLY PRODUCTIVE WORM PROCESSING MACHINES

WORM MILLING

CLC 200 FR

The CLC 200 FR milling machine for worm shafts features a milling head for installing milling cutters and a vertical workpiece axis. A 2-station or 4-station NC ring loader is available for the machining process. As an option, an additional process can be integrated at the 90° position of the ring loader.

TECHNICAL DATA		CLC 200 FR
Max. workpiece diameter	mm in	200 8
Worm production		✓
Milling cutter diameter	mm in	240/275 9/11
Tooth depth	mm in	22 7/8
Number of workpiece tables		1
Swivel angle	°	+/- 60

PROFILE GRINDING OF WORMS

GR 250 – GW 250

These profile grinding machines are equipped with a double table, which greatly reduces the chip-to-chip time. The position of the gearing and the oversize are measured at the loading and unloading position, making this machine highly productive.

A measuring system can be installed as an option.

GR 250

The GR 250 has a grinding head for a dressable ceramic grinding wheel.

GW 250

The GW 250 has two parallel grinding spindles for grinding worms, one for the CBN roughing wheel and one for a CBN finish grinding wheel. As an option, this machine can be equipped with a tangential slide, so that rotors can be machined with a CBN roughing and finish grinding wheel. Loading and unloading processes, as well as the measurement of components, are carried out parallel to the machining process. Due to the short workpiece changeover time, the spindle operates almost continuously.

TECHNICAL DATA		GW 250	GR 250
Max. workpiece diameter	mm in	150 6	250 10
Module range		0.7/7	0.7/7
Max. workpiece length	mm in	550 21	550 21
Number of axes		5	4
Number of workpiece spindles		2	2

EMAG SU TOOL GRINDING MACHINE AND DEBURRING MACHINE

TOOL GRINDING MACHINE

HRG 350

The HRG 350 profile grinding machine is suitable for reprofiling and producing hobs and form cutters. These can be helical or threaded hobs.

As an option, worm gear cutters and milling cutters can be ground.

The tools to be ground can have involute and non-involute profiles.

Ceramic grinding wheels are used. A dressing unit is incorporated into the machine.

TECHNICAL DATA		HRG 350
Max. cutter diameter	mm in	300 12
Max. module range		0.6 – 10 (25 as an option)
Max. grinding length	mm in	450 17.5
Grinding wheel diameter (profile + relief grinding)	mm in	30/100 1.5/4

CHAMFERING AND DEBURRING

SCT 3

Components are chamfered and deburred with the help of a roller deburring tool on the SCT 3 chamfering and deburring machine. The material is pressed to the flat surfaces via a forming process and removed with secondary deburring disks.

TECHNICAL DATA		STC 3
Max. external diameter	mm in	25/350 1/14
Max. workpiece length	mm in	500/750 20/30
Max. gearing length	mm in	200 8
Module range		1/8
Number of tool heads		2

EMAG ELC SERIES

ELC 160

The ELC 160 is a modular system concept, which can be configured for a wide range of tasks. The ELC 160 can be fitted with all laser technologies. Whether you are using a CO_2 laser or fiber-guided systems (fiber, disk) – anything is possible.

The ELC 160 is suitable both for manual loading and for automatic loading which enables it to be adjusted flexibly to the production concept and logistics.

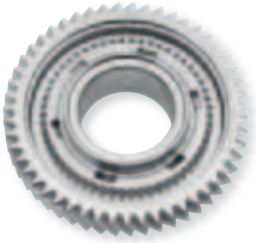
EXPANSION STAGES/ADDITIONAL FUNCTIONS:

+ Joining/Press-fitting of the individual components
+ Inductive preheating/postheating
+ Brushing the weld seam
+ Laser marking
+ Workpiece measurement

ELC 160 HP

EMAG's ELC 160 HP is a system that has been specially developed to meet the requirements of transmission production. Our consistent striving for maximum productivity in large-scale production by drastically reducing cycle times makes this machine one of the most efficient laser welding systems on the market.

The secret of the high productivity levels achieved by the ELC 160 HP is the simultaneous use of three key technologies that EMAG has perfected over the last few years: thermal joining, inductive heating and laser welding. The modular machine design, which allows the machine to be fully adapted to every workpiece, as well as the use of up to three joining punches, two inductors, and three welding guards in the production process, make this a highly flexible system for the manufacturing of gear wheels.



ELC 250 DUO

The ELC 250 DUO uses the pick-up principle – its spindle loads itself using the pick-up method and positions the workpiece for the welding lens or other process modules.

The ELC 250 DUO has two independent machining stations. In this way, different workpieces can be machined simultaneously or complex follow-up machining can be carried out (e.g., laser cleaning/joining/welding/brushing/inspection). This allows maximum technological flexibility to be achieved and productivity to be increased.

The principle of the stationary lens allows all laser technologies to be integrated. The ELC 250 DUO can therefore be fitted both with modern solid-state lasers (fiber, disk) and with CO_2 lasers. Various lenses are available to suit the task in hand.

EMAG ELC 6 · ELC 600

ELC 6

The EMAG ELC 6 is a production laser welding system for maximum output and is ideal for classic powertrain components with round welds. The machine is based on a rotary indexing system with a machining station and a loading and unloading station.

THE MAIN FEATURES OF THE ELC 6 ARE AS FOLLOWS:

+ Maximum operating safety thanks to the "Fixed lens/moving workpiece" principle
+ Rotary indexing system to achieve the best possible cycle time
+ Initial tension for welding up to max. 10 kN possible (30 kN available as an option)
+ Compact design and excellent accessibility
+ Short retooling times
+ Minimization of equipment and change parts
+ Low operating costs using high-efficiency lasers and mainly electric drive units rather than pneumatics and hydraulics
+ High level of flexibility in terms of technology, output, and automation

TECHNICAL DATA		ELC 6
Max. external diameter	mm in	300 12
Max. workpiece height	mm in	300 12
Axial welding diameter	mm in	75/200 3/8
Radial welding diameter	mm in	75/250 3/10

ELC 600

The ELC 600 from EMAG LaserTec is a system for laser welding large workpieces. This makes the machine ideal for components from the commercial vehicle segment, for example, for truck differential housings. These components weigh up to 130 kilograms and have a diameter of up to 600 millimeters.

TECHNICAL DATA		ELC 600
Max. workpiece diameter	mm in	600 24
NC axis		3 (XCW), optional + 2 XB (lens) + 1 torque test W
Max. fixtures		3
Max. workpiece height	mm in	600 24
Weld counter bearing, 1x radial/axial		1/3
Max. welding clamping force	kN	100
CNC controller		SIEMENS SINUMERIK 840D sl
Torque testing system	Nm ft-lb	65 48
Max. solid-state laser	kW hp	8 10
Welding lens		PRECITEC YW52 or others
Sensors		PRECITEC LWM, weld detection device EMAG EC Seam or others




EMAG ELC 1200 V · ELC 1200 H

ELC 1200 V

The vertical laser welding machine ELC 1200 V is designed for workpieces up to 1,200 mm in length and impresses with its fast processing, a small footprint and extreme ease of operation. The ELC 1200 V offers maximum flexibility in production. The 3-axis laser lens is NC-controlled and can be configured to meet a wide variety of individual requirements. In combination with the NC-controlled C-axis of the clamping device, the welding lens can also produce interpolated welds. This means that, for example, a quick conversion for laser welding of families of parts can be implemented without any problems. The clamping system is, of course, just as flexible as the laser lens. The key highlight, however, is the HMI (Human Machine Interface) with which the machine can be controlled and programmed.

TECHNICAL DATA		ELC 1200 V
Max. workpiece diameter	mm in	300 12
Max. workpiece length	mm in	1,200 47
Min. workpiece length	mm in	50 0.2
Max. workpiece weight	kg lb	10 22
Workpiece position		Vertical
Max. fixtures	Qty	2
NC axis		QCC (table) + XZB (lens)
CNC controller		SIEMENS SINUMERIK 840D sl
User interface		EMAG EDNA HMI

ELC 1200 H

The ELC 1200 H is a production laser welding machine for shaft-type components. It can be loaded and unloaded either manually or with automation. A modular automation kit is available for this purpose to cover a very wide range of requirements in terms of material flow and parts types.

TECHNICAL DATA		ELC 1200 H
Max. workpiece diameter	mm in	100 4
Max. workpiece length	mm in	1,200 47
Min. workpiece length	mm in	50 0.2
Max. workpiece weight	kg lb	20 44
Workpiece position		Horizontal
Max. fixtures	Qty	2
NC axis		Q (table) + UUAA (device 1) + UUAA (device 2) + XZB (lens)
CNC controller		SIEMENS SINUMERIK 840D sl
User interface		Siemens OP012

EMAG LC 4 · ELC 1300 LH · SFC 600

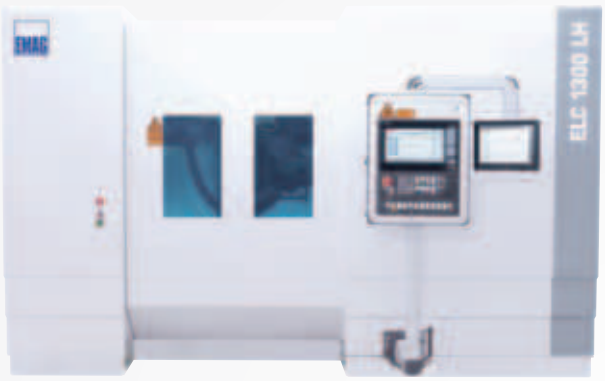
LC 4

The LC 4 laser cleaning machine evaporates the impurities on surfaces using a high-energy laser beam.

The machine is designed for components with a maximum diameter of 200 mm and a maximum height of 350 mm. To order, the laser lens can be aligned by the NC controller.

TECHNICAL DATA		LC 4
Footprint (without suckers)	mm in	1,500 x 3,050 60 x 120
Laser capacity (fiber laser)	D	200
Max. axis speed (rapid-traverse) X-/Z-axis	m/s in/s	0.4/0.5 0.01/0.02
Typ. C-axis feed rate	m/s in/s	0.05 0.002
CNC controller		Sinumerik 840D sl

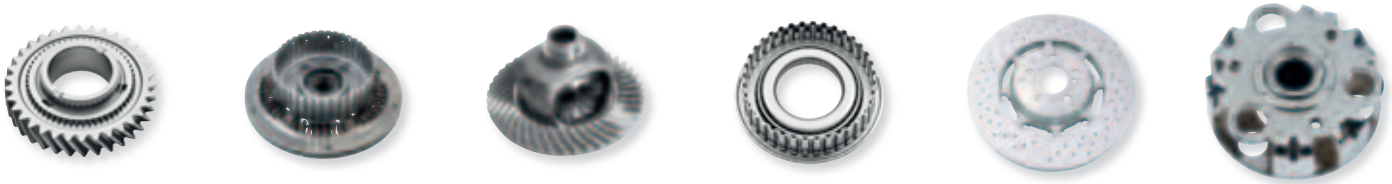
ELC 1300 LH



The ELC 1300 LH is a production laser hardening machine developed for laser hardening shaft-type workpieces such as special tools with HSK interfaces. The machine design with an NC moving lens minimizes the programming work for new workpieces. This means that the machine can be very easily retooled to handle a very wide range of workpieces with similar hardness values.

Its kinematic design also makes the machine suitable for laser welding or coating shaft-type parts with lengths of up to 1,300 mm and a diameter of up to 400 mm.

TECHNICAL DATA		ELC 1300 LH
Max. workpiece diameter	mm in	400 16
Max. workpiece length	mm in	1,300 51
Max. workpiece weight	kg lb	50 110
Max. fixtures	Qty	1
NC axis		4 (XYZB) + 3 CCW (workpiece)
CNC controller		SIEMENS SINUMERIK 840D sl
User interface		Siemens OP012

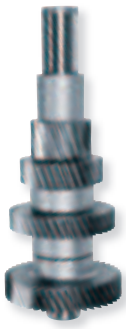


SFC 600

The joining machine SFC 600 features our patented thermal stress-free joining process combining precision and high flexibility for the heat shrinking of components (cams, bearing rings, sensor wheels, etc.) onto camshafts.

The efficiency of the machine is mainly the result of its modular design with short cycle times and quick retooling times.

TECHNICAL DATA		SFC 600
Max. workpiece diameter	mm in	40 1.5
Max. component diameter	mm in	70 3
Max. workpiece length	mm in	600 23.5
Joining axis travel, X/Y/Z	mm in	1,000/150/600 39.5/6/23.5



EMAG (P)ECM SYSTEMS

PREMIUM INTEGRATED (PI)

The PI machine with its die-sinking, deburring, rifling, or oscillation module and integral electrolyte management system is a compact entry-level machine to the (P)ECM precision machining process:

+ Modular design
+ Machining area: die-sinking module, oscillation module, rifling module, or deburring module
+ Scalable generator technology up to 2,500 A
+ DC, pulse and PECM technology
+ Flexibly configurable pulse technology
+ Individual cathodes can be selected/deselected
+ Single cathode monitoring
+ Process control using time, distance, and ldt
+ Touch panel and S7-1500 controller from Siemens
+ Conductivity monitoring
+ Temperature control
+ pH value control with metering
+ Can be transported with a forklift truck

Options:

» Microfiltration
» Fast short-circuit shutdown
» Automatic cathode cleaning
» Oscillation at up to 100 Hz and stroke from 0 to 0.6 mm
» C-axis for interpolated multiple die-sinking movement
» IoT Ready
» Automation interface
» Single nest pressure control
» Single nest flow monitoring
» Automatic machining area door

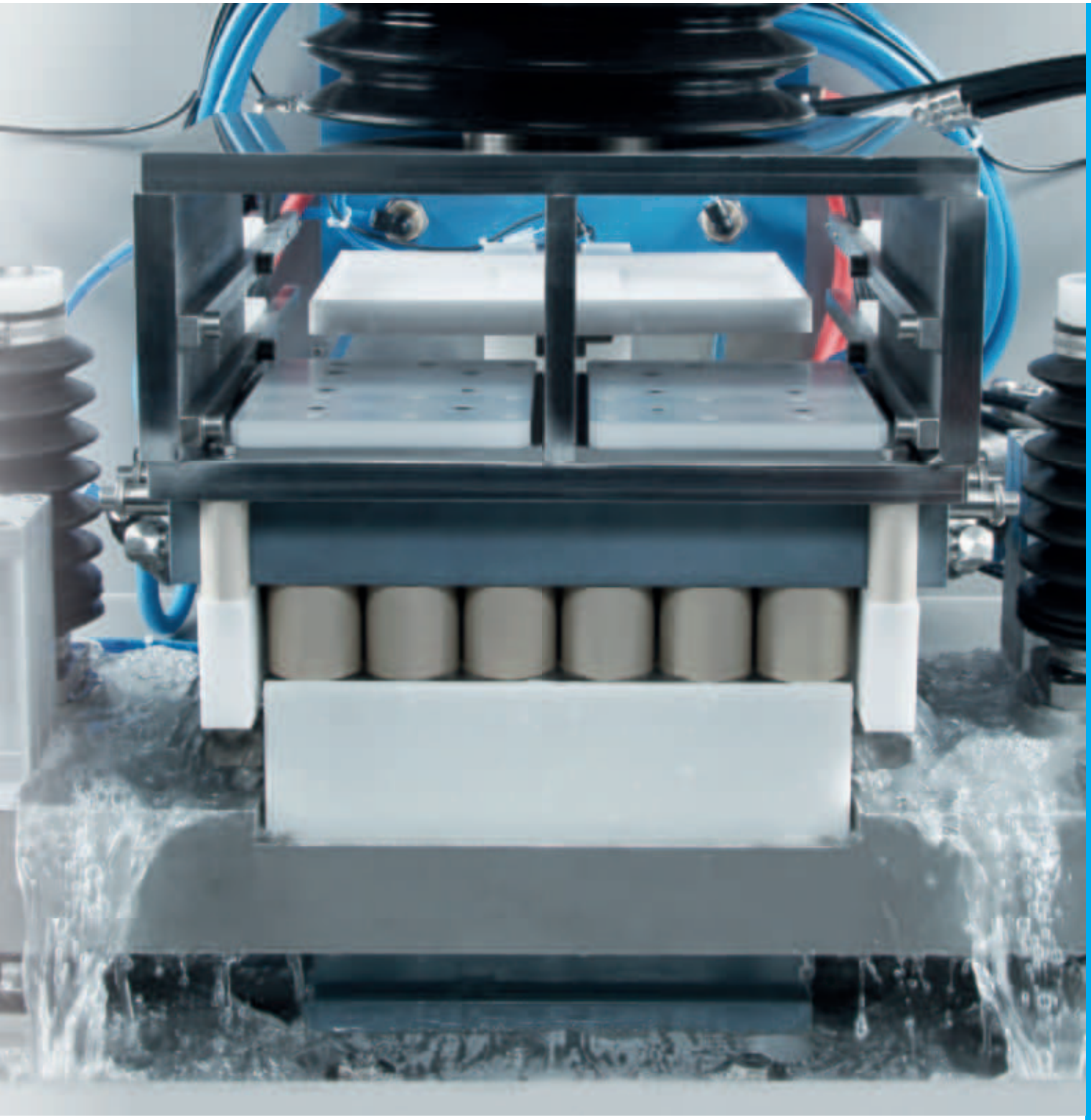
PREMIUM STANDARD (PS)

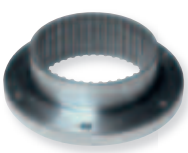
The PS machine with its die-sinking, deburring, or oscillation module is the parallelizable machine platform for (P)ECM precision machining:

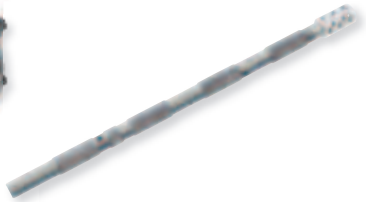
+ Machining area: die-sinking module, oscillation module or deburring module
+ Scalable generator technology up to 2,500 A
+ DC, pulse and PECM technology
+ Flexibly configurable pulse technology
+ Individual cathodes can be selected/deselected
+ Single cathode monitoring
+ Process control using time, distance, and ldt
+ In the form of a die-sinking module: 400 mm Z stroke
+ In the form of an oscillation module: 200 mm Z stroke
+ Touch panel and S7-1500 controller from Siemens
+ Conductivity monitoring
+ Temperature control
+ pH value control with metering

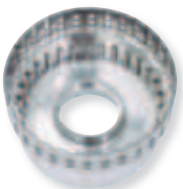
Options:

» Fast short-circuit shutdown
» Automatic cathode cleaning
» Oscillation at up to 100 Hz and stroke from 0 to 0.6 mm
» C-axis for interpolated multiple die-sinking movement
» IoT Ready
» Automation interface
» Can be combined with all electrolyte management systems from 20 to 600 l/min
» Automatic machining area door



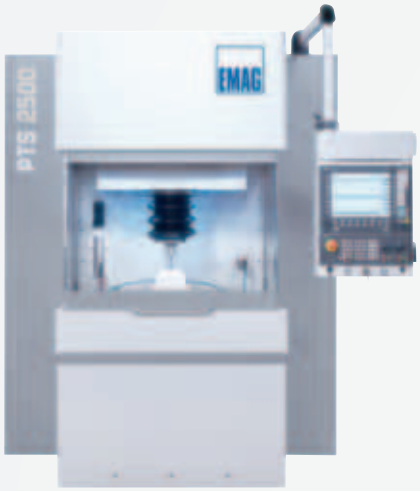






EMAG PECM SYSTEMS

PTS

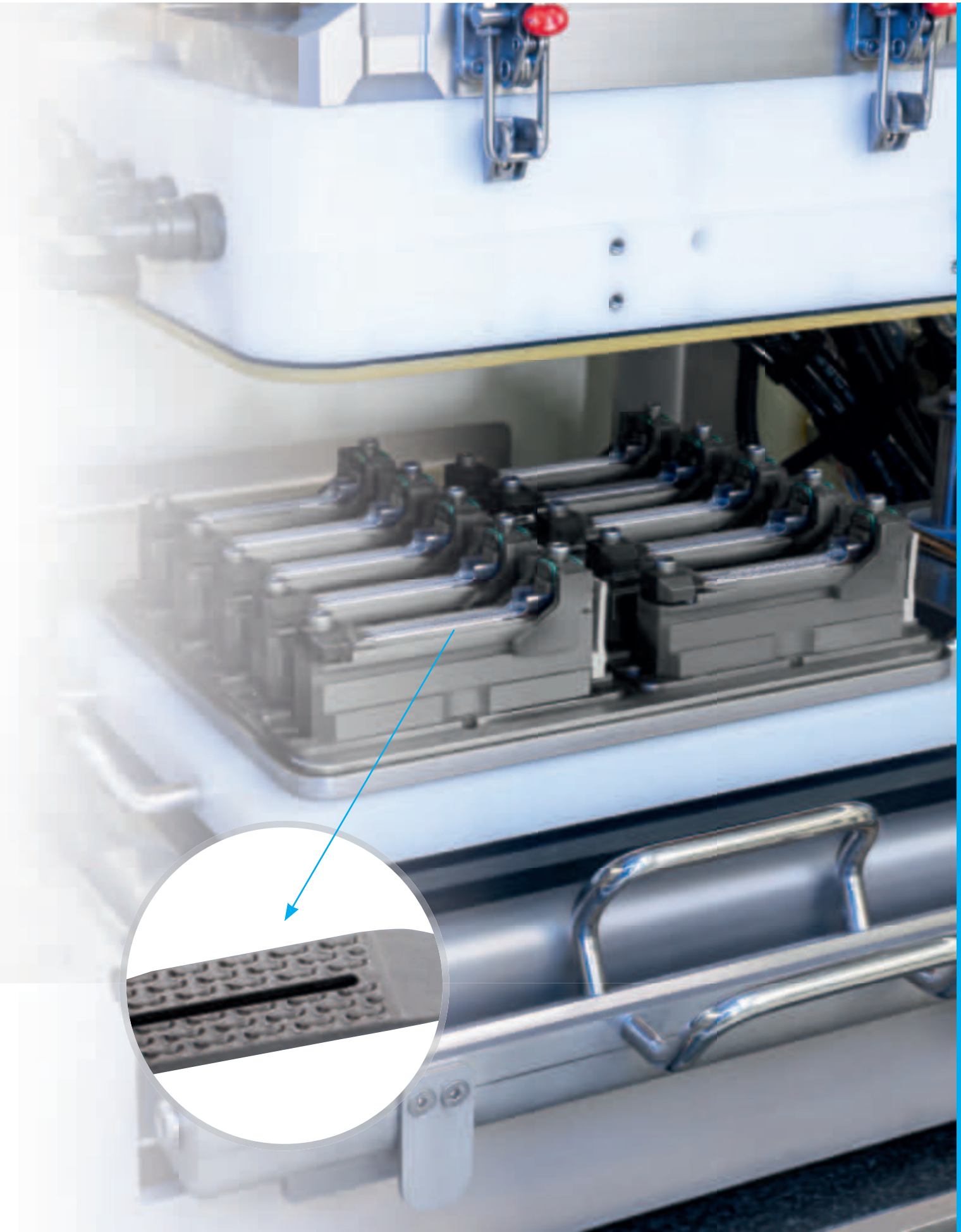


The economical solution for PECM process development and for the PECM machining of challenging 2D and 3D geometries.

+ Scalable generator technology up to 12,000 A
+ DC/Pulse/PECM technology
+ Flexibly configurable pulse technology
+ Fast short-circuit shut-down
+ Process control using time/distance/ldt
+ Machine base made of Mineralit
+ Clamping table: 800 x 550 mm (W x D)
+ Machining area: 1,070 x 700 x 515 mm (W x D x H)
+ Footprint: 2,100 x 3,200 x 2,900 mm (W x D x H)
+ Oscillator with play-free precision drive
+ Z-axis with 350 mm stroke and max. 25 kN axial load
+ Hydraulic zero point clamping system
+ Siemens Sinumerik 840D sl controller

Options:

» Individual cathodes can be selected/deselected
» Single cathode monitoring
» Single nest pressure control
» Single nest flow monitoring
» Automatic machining area door
» Cathode cleaning
» XY worktable
» C-axis
» Scalable electrolyte management systems
» IoT Ready
» Automation interface
» Oscillation at up to 100 Hz and stroke from 0.05 to 0.6 mm



EMAG PECM SYSTEMS

PO 100 SF

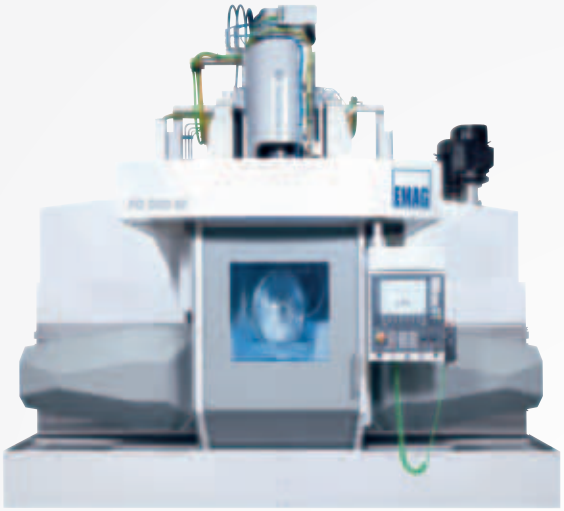
The economical solution for the synchronous machining of both sides of turbine blades.

+ Scalable generator technology up to 24,000 A
+ DC/Pulse/PECM technology
+ Single cathode monitoring
+ Fast short-circuit shut-down
+ Process control using time/distance/ldt
+ Machine base made of Mineralit®
+ Clamping table: 370 x 450 mm (W x D)
+ Machining area: 750 x 600 x 360 mm (W x D x H)
+ Footprint: 2,800 x 2,300 x 2,600 mm (W x D x H)
+ Oscillator with play-free precision drive
+ X1-/X2-axis with 200 mm stroke and max. 25 kN axial load
+ Y-axis for interpolated feed: 100 mm stroke
+ Hydraulic zero point clamping system
+ Siemens Sinumerik 840D sl controller

Options:

» Parallel machining of blades
» Cathode cleaning
» Scalable electrolyte management systems
» IoT Ready
» Automation interface
» Single nest pressure control
» Single nest flow monitoring
» Oscillation at up to 100 Hz and stroke from 0.05 to 0.6 mm

PO 900 BF



The alternative for the traditional machining of blisks and IBRs:

+ Scalable generator technology up to 12,000 A
+ DC/Pulse/PECM technology
+ Flexible step technology and type management
+ Fast short-circuit shut-down
+ Process control using time/distance/ldt
+ Machine base made of Mineralit®
+ Component diameters of up to 900 mm
+ Workpiece weight up to 300 kg
+ Footprint: 4,400 x 6,600 x 4,500 mm (W x D x H)
+ Oscillation at up to 50 Hz and stroke from 0.05 to 0.9 mm
+ Oscillator with play-free precision drive
+ X1-/X2-axis with 250 mm stroke and max. 50 kN axial load
+ Compound slide for holding workpieces with Y-/Z-axis, C-axis, and B-axis
+ X-, Y-, Z-, and C-axis with interpolated feed
+ Zero point clamping system for cathodes and workpiece
+ Siemens Sinumerik 840D sl controller

Options:

» Cathode cleaning
» Scalable electrolyte management systems
» IoT Ready
» Automatic machining area door

ELECTROLYTE MANAGEMENT SYSTEM (EMS)

Both systems with chamber filter presses and with microfiltration are available for filtration purposes. The filtrate quality and volume can thus be tailored precisely to requirements. Systems from 40 to 900 l/min filtration capacity are available as standard.

High reproducibility of the machining result is assured by monitoring conductivity, temperature, pressure, flow rate, and pH value. The sludge can be discharged either manually or automatically depending on cutting volume and can be designed to operate without interrupting production on request.

EMAG TRACKMOTION 4/8

TRACKMOTION 4/8

TrackMotion is a linking system to connect two or more VL/VLC or VT/VTC machines and additional components such as feeding and discharge belts, measuring equipment, etc. The TransLift lift and turn-over unit runs on a modular rail system and features a programmable electric gripper which can transport and turn workpieces.

		TM 4-20		TM 8-70	
TECHNICAL DATA		**VL 2**	**VL 4**	**VL 6**	**VL 8**
Max. workpiece diameter	mm in	100 4	200 8	300 12	400 15.5
Max. workpiece length	mm in	150 6	200 8	250 10	300 12
Max. workpiece weight (gripper)	kg lb	20 44	20 44	70 154	70 154
Distance between transport and pick-up	mm in	1,200 47	1,425 56	1,515 59.5	1,830 72
Horizontal travel speed	m/min ipm	150 5,907	150 5,907	150 5,907	150 5,907
Vertical travel speed	m/min ipm	35 1,378	35 1,378	35 1,378	35 1,378
Time for turning through 180°	sec.	1.2	1.2	1.7	1.7
Max. horizontal travel length	m ft	20 85.5	20 85.5	20 85.5	20 85.5
Stroke in Z (TransLift)	mm in	450 17.5	450 17.5	650 25.5	650 25.5
Speed	rpm	6,000	4,500	3,100	2,850

EMAG SCS 1/4
EMAG BIN-PICKING CELL

SCS 1/4

Highly productive manufacturing with a minimum footprint – that is what the SCS Series stacking cells deliver. Whether they are for machining chucked parts or shaft parts, EMAG machines become compact, fully automated production systems that can produce autonomously for hours when combined with the SCS stacking cells. Depending on the diameter of the workpieces being machined, EMAG can supply the automation system in two sizes: the SCS 1 for parts up to around 200 mm in diameter and the SCS 4 for components up to around 400 mm in diameter, including an automatic palletizing device with a pallet pick-and-place unit. The parts are handled and the machines are loaded and unloaded by a robot. Naturally, the integration of components from any major manufacturer is always possible.

TECHNICAL DATA		SCS 1	SCS 4
Workpiece size up to approx.	mm in	200 8	400 16
Max. basket/pallet size (height is adjustable)	mm in	600 x 400 24 x 16	600 x 500 24 x 20
Max. basket/pallet weight (incl. workpieces)	kg lb	- -	25 55
Max. pallet drawer weight (incl. workpieces)	kg lb	45 99	- -
Max. weight per unit	kg lb	- -	250 551

BIN-PICKING CELL

The smart automation solution enables machines to be loaded direct from workpiece bins. The vertical pick-up turning machines from EMAG are already highly automated, in other words, both the machining process and the loading and unloading by pick-up spindles from the integral workpiece belt is fully automated. The bin-picking cell allows machines to be loaded direct from a bin. The positions of the raw parts inside the bin are identified in real-time using a 3D camera system. These data are used to control a robot arm, which picks the individual components one by one out of the bin (bin picking), and then places them on the workpiece belt of the machine.

FEATURES

+ 3D camera system
+ Mobile control panel
+ Roller shutter door for fast loading and unloading (optional)
+ Level indicator with residual quantity estimate
+ Gripper with collision monitor
+ Individual grippers to suit component contours
+ Bins can be changed by AGV (automated guided vehicle)

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