Summary

1 EMAG VERTICAL TWO SPINDLE TURNING CENTRE VSC 400 DUO

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1 EMAG VERTICAL TWO SPINDLE TURNING CENTRE VSC 400 DUO

1.1 BASIC MACHINE

1.1.1 1 MINERALIT (CAST GRANITE) MACHINE BED
consisting of two separate sections, to prevent interaction during the machining process. For transport purposes the two sections are mechanically coupled.
The machine bed is manufactured from high quality Mineralit (cast granite) which guarantees superior thermal stability and excellent dampening characteristics. Mineralit has excellent vibration dampening properties which are six to eight times better than cast iron. The large distance between the two high precision pre-stressed linear roller guideways of the X-axis guarantees high accuracy and high dynamics. The guideways are outside the working area and therefore require no protective covers.

1.1.2 1 MACHINING AREA
The machining area is effectively separated from the load/unload area by the two side walls of the Mineralit machine base and a partition wall facing the pick-up station.
A large door at the front of the machine provides access to the machining area(one for each spindle). The door features a safety glass window to DIN EN 12415 specification.
A inspection lamp is installed in the machining area.

1.1.3 2 MULTI-FUNCTIONAL CROSS-SLIDE
This unit is equipped with separate X and Z axes for each spindle. Both spindles can be programmed independently via the CNC control. Short idle times for workpiece exchange and measurement are obtained through high rapid traverse speeds.
The axes drives comprise rapid-reaction, maintenance-free AC synchronous drive with digital controllers. The X- and Z-axis are driven by a motor and a high-precision ball lead screw.
The X- and Z-axis are equipped with completely enclosed linear measuring systems.
On activation of the emergency-off switch or in case of power failure a feed motor with integrated brake will stop the vertical axis.

1.1.4 2 MOTOR SPINDLES
Each spindle headstock with motor spindle.
The motor spindles are a high dynamic frequency controlled service free AC asynchronous spindle motors.
High degree of spindle rigidity due to triple bearing support over a short distance. Precision shoulder bearings arranged in tandem (double-O). Additional bearing at spindle end for length compensation. All bearings are lifetime lubricated and thus maintenance free.
Sealing air to prevent dirt from penetrating from the outside.
The guideway system in the Z axis is equipped with hydrostatic bearings for compensation the cutting forces which guarantee excellent guideway quality by minimum friction.
Thermo-symmetrical design and integrated coolant system guarantee constantly maintained accuracy.
Positioning accuracy of spindle: +/- 0,05 angular degrees (M19)
+/- 0,01 angular degrees (C-axis)

1.1.5	1	ENERGY CONTAINER WITH CONTROL CABINET Equipped to VDE 0113 and EN 60204, part 1 and integrated in the over-all machine frame, thus ensuring a totally transportable unit. 400 V machine voltage, 230 V control voltage (AC)/24 V DC. The power supply of the cross slide and main spindle is totally outside of the machining and swarf area. Easy access to the axis drives, recirculating ballscrews etc. is possible through doors in the side guards or from the top of the machine.
1.1.6	1	HYDRAULIC UNIT The hydraulic unit is equipped with a self regulating pump.
1.1.7	1	CENTRAL OIL SUPPLY SYSTEM for lubrication system of the recirculating ballscrews and guideway systems.
1.1.8	1	SERVICE UNIT FOR COMPRESSED AIR SUPPLY
1.1.9	1	COOLING UNIT (water - air) A cooling unit controls the thermal stability of the machine. Spindle bearings, drive unit, turret and machine base are maintained at ambient temperature (10°C - 42°C). The electrical cabinet is cooled by 20°C.
1.1.10	1	CNC-CONTROL SIEMENS 840 D According to control specification.
1.1.11	1	EMAG WORKPIECE CORRECTION SYSTEM (Control system Siemens 840D and 840Dsl) The EMAG workpiece correction system offers a user interface for the clear and simple correction of workpiece dimensions during the machining process. Control system-specific know-how is not required.
1.1.12	1	EMAG EASY COPY BASIC PACKAGE (Control system Siemens 840D and 840Dsl) This module provides basic file management functions in conjunction with the Siemens data storage system. Unlike the standard user interface, this module allows for the corresponding Siemens functions to be used on any drive and in any directory. Option: integration of network drives.
1.1.13	1	EMAG OPERATING AND SETTING MASKS The EMAG masks offer the setter/ operator optimal support in setting and operating the machine. Multiple base- and monitoring functions including data input are, depending on the machine type, available.

1.1.14 1 EMAG - TELESERVICE - SIEMENS
Control system: Sinumerik 840D and 840Dsl
- Linkage with user network necessary
- Connection via Internet and safe VPN technology to EMAG server
Scope of supply:
- Software for remote maintenance
- No additional equipment is supplied
Content:
- Remote access to NC / PLC / operating system for detailed error diagnosis and the possibility to support the customer in case of queries or problems.
Preconditions:
-Tele-diagnostics via Internet with VPN.
Your advantages:
- Quick, cost-effective support, resulting in reduced downtimes.
- Up-to-date problem solving without lengthy delays.
- Program extensions can be realised at a reduced cost.
- "On-the-spot" co-operation between specialist and operating/service personnel allows for complex errors to be diagnosed, analysed and eliminated quickly.
Use of the equipment past the warranty expiration date will be charged.
Option:
- UMTS-ROUTER
- EMAG REMOTE EXPERTS

1.1.15 1 COLOUR
Machine: light grey to RAL 7035, access door: stainless steel effect, automation, swarf conveyor: grey to RAL 7046.

1.1.16 1 NOISE LEVEL
A maximum sound level of 78 dB(A) to DIN 45635 is obtainded when turning with a continuous cut on a C45 steel disc in both longitudinal and transverse direction. If the workpiece has for example an interrupted cut due to its geometry or its clamping condition there may occur a higher sound level.
For an extra cost sound deadening material can be fitted to reduce this higher sound level.

1.2 ADDITIONAL EQUIPMENT

1.2.1 TOOLING SYSTEM

1.2.2 1 DISC TYPE TURRET C-441, 12xØ50mm DIN69880
Equipped for cylindrical shaft toolholders 50 mm. Quick indexing times are obtained through electromotoric indexing drive with direction logic. The coolant system guarantees constantly maintained accuracy. With internal coolant feeding to the tools.

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1.2.4 1 ROTARY OIL DISTRIBUTOR FOR TURRET
with three connections, for activation of hydraulic operated twin tool holder.

1.2.6 1 TWIN TOOL HOLDER, HYDRAULICALLY OPERATED, LIFT-OFF TYPE
Includes short-clamping block.
Can be adjusted manually to accommodate discs of 21 to 40 mm thickness.
Max. brake face length 85 mm.
One tool lifts off hydraulically by approx. 0.5 mm.
The second, stationary tool is released using the Z axis.
Cylindrical shank 50 mm dia. DIN 69880-Part 1.

1.2.7 **COMPONENT STORAGE AND TRANSPORT SYSTEM**

1.2.8 1 THROUGH FEED CONVEYOR (Shuttle)
for the component transport through the machine. With each 1 separat prism for the unmachined and machined component.
max. Workpiece dia. 400 mm
max. Workpiece height 160 mm
The pick-up spindle picks up the rough components from the transport conveyor and deposits the machined components onto the conveyor. The components are automatically positioned for pick-up by the pick-up spindle.
Various component diameters and heights are defined in the NC program.

1.2.9 1 SET OF WORKPIECE PALLETS
1 pallet for Op10 semi-finished parts
1 pallet for Op20 finished parts

1.2.10 1 WORKPIECE LOADING AND UNLOADING by motorised friction roller conveyors
Workpiece diameter: 100 - 400 mm
Length: approx. 2000 mm
Conveyors mounted to left and right of machine.
Workpiece separation, quick-change facility to adjust loading device to different workpiece diameters.

1.2.11 1 TURNAROUND STATION
The semi finished component from spindle 1 is placed on the transport conveyor is taken outside the machine turned through 180 ° and returned to spindle 2 for the second side machining.
One set of grippers is included.

1.2.12 1 SAFETY ENCLOSURE
Enclosure covering moving automation components. 2 Access doors mechanically and electrically lockable.

1.2.13 1 SCRAPER-TYPE SWARF CONVEYOR
Usage: for short swarf, in particular grey cast iron.
Swarf exit height 1250 mm.

1.2.14 **COOLANT AND SWARF DISPOSAL SYSTEM**

1.2.15 1 CENTRAL EXTRACTOR UNIT (PREPARATION)
2 connectors for central extractor unit, mounted at the machining area.
Diameter 2x 150 mm.

1.2.16 2 AIR BLAST DIRECTED AT THE PICK-UP UNIT AND CLAMPING CHUCK
For the cleaning of the pick-up unit and the clamping chuck by air blast. The air is processed by a service unit and directed at the component through 2 nozzles.

1.2.17 QUALITY CONTROL SYSTEM

1.2.19 OPTIONAL EQUIPMENT FOR CNC CONTROL

1.2.21 1 EMAG ODL (Operational Data Log)
(Control system Siemens 840D - as of software version 6 and 840Dsl)
- Confirmation of technical availability,
  including evaluation of operating status (production, malfunction, service, ...)
  outage analysis
- Machine utilisation
- Cycle time analysis
  quantity of components produced during shifts, fixed periods
  comparisons over various periods
- OEE (Overall Equipment Effectiveness)
- Detailed evaluation of alarms
- Export function under preparation
- Optional: visualisation on external PC possible
  (dependent on customer specification)

1.2.23 1 DRY MACHINING OF CAST IRON -AUXILIARY EQUIPMENT
FOR 2-SPINDLE MACHINE
Equipment for the machining of cast iron, to protect machines against abrasive dust, comprising:
A special wiper mounted in the spindle sleeve flange.
Bypass filter with 2 µm cartridge, to filter the hydraulic oil.
Ball screw cover with bellows.
Air seal for linear measuring systems. Capacity 5 litre/min. including filter combination, pressure regulator and connector with integrated flow control.
It is imperative that a central or a separate dust extractor is fitted.
Air flow for VSC x TWIN of at least 1500 m3/h.
Air flow for VSC x DUO of at least 3000 m3/h.

1.2.24 OTHER AUXILIARY EQUIPMENT

1.2.25 1 3-COLOUR STATUS LIGHT
mounted on machine. Colour code:
red: machine stopped
yellow: warning -tool to be changed,
-lubricant running low, etc.
green: machine in automatic cycle.

1.3 COMPONENT RELATED EQUIPMENT

1.3.1 TOOL EQUIPMENT

1.3.2 1 TOOL PACKAGE (OP10 & OP20)
are to be supplied by the customer according to EMAG tooling layout.

1.3.3 CHUCKING SYSTEM

OP 10

1.3.4 1 ROTATING SOLID CENTRE HYDRAULIC CHUCKING CYLINDER SIN125
Max. drawbar force 7.175 daN at 70 bar.
The clamping pressure is infinitely adjustable and controlled by a pressure switch. The clamping cylinder stroke is controlled by a linear measuring system.

1.3.5 1 CONNECTING PARTS
for 3 jaw power chuck
consisting of flange and draw bar adapter

1.3.6 1 3 JAW POWER CHUCK Ø KFD-315/3F
with centrifugal force compensation

OP 20

1.3.8 1 ROTATING SOLID CENTRE HYDRAULIC CHUCKING CYLINDER SIN125 -
AIR SENSING
WITH WORKPIECE POSITION MONITORING (SIEMENS)
Max. drawbar force 7.175 daN at 70 bar.
The clamping pressure is infinitely adjustable and controlled by a pressure switch. The clamping cylinder stroke is controlled by a linear measuring system.

The position of the workpiece in the clamping fixture is monitored by measuring the air pressure between the part stop and the component.
The air supply is controlled by a directional valve.
The air flow is cleaned by a service unit and sent through the main spindle.
NOTE:
Equipping the clamping fixture with a pneumatic system monitor is not included in the price of this item.

1.3.9 1 CONNECTING PARTS
for 3 jaw power chuck
consisting of flange and draw bar adapter

1.3.10 1 3 JAW POWER CHUCK KFD-280/3NF
with pull down action and centrifugal force compensation

1.5.2 1 CNC CONTROL SIEMENS
SINUMERIK 840 D with integrated PLC S7-300

Operator panel with TFT color monitor consisting of OP010 + PCU50 +
Control panel (MCP483)
Operator software HMI-Advanced with HMI-Pro
Screen language and on-screen messages in German / English / in official EU language, more languages available as an optional (see ENO S 00.00.001)
CNC program and data memory 3.0 Mbyte, up to 6 MB additional memory is available as an option.
USB-interface (front) for memory-stick or USB-disk drive.
Machine diagnostics via internet with VPN technology to verify EMAG's standard format (ENO S 00.00.002)
Software backup is to external media (CompactFlash-Card included and installed in the PCU50 slot) to verify EMAG's standard format (ENO S 00.00.003)

Optional:
- Simatic USB-Flashdrive (Id.-No.: 9007220)
- Simatic USB-Disk drive (Id.-No.: 6894901)
- Ethernet port (operator panel or electrical cabinet)
- V24-port (Id.-No.: 9565441)
- GHOST backup of hard disk to DVD after final acceptance of machine
- EMAG-BDE (Id.-No.: 20008337)
- EMAG-TPM (Id.-No.: 20008338)

Optional tool monitoring:
- Montronix
- Toolinspect

The control system is designed for a maximum ambient temperature of 45° C.

EMAG ADD-ON FUNCTIONS
Machine-specific documentation of functions and parameters is available directly on the control unit. (PDF display)
Automatic return to the home position upon machine error. Error recovery is a simple one button process.
First run high speed traverse is at a reduced speed from home to the first cut. Reduced speed allows you to avoid a collision and save damaged equipment and reprogramming costs.
Internal measuring probe with collision monitoring on the traversing movements (Option).
Automatic workpiece gaging when switching to a replacement tool or tool insert (Option).
Automatic filling and emptying of the entire machine.
"Optional Stop" (M01) allows you to make a programmed stop or interrupt production after finishing a part at a desired point.
Single cycle: Allows one part to be transferred and machined for setup and tryout purposes.

Structured workpiece programming:
Division of individual programs into subprograms, e.g. the program for the machining contains only the technology program and not the loading part.
The loading program has individual parameters. Division into machine and work piece specific parameters.

Programmable chuck with length measuring system in the pull rod.
Different clamping situations (Unclamped, Clamped and Over stroke) can be changed by parameter assignment. Displayed by diagnostics menu.
Recording and displaying of the most important production data: work piece counter, shift counter, cycle time, work piece status.
Production of definable batch sizes. The machine stops upon reaching the selected no.
Optimized programming for the turret keeps chips from collecting.
Rinsing of clamping devices after a programmable number of parts
Number and positions of the workpiece carriers can be defined for closed automation.
Lifecycle screen that displays tool wear and tool life.

1.5 MACHINE SPECIFICATIONS

1.5.1 1 TECHNICAL MACHINE DATA VSC400DUO Subject to change without notice

WORKING AREA		
Chuck diameter	mm	315/400
Swing diameter	mm	420
X-stroke	mm	850
Z-stroke	mm	315
MAIN SPINDLE	Qty	2
Spindle flange acc. to DIN 55026	size	11
Spindle front bearing diameter	mm	160
max. spindle speed	rpm	3400
Spindle distance	mm	1055
MAIN DRIVE	Qty	2
AC-Asynchronous motor 40/100% ED	kW	61/45
Full power at spindle speed	rpm	900
Torque at 40/100% ED	Nm	650/480
FEED DRIVE		
Rapid traverse feed, X	m/min	45
Rapid traverse feed, Z	m/min	30
Feed force, X/Z	kN	11
Ball screw diameter X/Z	mm	50/40
TURRET		
Cylinder shaft DIN 69880	2x12fold	
Shaft diameter	mm	50
ELECTRICAL EQUIPMENT according to VDE 0113		
Supply voltage	V	400
Control circuit voltage - DC	V	24
- AC	V	230
Frequency	Hz	50
Total connected load	kVA	100
Input fuse	A	200
DIMENSIONS AND WEIGHT		
Length	mm	4300
Width	mm	2400
Height	mm	3300
Weight	kg approx.	20000