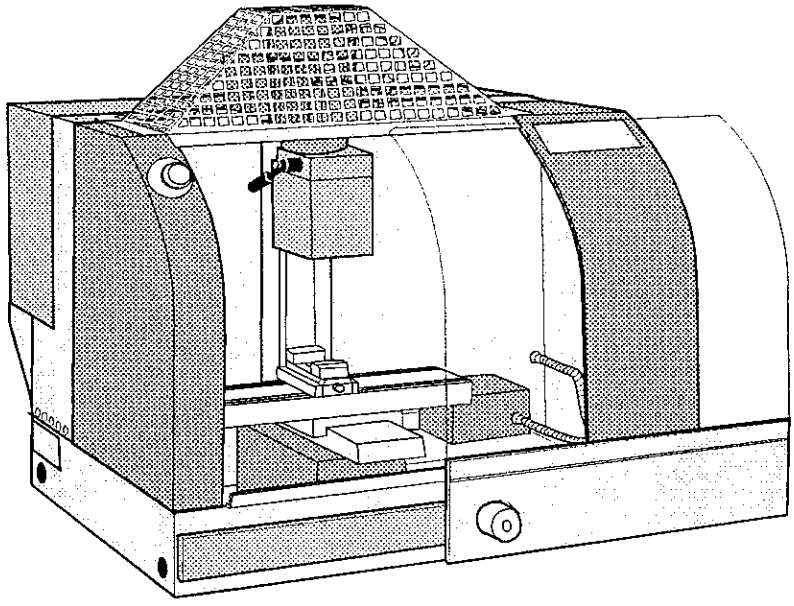
Machine description

EMCO PC MILL 55

Milling machine



Edition 1999

Ref. No. EN 4326

Machine description
EMCO PC MILL 55
C99-11 EN 4326

EMCO MAIER Gesellschaft m.b.H. • P.O. Box 131 • A-5400 Hallein/Austria • Tel. (06245) 891-0 • Fax (06245) 86965

Introduction

For more than five decades EMCO has been developing metal working machines and has also been successfully on the market since 1980 with computer controlled machine tools (CNC machines), particularly on the training sector.

This high degree of experience is a profit for the turning and milling machines of the PC TURN and PC MILL model series.
The newly designed compact machines meet entirely today's requirements in construction and set up as well as safety.

The PC machines are operated via a conventional personal computer (PC). This kind of operation permits an efficient training of the most different CNC controls (SIEMENS, FANUC, etc.) with one and the same machine.
The CNC monitor of the installed CNC control is simulated on the PC screen, input of data is carried out alternatively via the PC keyboard or via a control keyboard available as accessory.

Due to the worldwide industrial use of our machines we dispose of a service network wich covers all world areas.
Immediately available service engineers, telephone service as well as a 100% sparepart supply exceeding the 10-year obligatory provision is something natural for us.

One of our more than 100 general representatives worldwide will inform you on particular new developments (e.g. clamping options for work pieces or tools, new softwares, etc.) and theire trafitting possibilities.

In the present operating instructions you will find a complete description of safety hints, transport, set-up, operation and maintenance of the machine. Therfore read this instructions completely before machine start-up.

EC conformity

CE The CE sign certifies together with the EC declaration of conformity that the machine and the manual correspond to the EC guideline for machines 89/392/EEC and its modifications 91/368/EEC and 93/68/EEC.

EMCO MAIER Gesellschaft m. b. H.
Abteilung Technische Dokumentation
A-5400 Hallein, Austria

EMCO
industrial training systems

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Adequate use

The machine is designed for milling and turning work of machinable metals (aluminium, brass and, to a limited degree, steel) and machinable synthetic materials. Machining of other materials is not admitted and may be carried out in particular cases only after consultation with the machine manufacturer.

Adequate use also includes compliance with the operating, maintenance and repairing instructions indicated by the manufacturer.

The machine may exclusively be operated and maintained by persons familiar with operation, maintenance and repair and who know about the hazards.

All regulations for the prevention of accidents and safety instructions for work with machine tools and CNC machine tools have to be complied with at any time.

In case of inadequate use of the machine the manufacturer renounces any liability and the responsibility is transferred exclusively to the user.

Warranty conditions for new EMCO machines

1. The warranty period for new EMCO machines is, without limitation of operating hours, 12 months after initial shipment of the machine from EMCO or its authorized representative. Should the installation be completed by EMCO or its authorized representative, the warranty period begins with the completed installation of the machine.
   If a delay of installation occurs which is not caused by EMCO or its representative, the warranty period becomes invalid 12 months after scheduled installation date.
2. The warranty extends to the elimination of all defects in material or workmanship which affect the regular function of the machine.
3. Occuring defects must be immediately reported to the EMCO respresentative or the next EMCO service department with detailed description of the defect in written or oral form, followed by a written verification.
4. Defects which are correctly reported and under warranty will be corrected by either repair or replacement delivery to the original buyer free-of-charge; defective parts are to be returned to EMCO or the EMCO authorized respresentative, freight prepaid, if requested.
5. Warranty for spare parts: Emco guarantees to the original buyer that, only those parts sold directly by Emco or through an authorized representative will be free from defects, which render part commercially unacceptable in material and workmanship, for a period according to applicable national law, at least three (3) months, but not to exceed six (6) months from the date of initial shipment or installation by Emco or its representative.
   In the case of repeated claims for the same part: Warranty replacement does not extend the period of the original warranty.
6. There is no claim of warranty for defects which occured by:
   Negligence of operating instruction manuals, safety and handling regulations or other instructions regarding delivery, installation, set-up or usage of the machine, incorrect set-up resp. installation, as well as, unauthorized, not expressed regulated or allowed alternations or modifications of the machine by the original buyer or third parties, natural wear, improper or negligent handling, chemical, electro-chemical or electrical influences, inadequate energy supply or force majeure.
7. Any service performed by EMCO or its authorized representative beyond warranty will be charged at EMCOs or its authorized representative's regular rates.

Safety recommendations

Read documentation
Read this documentation completely before you start up the machine.

Electrical connection
The electrical connection of the machine must only be carried out by electrics experts.

Authorized operation
The machine may only be operated by authorized persons.
Protect the machine against unauthorized start-up (main switch which can be locked).

Start-up
Make sure that prior to each start-up the machine is in per fect maintenance state and that no safety features have been removed.

No modifications on machine
Modifications on your own on safety features, bridgings of control features as well as any interference with the electric/electronic part of the machine is prohibited.

In case of hazards EMERGENCY-OFF
In case of hazards immediately actuate EMERGENCY-OFF key to stop machine.

Safe tool-clamping
Prior to start of operation check if workpiece and tool are clamped safely.

Observe speed limits
Clamping devices are subject to speed limits.
Thus observe the maximum speed of the clamping devices used by you.

Use chip hook
Remove chips only with machine switched off and by means of a chip hook.

Do not reach into running machine!

Tool change
Change machining tools only during standstill of machine.

Measurement work
Carry out measurement work only during stand-still of the machine and with EMERGENCY-OFF key actuated.

Wear body protection
Mind that your hair does not get caught in the machine - hair protection to be worn.
Protect your eyes with safety-glasses.
Do not wear loose working clothes. Mind that the working clothes are tight around the wrists and hips.

Machine supervision
Never leave running machine unattended.
Before leaving the working place switch off machine.

Maintenance and readjustment work
All maintenance and readjustment work may be carried out only with machine switched off and EMERGENCY-OFF key actuated.

Claim
In the event of a collision or instance of damage, contact the representative or manufacturer.
In case of complaints, damage, confusions and spare parts orders always indicate the machine number.
For parts not supplied by EMCO, EMCO will not assume liability.

Technical data of the machine

Working Area		
Slideway longitudinal (X-axis)	[mm]	190
Slideway cross (Y-axis)	[mm]	125
Slideway vertical (Z-axis)	[mm]	190
effective Z-stroke	[mm]	120
Distance spindle nose - table surface (milling spindle vertical)	[mm]	30-220
Distance spindle nose - table surface (milling spindle horizontal)	[mm]	82-272
Milling Table		
Clamping surface (L x D)	[mm]	420x125
Maximum table load	[kg]	10
2 T-slots	[mm]	11
Distance of T-slots	[mm]	90
Milling Spindle		
Spindle bearing	[mm]	ø35
Type of bearing		roller bearing
Clamping fixture similar to DIN 2079		SK30
Tightening bolt		works standard
Tool clamping		manual
Milling Spindle Drive		
A.C.-motor		
Power with 100%/60% D.C.	[W]	500/750
Nominal motor speed	[rpm]	1400
Speed range (infinitely variable)	[rpm]	100-3500
maximum torque on milling spindle	[Nm]	3,7
Drilling capacity in aluminium	[mm]	ø10
Thread-cutting capacity in aluminium	[mm]	M6x15
Feed Drives		
Step resolution/output resolution	[µm]	0,5
Operating feed in X/Y/Z (infinitely variable)	[mm/min]	0-2000
Rapid feed in X/Y/Z	[mm/min]	2000
max. feed force X/Y/Z	[N]	800/800/1000
Electrical Connection		
Power supply	[V]	100/110/230
maximum voltage fluctuations	[%]	+5/-10
Frequency	[Hz]	50/60
Connected load	[kVA]	0,9
Main fuse	[A-slow]	10

Subject to technical modifications!

Machine Dimensions		
total length x total depth x total height	[mm]	840 x 865 x 816
total weight of machine	[kg]	160
Sound Level		
mean sound level	[dB(A)]	70
With the following conditions: measuring method: enveloping surface method according to DIN 45 635 operating method: maximum speed during idle running		

PC Configuration

	Minimum Configuration
IBM or IBM compatible	Pentium 100
Hard disk	20 MB free
Disk drive	3½"
Operating system	Windows 95
Main storage	16 MB
Graphics card	VGA color graphics card
Display	color display 14"
Keyboard	MF-2
BUS (free slot)	ISA or EISA slot for installing the interface card PCCOM (RS422/CAN)

Subject to technical modifications!

Declaration of conformity

Product:	PC-controlled lathe for training	
Machine data:	***Model***	***Type***
	EMCO	***PC TURN 55***
Address of manufacturer:	Emco Maier Ges.m.b.H Salzachtal Bundesstraße Nord 58 A-5400 Hallein	
Bases of standards:	EN 292-1; EN 292-2; EN 294; EN 418; EN 60204-1; prEN 954-1; prEN 1037; prEN 1050; prEN 1088	
Regulations:	MSV (BGBl. Nr. 306/1994, 27.4.94)	
Test certificates:		
Particular notes , enclosures:	Electrical documentation as applicable	

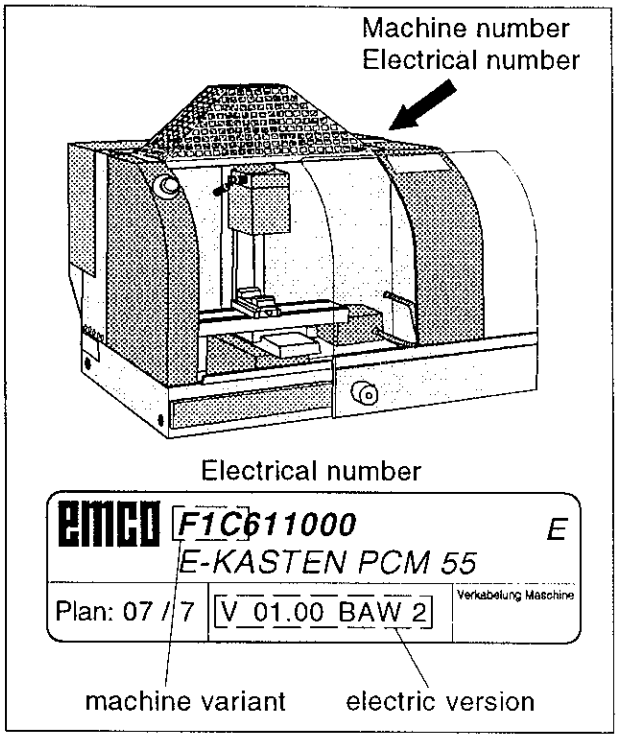
We herewith declare that the above-mentioned product referring to the subject declaration is in conformity with the currently valid stipulations of the directive of the Council dated June 14th, 1989 for the alignment of the legal stipulations of the member states for machines (89/392/EEC) and its modifications dated June 20th, 1991 (91/368/EEC), June 14th, 1993 (93/44/EEC), July 22nd, 1993 (93/68/EEC), with the directive of the Council dated May 3rd, 1989 for the alignment of the legal stipulations for electromagnetic compatibility (89/336/EEC) and its modifications dated April 28th, 1992 (92/31/EEC) and July 22nd, 1993 (93/68/EEC), and with the directive of the Council dated February 19th, 1973 concerning low voltage equipment (73/23/EEC) and its modification dated July 22nd, 1993 (93/68/EEC).
Furthermore, the conformity of the subject product with the above-mentioned standard bases and regulations is effective.

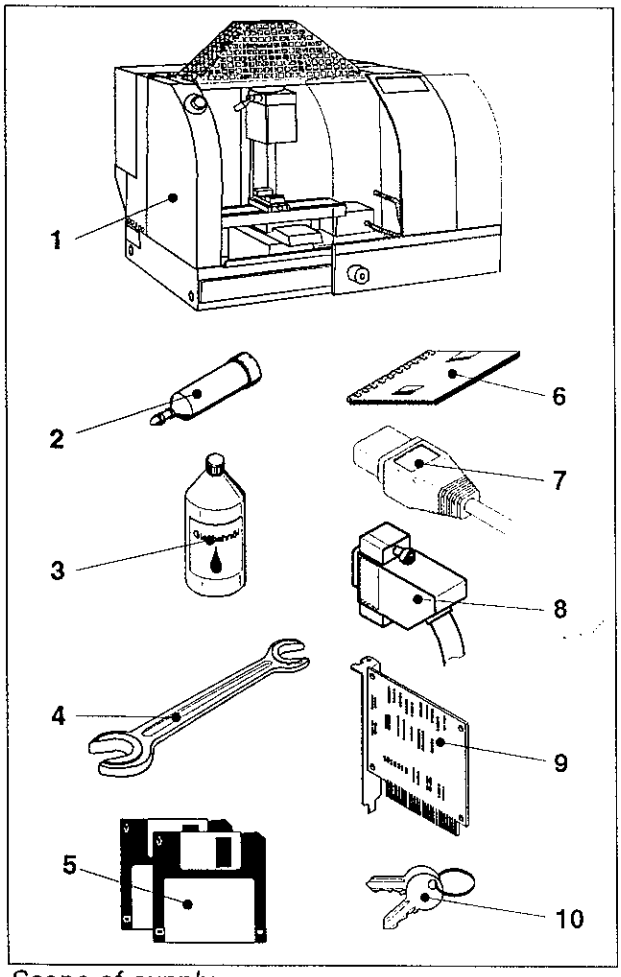
Place, date: Hallein, 11.02.98

Authorized person: Head of quality department Peter Binggl .....

QUALITÄTSSICHERUNG
EMCO MAIER GESELLSCHAFT M.B.H.
POSTFACH 131 · A-5400 HALLEIN

A Machine installation





Scope of supply

Machine acceptance

- Check the machine for any transport damage and completeness of the delivery.
  If you find any defects, please contact the dealer or the insurance company.
- In case of complaints always specify the exact designation of the machine and the machine number.
  The self-adhesive plate indicating the machine number and the electric number is on the machine side below the key switch.

  On the plate with the electric number you'll find:
  - machine variant (e.g. "F1C")
  - Electric version (e.g. "V 01.00 BAW 2")

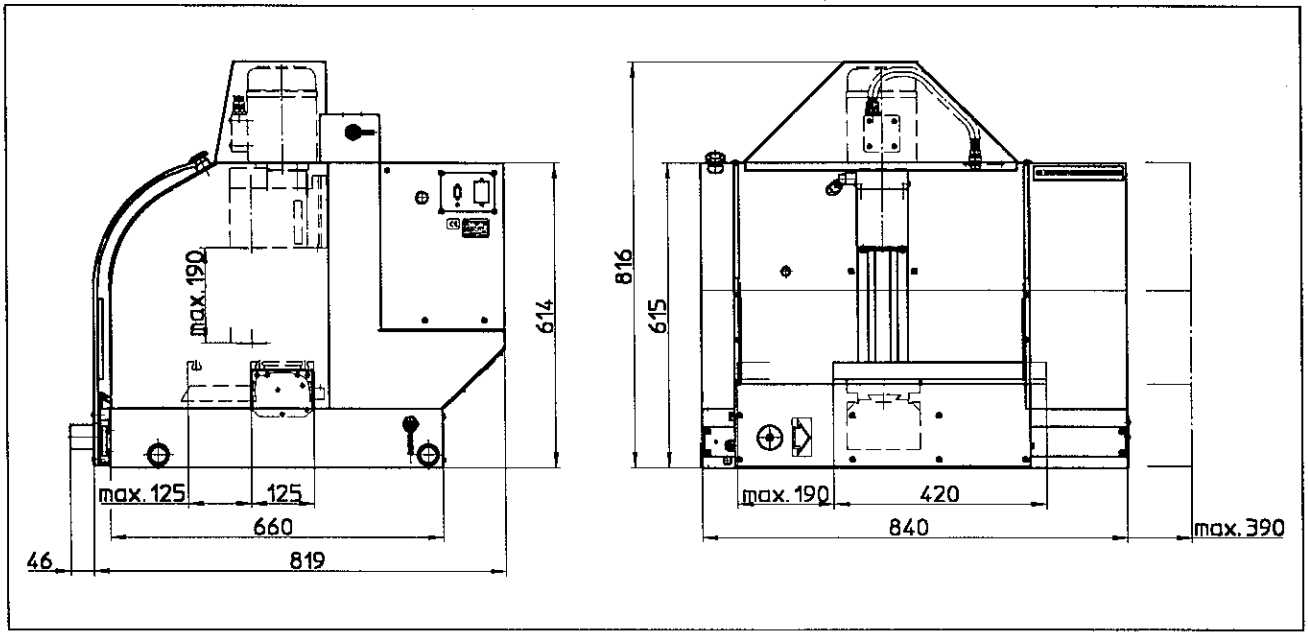
  The available circuit diagrams for this machine you will find in the Electrical Documentation, which is put inside of the electrical cabinet of the machine.
  The Electrical Documentation may also be ordered from EMCO:

  Electrical Documentation EMCO PC MILL 55
  Ref. No. ZVP 675 020
  Version F1C_V01.00 BAW 2
  (= machine variant and electrical version of your machine)
- The rust protection agent must be removed by the customer

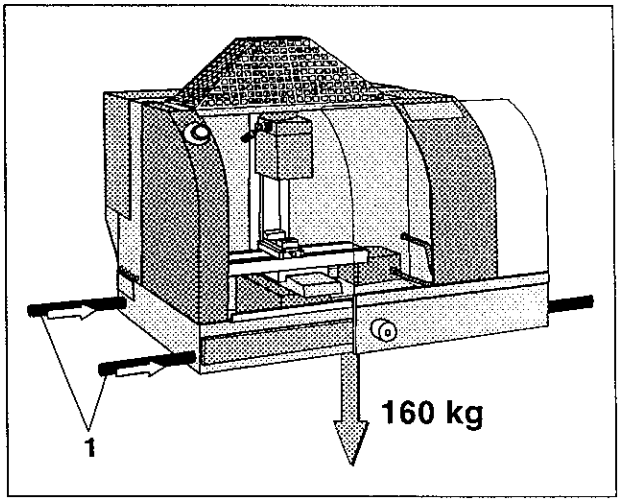
Scope of supply

1. Milling machine EMCO PC MILL 55 with chip tray, splash guard, complete electric equipment, chip guard door and safety package.
2. 1 oil gun
3. 1 bottle (0.25l) of slideway oil
4. 1 hexagonal key SW10×13
5. Floppies with NC software and machine data
6. 1 machine- and software description
   1 electrical documentation
7. 1 power cable
8. 1 9-pole interface cable (RS 422)
9. 1 PC interface card PCCOM (RS 422/CAN)
10. 2 keys for main switch

Dimensions of the machine



Dimensions of the machine



Transport of machine

Transport of the machine

For transporting the machine two bars can be pushed through the holes (1).
Weight of machine ..... approx. 160 kg

Danger:
For transporting the machine only use such bars which ensure that the carrying capacity of the bars corresponds at least to the weight of the machine.

Installation requirement

The machine has to be placed on a stable table.

Weight of machine ..... 160 kg
Ideal table height ..... approx. 650 mm
Installation width x depth ..... 840 x 660 mm

Note:
Mind that the ventilation slots on the electric cabinet are not blocked or covered.
In case of insufficient ventilation disturbances on the machine due to too high temperature might occur.

Electrical connection of the machine

Danger:
A ground wire contact has to be available at the socket.

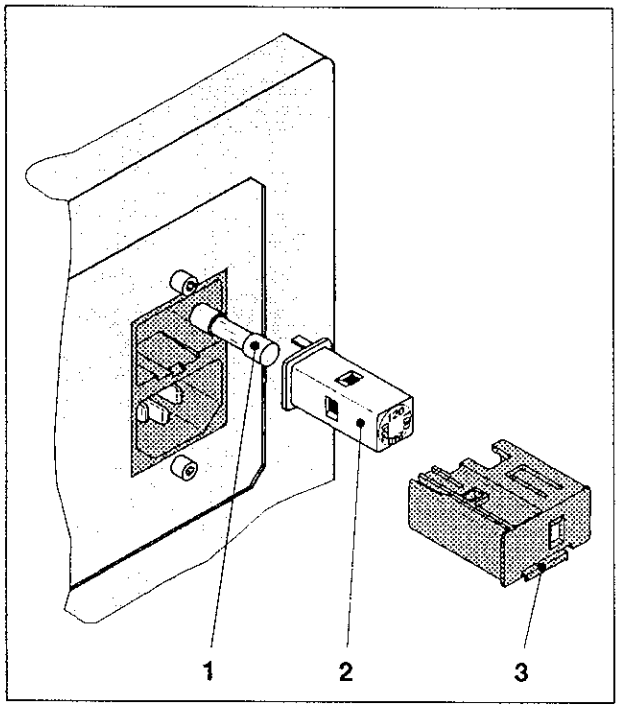
Voltages:	100 V 1/N/PE~50/60 Hz
	110 V 1/N/PE~50/60 Hz
	230 V 1/N/PE~50/60 Hz
Connected load:	0,9 kVA
Preliminary fuse:	max. 10 A slow
Max. voltage fluctuations:	+5/-10%

Adjustment of the required supply voltage

- Push up the latch on the casing (3) and remove the casing with the fuse (1) and the selector pin (2).
- Turn the selector pin (2) in such a way that in the window of the casing (3) the following voltage setting appears:

Mains supply	Setting in control window
*100V-mains	setting 100V + Transformer
110V-mains	setting 120V
230V-mains	setting 220V

- Put the whole unit with fuse (1), selector pin (2) and casing (3) again into the socket.



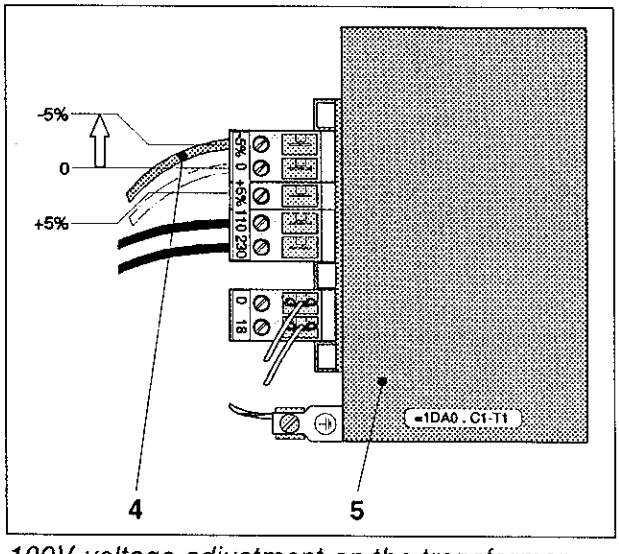
Adjustment of the supply voltage

Attention:
With the 100V mains supply there has to be done a modification on the transformer of the machine!

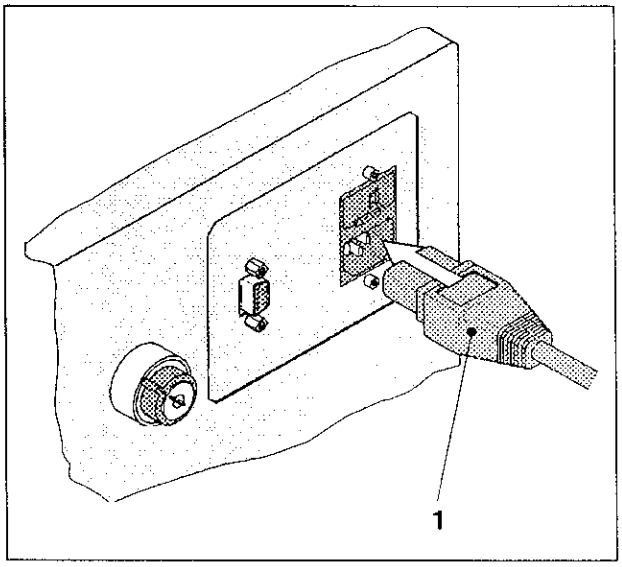
Modification on transformer for 100V mains supply

Danger:
Modifications in the electric cabinet may only be carried out by an electrics expert.

- Unscrew cover of the electric cabinet on the rear side of the machine.
- Connect blue core (4) on the transformer (5) from setting "0" to setting "-5%".
- Remount cover of electric cabinet.



100V-voltage adjustment on the transformer



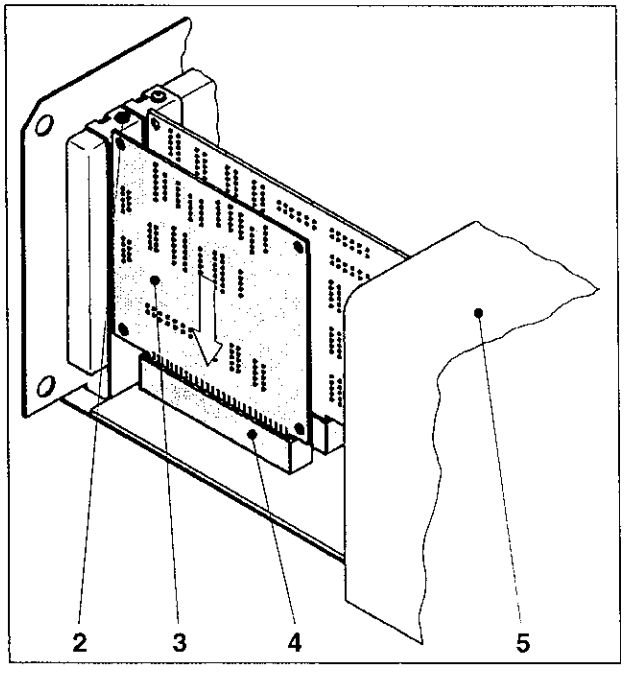
Power connection of the machine

Connection of the power cable

- Plug in the power cable (1) at the machine and the other end at a socket with ground wire contact.

Installation of the interface card

Prior to installing the software the interface card should be mounted.
The interface is a serial interface RS 485 and is used for connecting the computer with the machine.

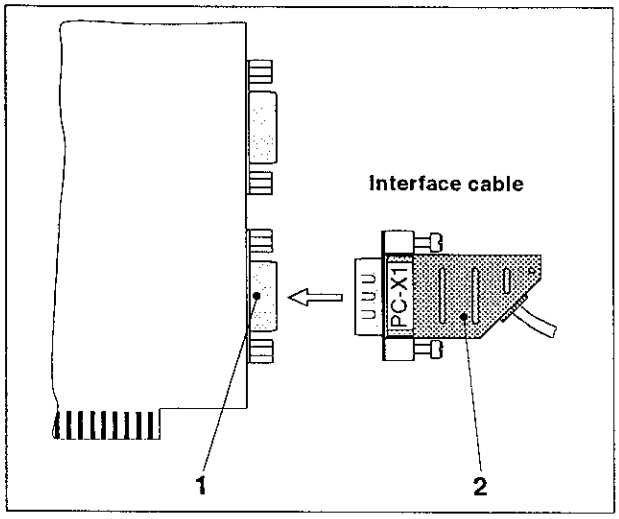


Installation of the interface card

Danger:

- The interface card may be only be mounted if the computer is disconnected from the power supply (take off plug).
- The computer may be connected again to the power supply only if the frame is mounted again.

- Switch off computer and take off plug.
- Take off frame cover (5) of the computer.
- Insert interface card (3) in a free slot (4).
- Tighten interface card (2) with fixation screw (2).
- Remount frame cover (5).
- Connect power supply plug.

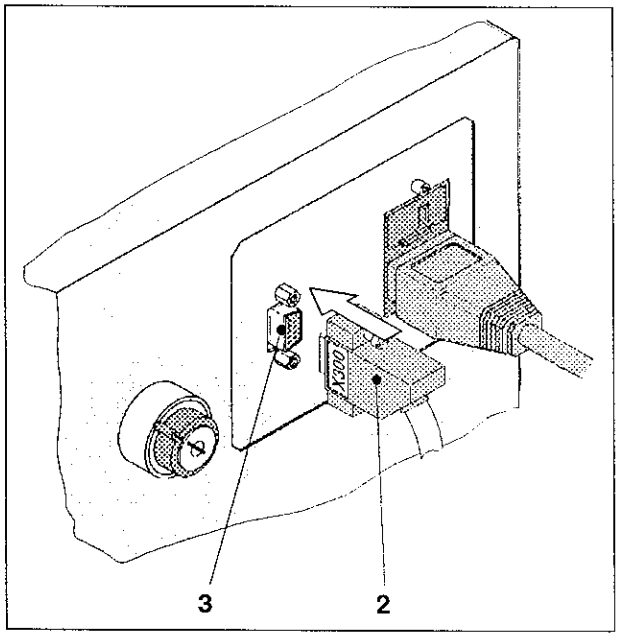


Connection of interface cable to the PC

Connection PC-machine

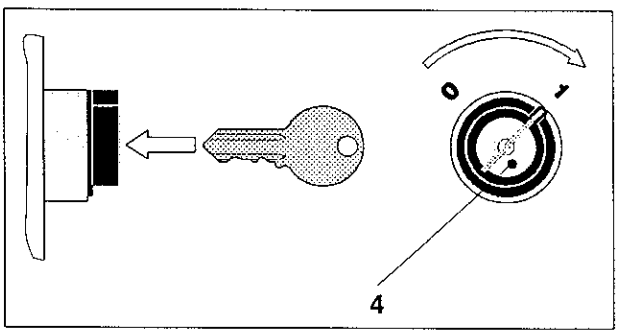
Attention:
The machine cannot be controlled, if the interface cable will be connected wrongly.

- Connect interface cable (2) with the plug named "PC-X1" on the lower socket of the interface card (1).



Connection of interface cable to the machine

- The free end of the interface cable with the plug named "Maschine-X300" has to be connected on the socket (3) of the machine.



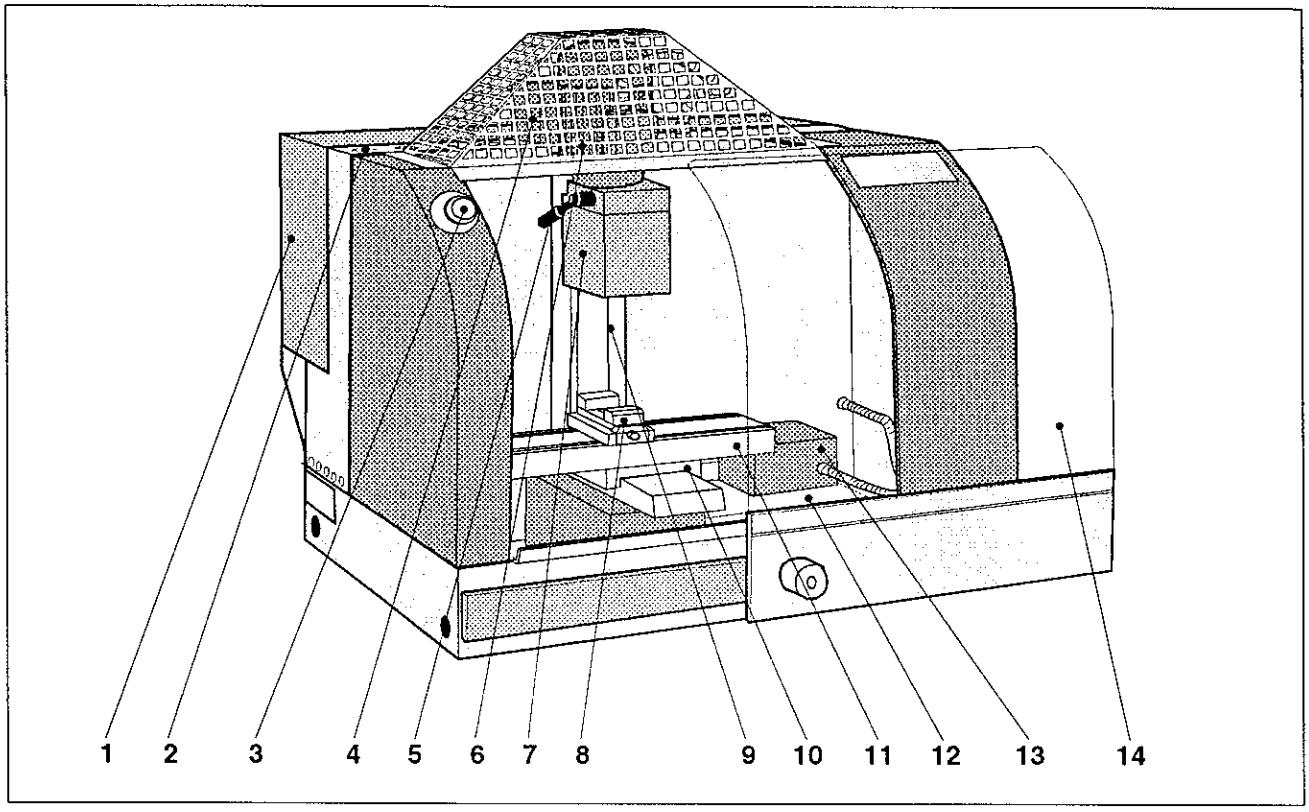
Key switch on the machine

Initial start-up

- Machine is to be cleaned from rust preventive agent with a clean cloth.
- Establish power connection.
- Switch on machine at key switch (4).

Note:
If the machine is not used for a longer period of time, slightly oil blank parts, protect machine against unauthorized start-up (take off key) and cover machine with dust protection.

B Description of machine

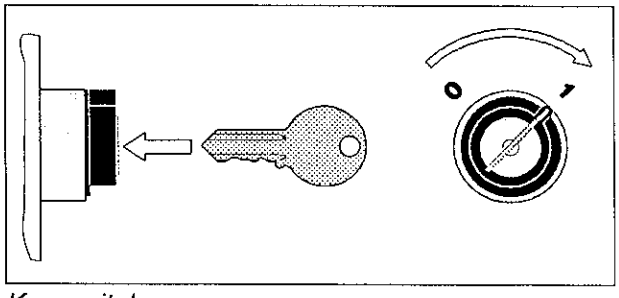


EMCO PC MILL 55

1. Electric cabinet
2. Tool support for 4 tools
3. EMERGENCY-OFF key
4. Protection cap
5. Clamping lever for tool clamping
6. Drive motor for milling spindle
7. Milling head with milling spindle
8. Machine vice (accessory)
9. Z-guide
10. Y-slide
11. Milling table (X-slide)
12. Chip tray
13. Step motor X-axis
14. Chip guard door

Operating elements

Key switch



Key switch

Danger:

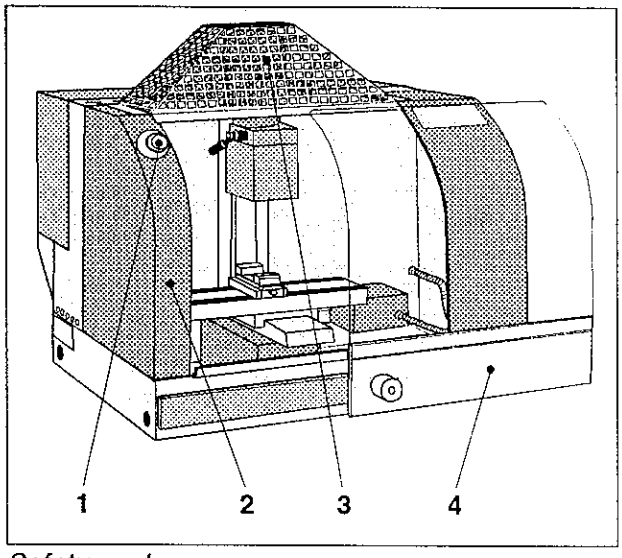
Always take off key to protect the machine against unauthorized start-up.

With the key switch position "1" and released EMERGENCY-OFF key the machine is ready for operation.
The main and feed motors are supplied with power.

EMERGENCY-OFF key

Danger:
The EMERGENCY-OFF key is to be actuated immediately in any hazard situation.

When actuating the EMERGENCY-OFF key (1) the power supply to the main and feed motors is interrupted.
For unlocking turn knob in clockwise direction.



Safety package

Safety package

Danger:
Modifications on safety devices as well as bridgings of control devices are prohibited!

The safety package is contained in the base machine and facilitates generally risk-free operation of the machine.
By opening the chip guard door the power supply to main and feed motors is interrupted.

The safety package comprises:
- EMERGENCY-OFF key (1)
- Protective cover around the entire working area of the machine (2)
- Protection cap (3)
- Chip guard door with limit switch (4)

The step motors

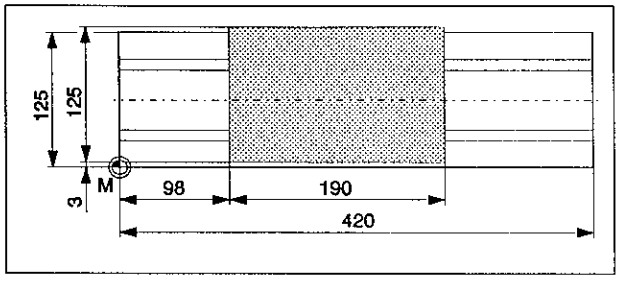
The step motors are used for driving the slides in X-, Y- and Z-direction.

Feed speed X/Y/Z	0-2 000 mm/min
Rapid traverse X/Y/Z	2 000 mm/min
Step resolution	0.5 µm
Traversing path X-slide	190 mm
Traversing path Y-slide	125 mm
Traversing path Z-slide	190 mm
Feed force X/Y	max. 800 N
Feed force Z	max. 1000 N

Working area

Working area in X- and Y-axes

Traversing path X-axis ..... 190 mm
Traversing path Y-axis ..... 125 mm



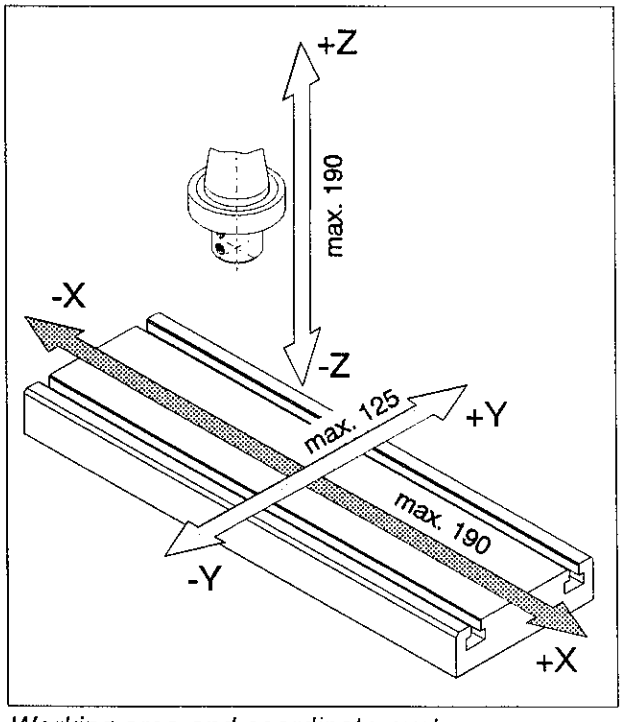
Traversing paths of the X- and Y-slides

Note:
Mind that the clamped workpieces in the traversing area of the milling cutters are clamped at the milling table.

Working area in Z-axis

The working area in Z-direction depends on the length of the clamped workpiece.
Further details are to be found at the respective clamping device.

effective Z-stroke ..... 190 mm



Working area and coordinate system

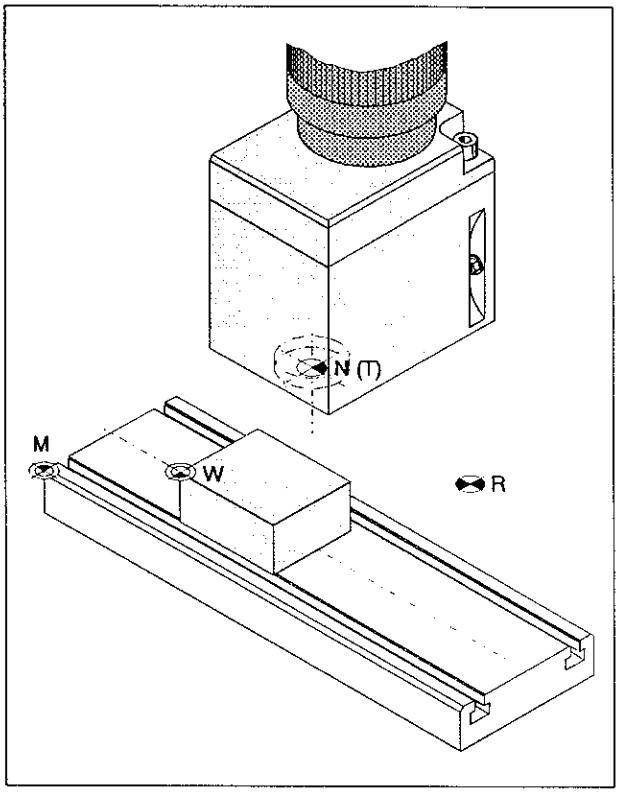
Limitation of traversing paths

The traversing paths of the slides are limited by software limit switches.
When reaching a software limit switch the respective feed motor stops and a message is indicated at the monitor of the control.
By means of the software limit switches a mechanical overload of the axis spindles due to fixed stops is avoided.

Coordinate system

The coordinate system is turning in clockwise direction. The origin lies in the machine zero point M or in the workpiece zero point W.

Points at the machine



Points at the machine

Machine zero point M

The machine zero point M lies on the surface of the milling table on the left front edge.
The machine zero point M is the origin of the coordinate system.

Reference point R

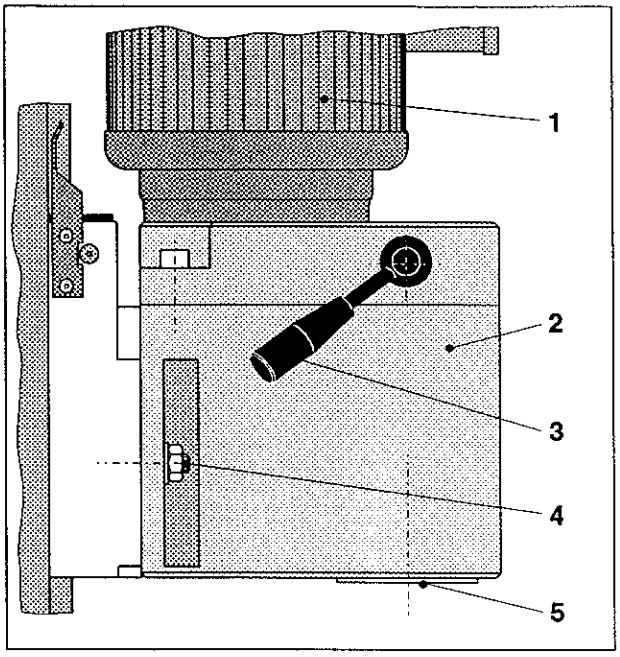
The reference point is a fixed point on the machine. It serves for the calibration of the measuring system.
The reference point must be approached after each switch-on of the machine to communicate the exact distance between the points M and N (T) to the control.

Workpiece zero point W

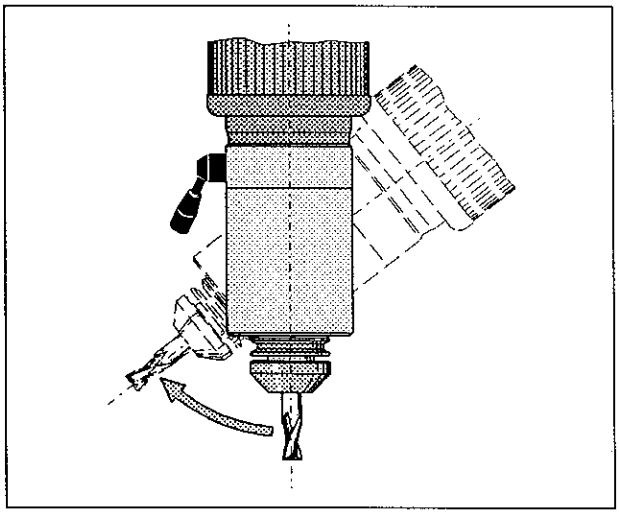
The workpiece zero point W can be freely programmed by the user.
By programming a workpiece zero point the origin of the coordinate system is displaced from the machine zero point M into the workpiece zero point W.

Tool-holding fixture reference point N (T)

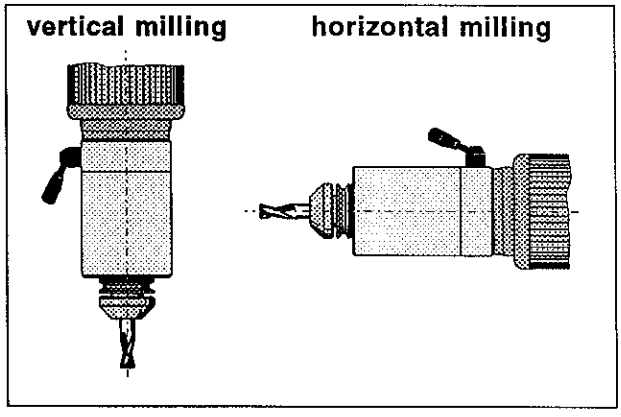
The tool-holding fixture reference point N (T) lies exactly in the rotary axis at the front of milling spindle nose.
The tool lengths are described from this point.



Milling head



Swivelling the milling head



Kinds of milling

The milling head

In the milling head (2) the milling spindle (5) with the inner cone and the clamping device (3) for the tool support are placed.
The drive motor (1) for the milling spindle is mounted on the milling head .
For horizontal milling the milling head together with the drive motor can be swivelled by 90°. The limitation of the max. swivel movement of 90° is carried out by stop bolts.

Swivelling the milling head

Applications with swivelled milling head:
- Milling of chamfers
- Milling of grooves with the disk milling cutter
- etc.

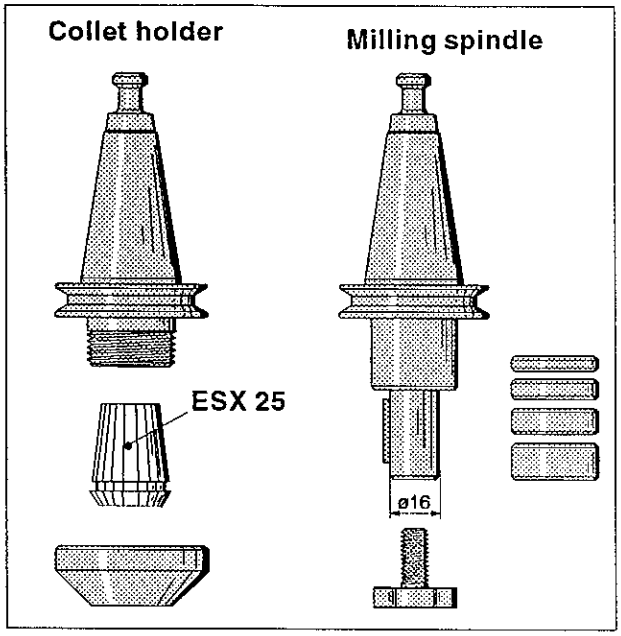
Danger:
Swivelling the milling head may only be carried out during machine standstill.

- Move milling head downwards (–Z-direction)
- Untighten the clamping nuts SW13 (4) on both sides of the milling head (2).
- Swivel milling head (2) together with drive motor (1) into the desired direction.
- Tighten clamping nuts (4).

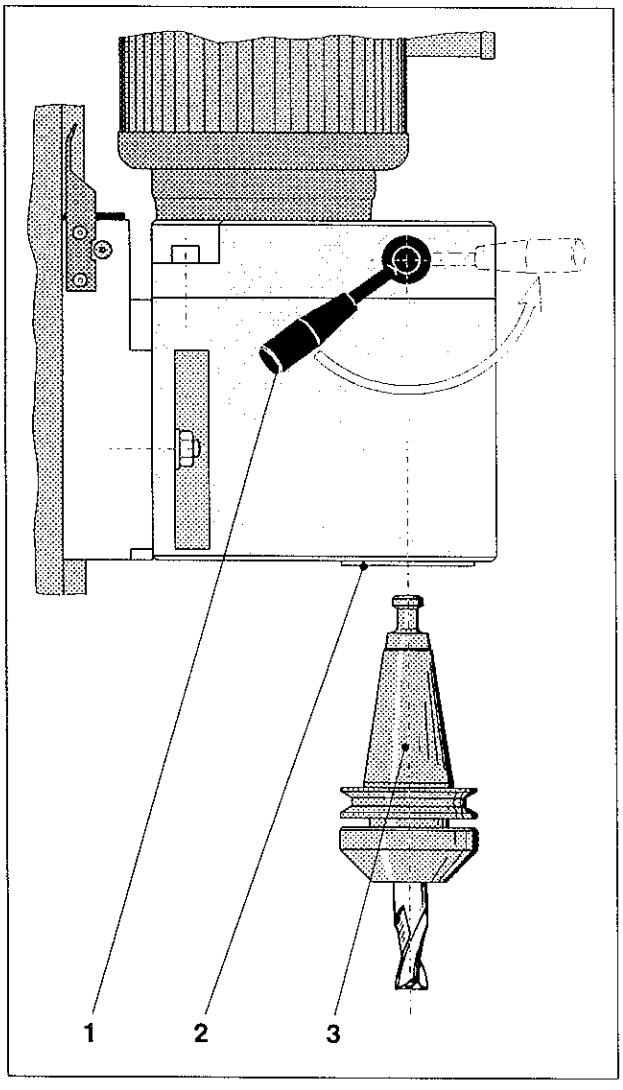
Attention:
- Mind during swivelling that the milling head does not knock too hard against the stop bolts in order to avoid damages at the stop bolts and milling head.
- Pay attention to the changed directions of the axis of the coordinate system
- Take care, that the milling head will not collide with the protection cap at swivveled milling head! (too great +Z-movement)

Vertical-horizontal milling

The terms vertical milling and horizontal milling refer to the position of the milling spindle axis (vertical or horizontal).



Toolholder



Mounting and dismounting the toolholder

The toolholder

The machining tools are mounted on the toolholder.
Drills, end-milling cutters and profile cutters are clamped by means of chucks into the collet chuck, shell end mills and disk milling cutters are mounted on the shell end mill arbor.

Tool support similar to DIN 2079 ..... SK 30
Clamping bolt ..... works standard

Mounting the toolholder

Danger:

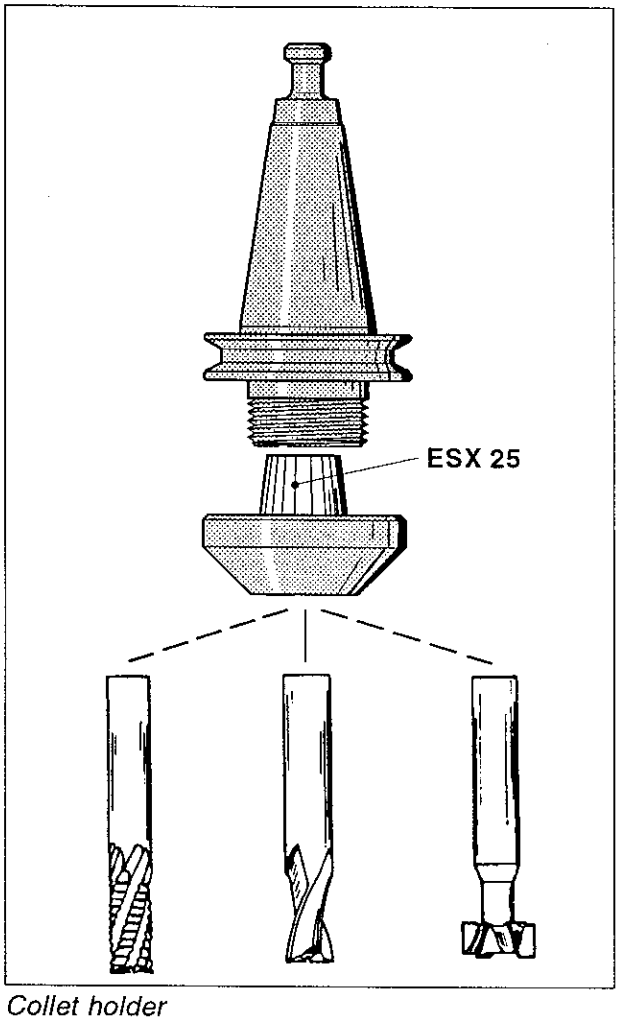
- Mounting and dismounting the toolholder may only be carried out during machine standstill.
- Due to the modified DIN tool support only toolholders bought particularly for this machine from EMCO may be clamped.

- Pull forward spring-weighed clamping lever (1) until stop (turn to the right) and hold in this position.
- Insert toolholder (3) into the support (2). Do not release the toolholder.
- Let clamping lever (1) swivel back slowly (lever turns to the left).
- The toolholder (3) is clamped into the tool support (2) by the spring power.

Note:
When mounting the toolholder clamping taper of the toolholders and inner cone of the tool support must be free of dirt and grease.

Dismounting the toolholder

- Hold fast toolholder (3).
- Pull forward clamping lever (1) (turn to the right) with the other hand .
- The toolholder (2) falls out of the tool support (2).



Collet holder

Collet holder

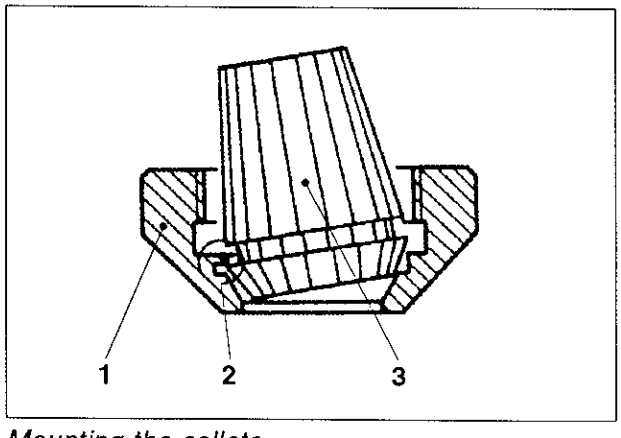
In the collet holder drills, end-milling cutters and profile cutters are clamped.

Order no. F1Z 010
Clamping range ..... 1.5 up to 16 mm
Collet type ..... ESX 25

Maintenance of collets and collet holders

Note:
In case of insufficient maintenance dirt and chips may damage collet holder and collets. Thus, the round-run accuracy of the tool might be impaired.

The collet holders and the collets have to be cleaned carefully and oiled slightly before and after use.



Mounting the collets

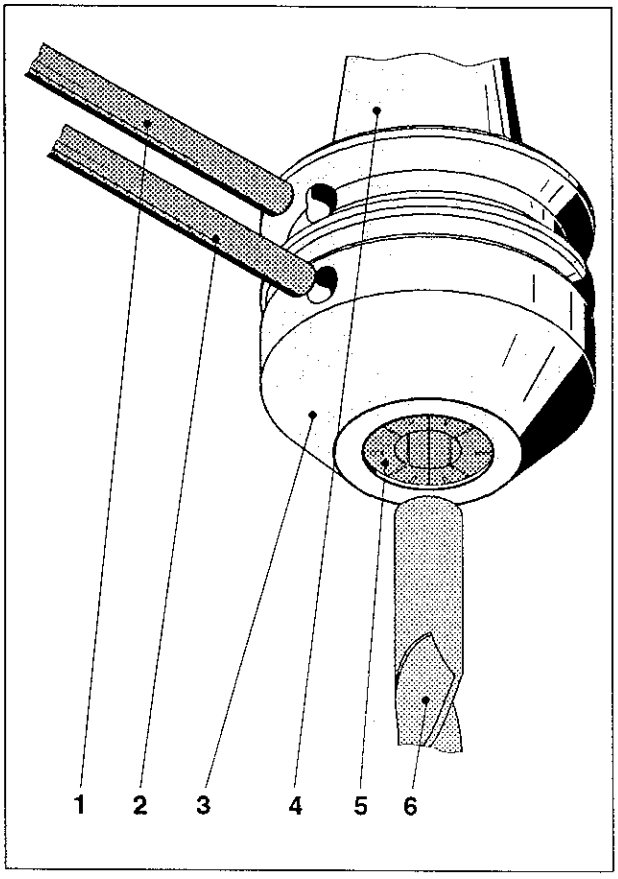
Mounting the collets

- Loosen clamping nut (1).
- Insert collet (3) obliquely into the clamping nut (1) so that the eccentric ring (2) engages in the groove of the collet.
- Screw collet with clamping nut onto collet holder.

Danger:
Mounting and dismounting of the collet holders may only be carried out during machine standstill.

Dismounting the collets

- Loosen clamping nut (1).
- Via the eccentric ring (2) in the clamping nut the collet (3) is pressed out when screwing off the clamping nut.



Clamping the tools in the collet holder

Clamping the tools in the collet holder

- Mount adequate collet (5).
- Insert tool (6) into the collet (5).
  Mind that the tool is pushed in far enough into the collet. When clamping too short the tool may be ejected from the device.
- Tighten clamping nut (3) with clamping pin (2). Countertighten the collet holder (4) with the second clamping pin (1).

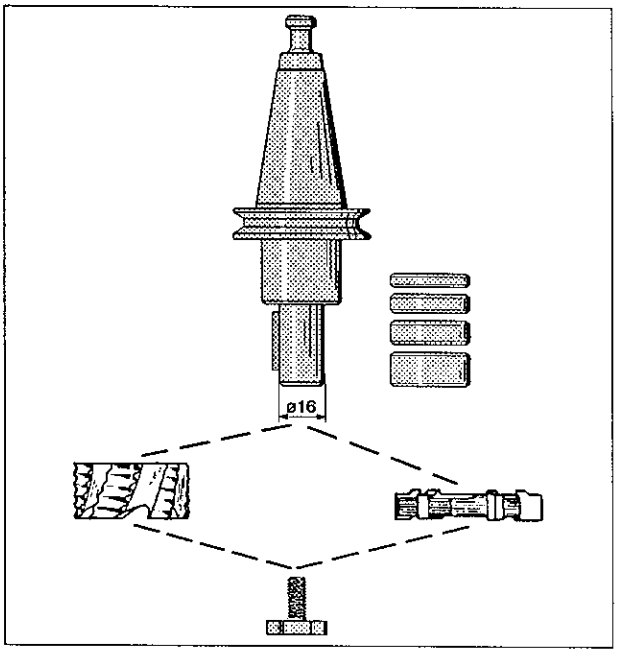
Danger:

- Clamping the tools may only be carried out during machine standstill.
- The "clamping ranges" indicated in the table must be complied with, otherwise the tools cannot be clamped safely.

Clamping ranges

The clamping ranges are engraved in the respective collet.

Nominal diameter of the collet	Clamping range	
	[mm]	[inch]
2.0	1.5-2.0	1/16-5/64
2.5	2.0-2.5	3/32
3.0	2.5-3.0	7/64
4.0	3.0-4.0	1/8-9/64-5/32
5.0	4.0-5.0	11/64-3/16
6.0	5.0-6.0	13/64-7/32-15/64
7.0	6.0-7.0	1/4-17/64
8.0	7.0-8.0	9/32-19/64-5/16
9.0	8.0-9.0	21/64-11/32
10.0	9.0-10.0	23/64-3/8-25/64
11.0	10.0-11.0	13/32-27/64
12.0	11.0-12.0	7/16-29/64-15/32
13.0	12.0-13.0	31/64-1/2
14.0	13.0-14.0	33/64-17/32-35/64
15.0	14.0-15.0	18/32-38/64
16.0	15.0-16.0	19/32-39/64-10/16

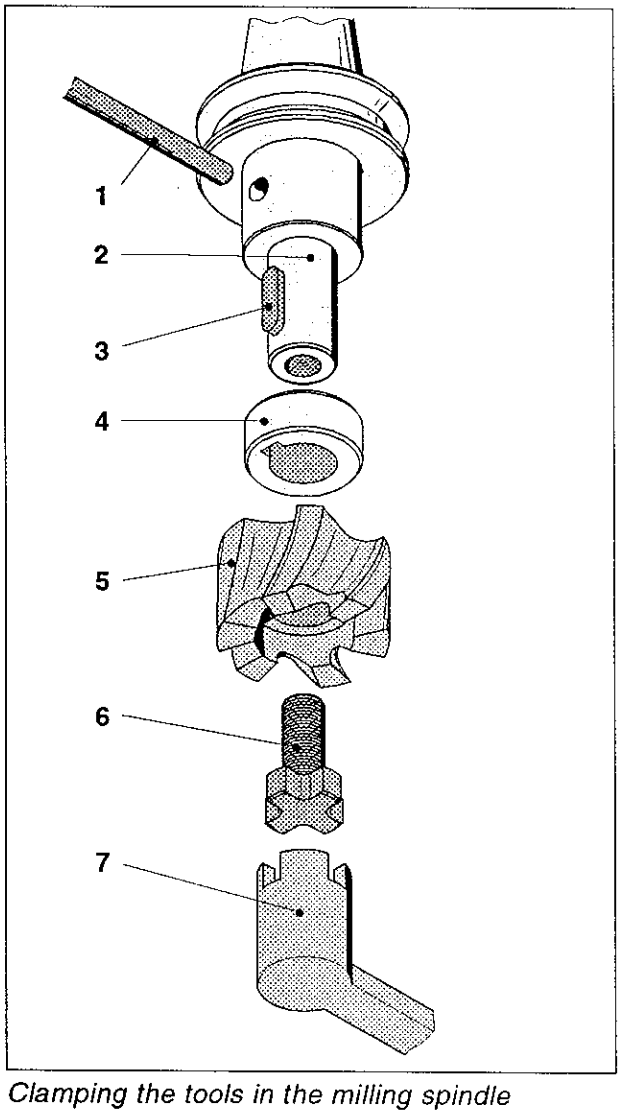


Milling spindle

Milling spindle

In the milling spindle shell end mills, disk milling cutters and circular saw blades are clamped.
With the milling spindle collars are supplied for compensating the milling cutter width and a wrench for tightening the screw.

Order no. F1Z 020
Tool support shaft ..... ø16 mm



Clamping the tools in the milling spindle

Clamping the tools in the milling spindle

Danger:

- Clamping the tools may only be carried out during machine standstill.
- Only tools with a bore of ø16 mm and square key groove may be clamped.

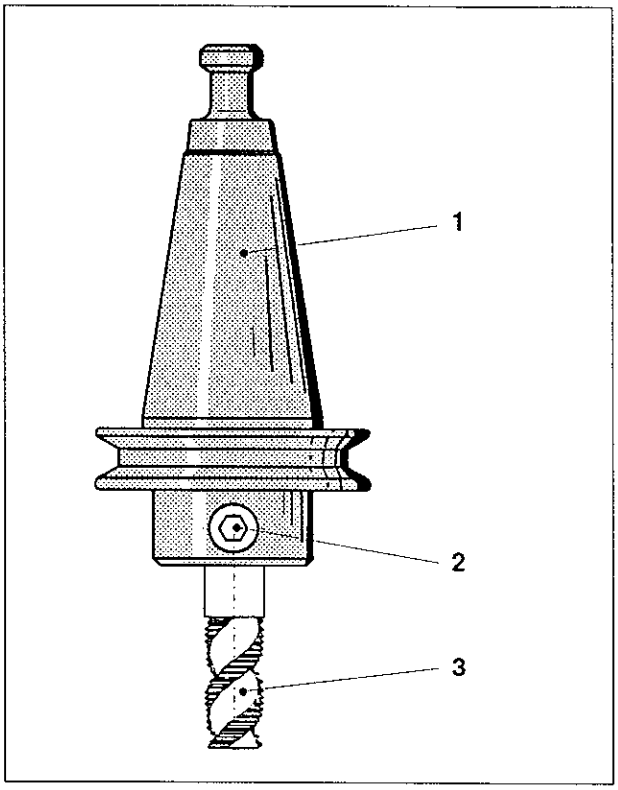
- Unscrew screw (6).
- If necessary, mount adequate collar (2) on the collar shaft (2).
  Take care of the square key (3).
- Mount (5) tool on the shaft (square key).
- Screw screw (6) into the shaft and tighten with the wrench (7).
  Countertighten the milling spindle with the clamping pin (1).

Tap holder

Because of the tap holder with integrated length compensation it is possible to tap.

Three different tap holders are offered:

	Order -No.:
Tap holder M3	F1Z 260
Tap holder M4	F1Z 270
Tap holder M5, M6, M8	F1Z 280
Length compensation	±6 mm



Mounting of the tap

Clamping tools in the tap holder

Danger:

- Clamping the tools in the tap holder may only be carried out during machine stand-still!
- Only taps may be clamped in the tap holder, which are designated clearly for the used tap holder!

- Loosen thread pin (2) with the hexagonal key (wrench size 2,5).
- Put in tap (3) into the seat of the holder (1) and turn it in a way, that the square of the tap gears into the square of the holder
- Tighten thread pin (2) to fix the tap (3).

Engraving spindle

Order-no. F1Z 590

In cause of the gear ratio to a very high spindle-speed, engraving works are possible.

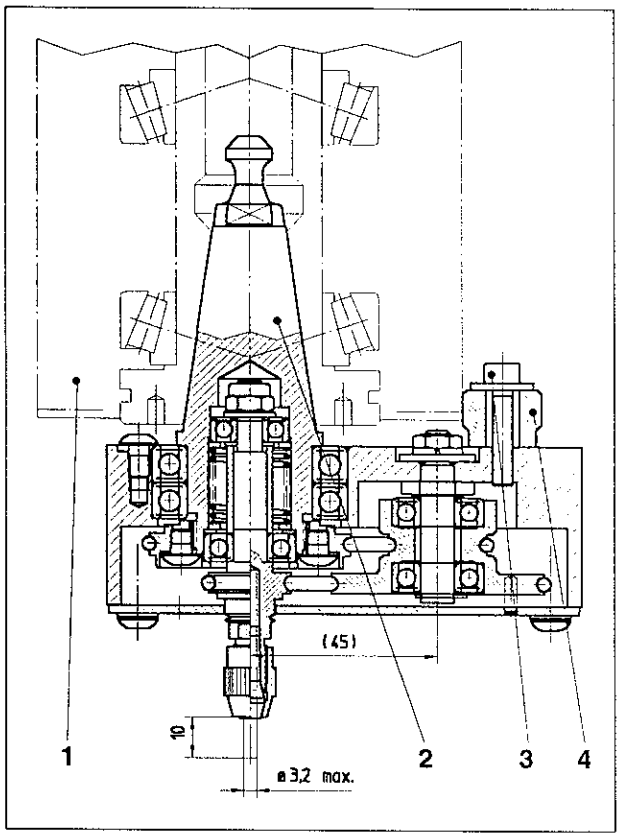
Technical data

Spindle speed ..... max. 18 000 rpm
gear ratio ..... i = 1:5
clamping diameter for tools ..... max. ø3 mm
clamping system ..... collets

Range

Engraving
Qualified for aluminium, nonferrous metals, plastics and hardwood

Boring
Aluminium, nonferrous metals ..... max. ø2 mm



Engraving Spindle

Danger:
The engraving spindle may not be used for milling-works!
Otherwise the spindle and the tool would be damaged, and persons could be hurt!

Mounting

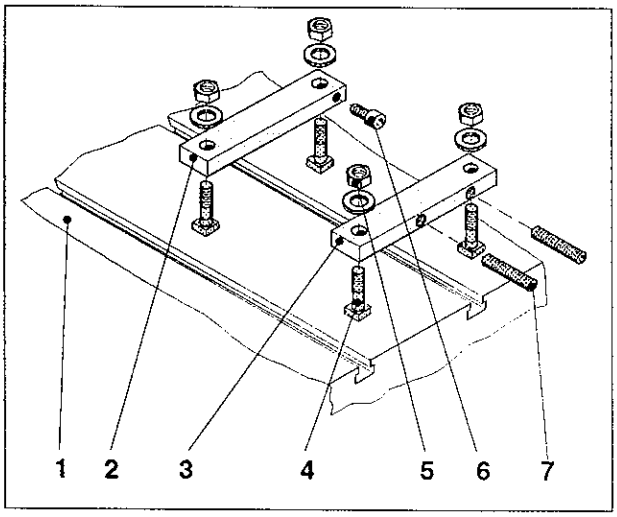
Danger:
- Mounting and dismounting the engraving spindle may only be carried out during machine standstill.

- Loosen the socket head screw(3).
- Mount the spindle shaft (2) in the main spindle.
- Press the twisting safety device (4) against the spindlestock (1) and clamp the screw (3).

Clamping the Workpieces

Clamping rails

Order-No. F1Z 060



Mounting the clamping rails

Mounting the clamping rails

- Thread in slot screws (4) at the milling table (1) and screw down clamping rails (2) and (3) with the nuts SW13 (5).
- Before tightening align clamping rails by means of a stop square rectangularly to the milling table.

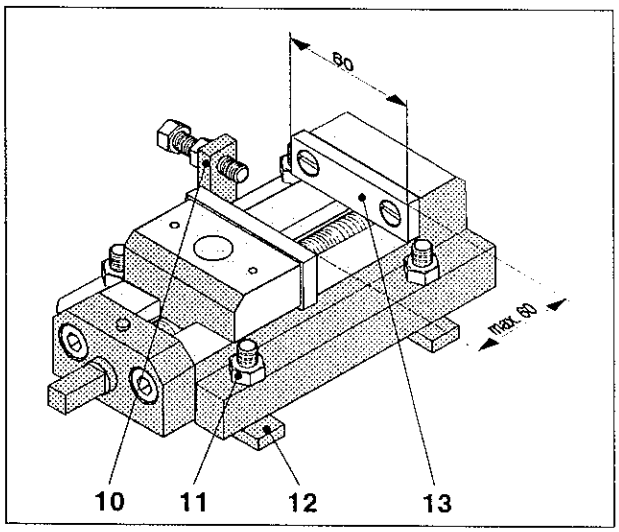
Clamping the workpieces

- Put workpiece between the clamping rails. The clamping rail (2) and the cheese head screw (6) serve as stop.
- Clamp workpiece with the two locking screws SW6 (7).

Danger:

- Clamping of the workpieces and the collets on the milling table may only be carried out during machine standstill.
- The workpieces must be clamped tightly and safely.
- The admissible clamping ranges must always be complied with..

The machine vice



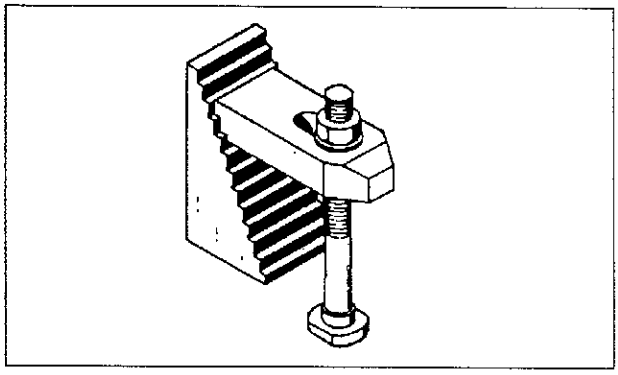
Machine vice

The machine vice is provided with exchangeable clamping jaws (13) and a stop (10).
The stop (10) is mounted laterally on the vice with a hexagon screw SW10.

Order no. F1Z 310
Jaw width ..... 60 mm
Clamping width ..... max. 60 mm

Mounting the machine vice

- Thread in sliding blocks (12) into the T-slots on the milling table.
- Align vice by means of a stop square rectangularly to the milling table.
- Clamp down vice tightly and safely by means of all 4 hexagon nuts SW13 (11).



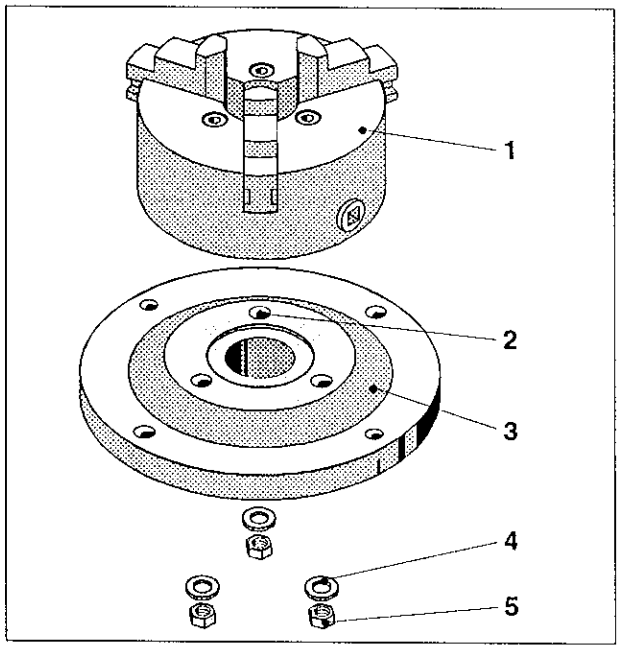
Incremental strap

Incremental straps

Incremental straps are suitable for clamping irregular and high workpieces.
For clamping a workpiece at least 2 incremental straps are required.

Order no. C3Z 300
Clamping height ..... 60 mm

Danger:
Clamping and releasing the workpieces with incremental straps may only be carried out during machine standstill.



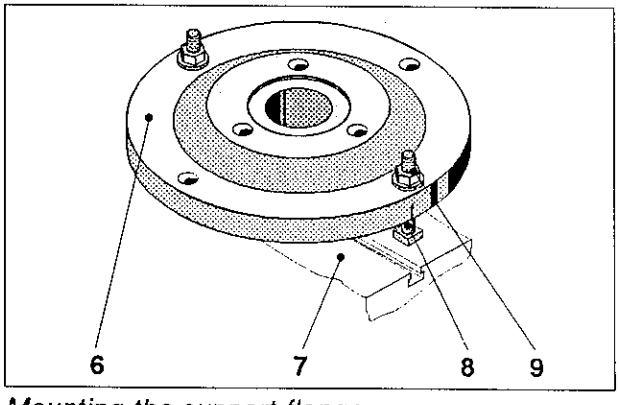
Mounting the chuck

Support flange

Order no. B4Z 250
The support flange (3) is used for the support of the 3- and the 4-jaw chuck as well as the clamping plate. It is mounted on the milling table.

Mounting the chuck on the support flange

- Insert chuck (1) with the mounted clamping bolts into the support bores (2) of the support flange (3).
- Thread washers (4) and nuts (5) on clamping bolts of the chucks and tighten nuts SW13 (5).



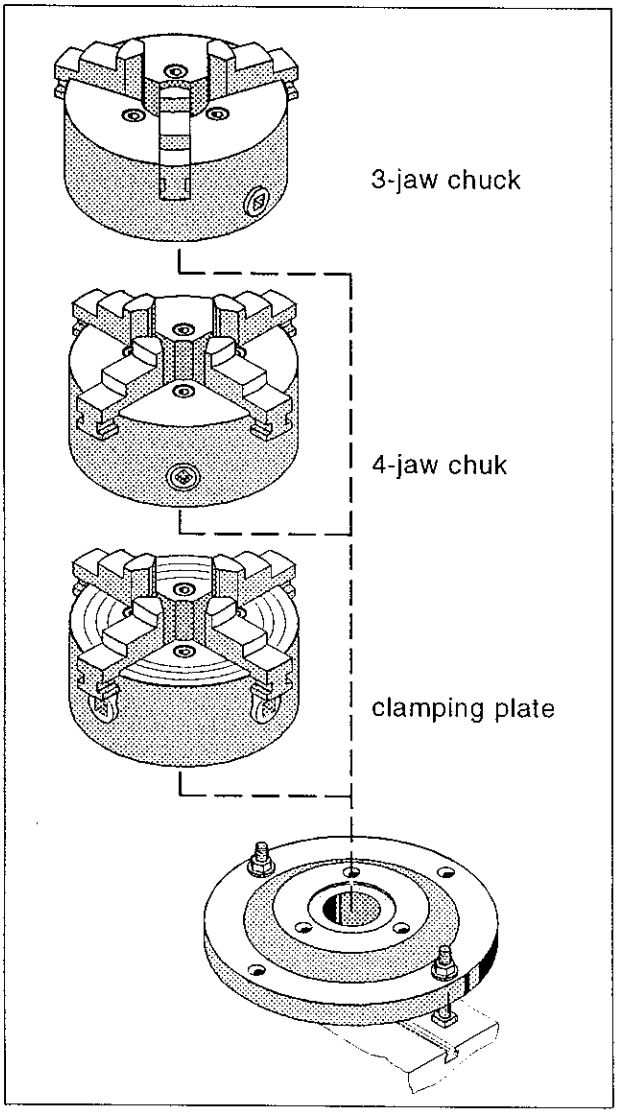
Mounting the support flange

Mounting the support flange on the milling table

- Thread in support flange (6) with both T-slot screws 15 x 4,5 (8) on the milling table (7).
- Tighten clamping nuts SW13 (9).

Chucks

Also mind the instruction enclosed in the respective chuck.



Chucks

3-jaw chuck

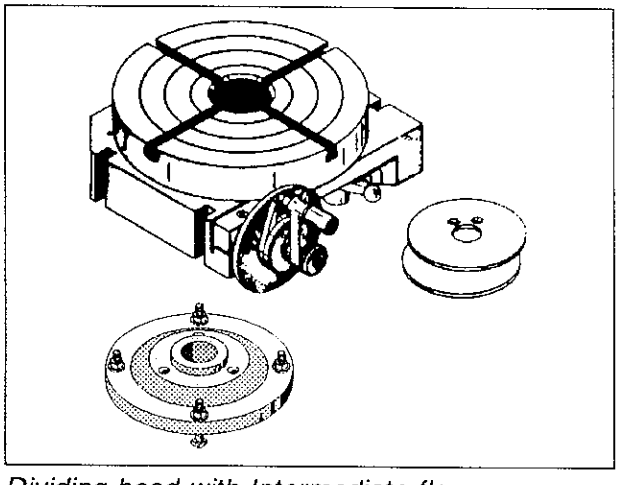
Order no. V1C 326
Serves for centre clamping of round, hexagonal and twelve-sided workpieces.

4-jaw chuck

Order no. V1C 328
Serves for centre clamping of round, four-sided and eight-sided workpieces.

Clamping plate

Order no. P3E 324
With the clamping plate workpieces can be clamped centrically and eccentrically. Each jaw can be adjusted and reversed individually.



Dividing head with Intermediate flange

Dividing head

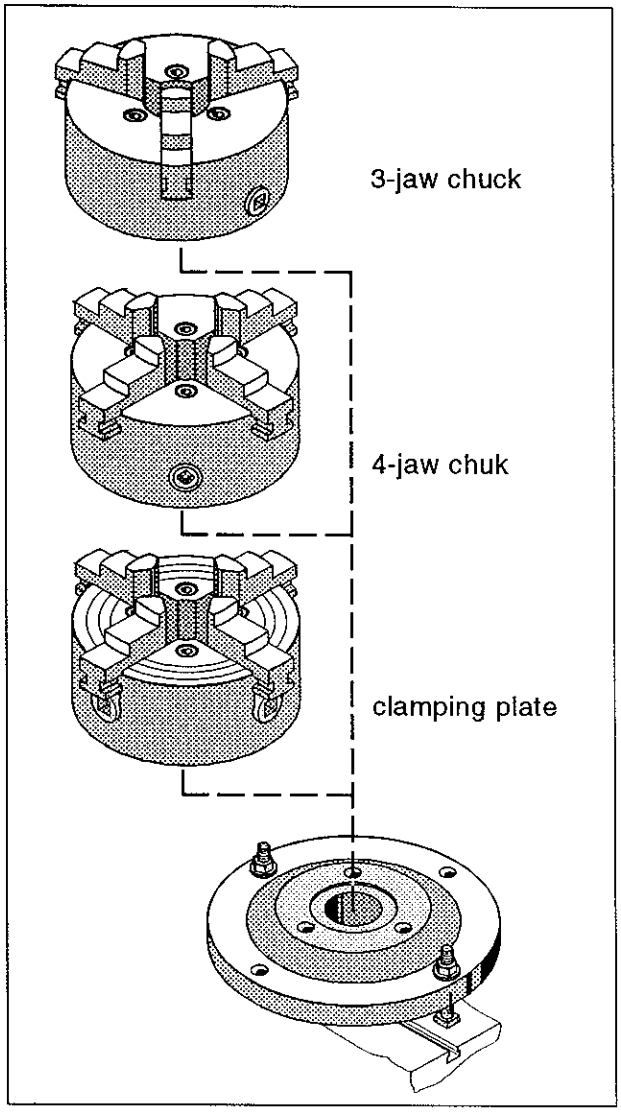
Order-No. 745 000

Dividing head with table ø150 mm and indexing disks.
For manufacturing gears, squears, hexagons, etc.

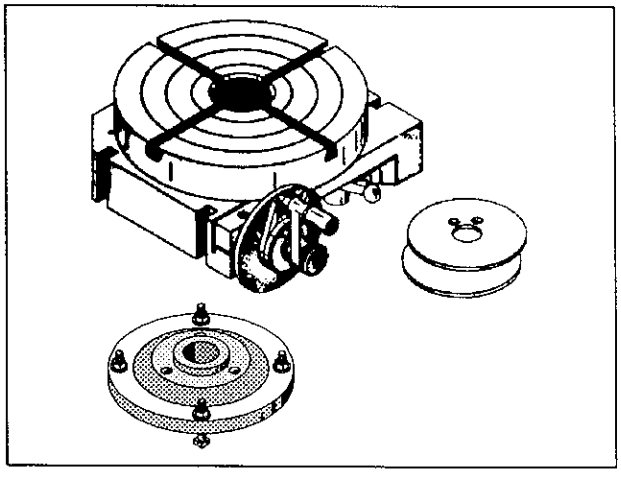
Intermediate flange

Order-No. B4Z 170

Necessary to mount chucks and clamping plate on the dividing head.



Chucks



Dividing head with Intermediate flange

Chucks

Also mind the instruction enclosed in the respective chuck.

3-jaw chuck

Order no. V1C 326
Serves for centre clamping of round, hexagonal and twelve-sided workpieces.

4-jaw chuck

Order no. V1C 328
Serves for centre clamping of round, four-sided and eight-sided workpieces.

Clamping plate

Order no. P3E 324
With the clamping plate workpieces can be clamped centrically and eccentrically. Each jaw can be adjusted and reversed individually.

Dividing head

Order-No. 745 000

Dividing head with table ø150 mm and indexing disks.
For manufacturing gears, squears, hexagons, etc.

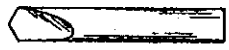
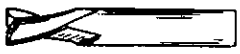
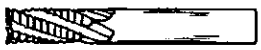
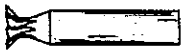
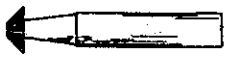
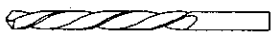
Intermediate flange

Order-No. B4Z 170

Necessary to mount chucks and clamping plate on the dividing head.

Tools

All listed tools are to be ordered by EMCO with the given Order-Numbers.

	Description	Order-No.
	**NC-start drill (HSS)**	
	shank-ø 10mm, acute angle 120°	**771 010**
	**Slot milling cutter (HSS) according to DIN 327, form B**	
	milling-ø 3mm, shank-ø 6mm	**764 301**
	milling-ø 4mm, shank-ø 6mm	**764 302**
	milling-ø 5mm, shank-ø 6mm	**764 303**
	milling-ø 6mm, shank-ø 6mm	**764 304**
	milling-ø 8mm, shank-ø 8mm	**764 306**
	milling-ø 10mm, shank-ø 10mm	**764 308**
	milling-ø 12mm, shank-ø 12mm	**773 300**
	**Heavy duty shank cutter (HSS) acc. to DIN 844, form A**	
	milling-ø 8mm, shank-ø 8mm	**764 200**
	milling-ø 10mm, shank-ø 10mm	**781 152**
	milling-ø 12mm, shank-ø 12mm	**781 151**
	milling-ø 16mm, shank-ø 16mm	**771 020**
	**Radius milling cutter (HSS)**	
	shank-ø 6mm	**771 030**
	shank-ø 12mm	**771 040**
	**Angle milling cutter (HSS) acc. To DIN 1833, form A, 60°**	
	milling-ø 16mm, shank-ø 12mm	**764 400**
	**Angle milling cutter (HSS) acc. To DIN 1833, form B, 45°**	
	milling-ø 16x4mm, shank-ø 12mm	**771 050**
	**Boring bar**	
	for bores ø16-40mm, shank-ø 15mm	**F1Z 050**
	**Edge indicator**	
	ø4/ø10mm, shank-ø 10mm	**F1Z 090**
	**Taps**	
	Set of 5 taps M3-M8	**781 300**
	**Drills**	
	Set of 25 drills for core holes	**271 230**
	**Heavy duty shell end mill (HSS), bore ø16mm**	
	ø40x20mm, bore ø16mm with roughing-/ finishing teeth	**764 410**
	**Staggered tooth side mill (HSS), bore ø16mm**	
	ø35x5mm	**764 900**
	ø50x6mm	**764 910**

Determination of the speed S during milling and drilling

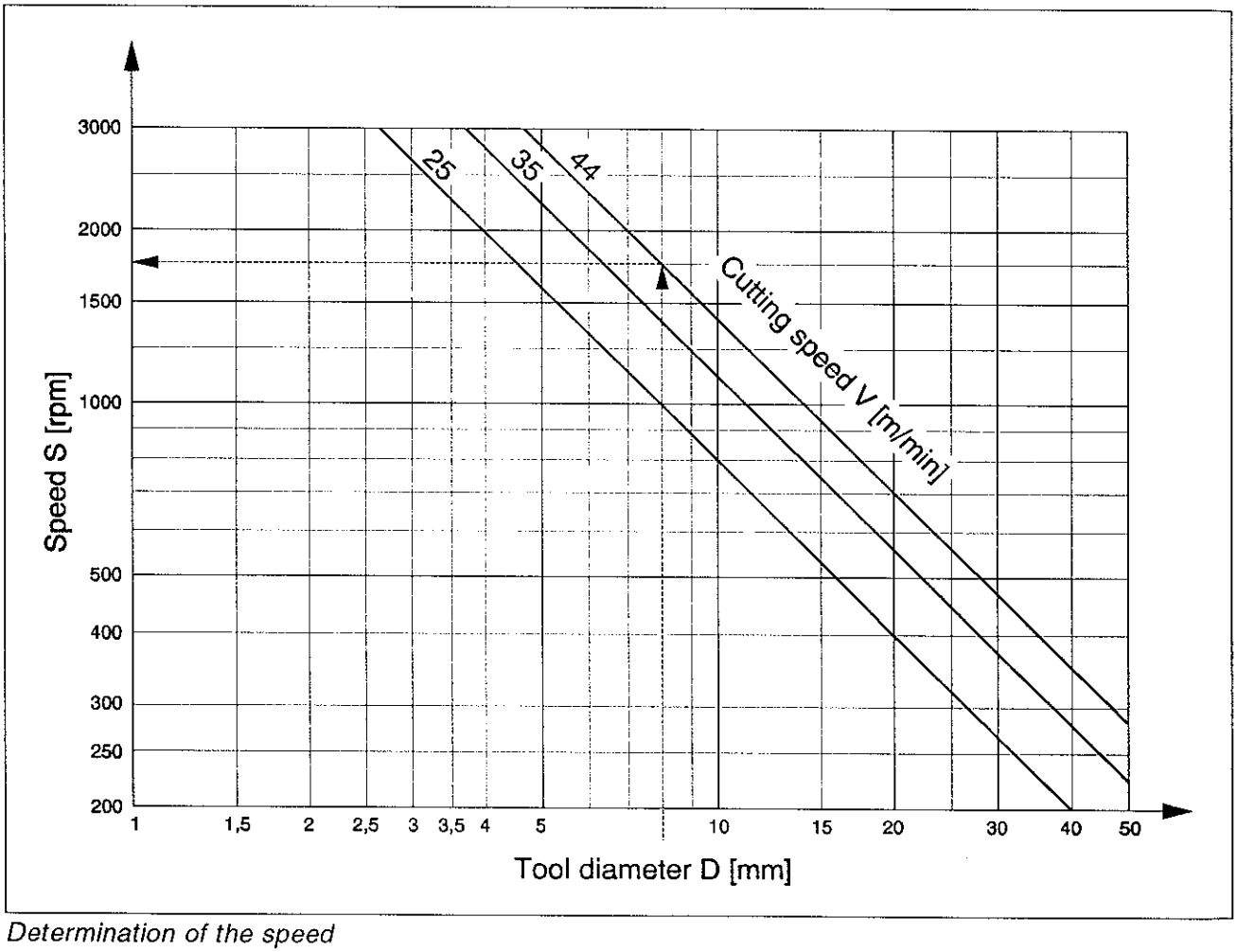
Example:

You know:

- tool diameter ..... D = ø8 mm
- cutting speed ..... V = 44 m/min

You want to know:

- speed S in [rpm]



Determination of the speed

Solution:

speed ..... S = 1750 rpm

Determination of the cutting depth t during milling

Example:

You know:

- workpiece material ..... Torradur B
- diameter of milling cutter ..... D = ø12 mm
- feed speed ..... F = 70 mm/min

You want to know:

- cutting depth t in [mm]

Determination of the feed speed F during milling

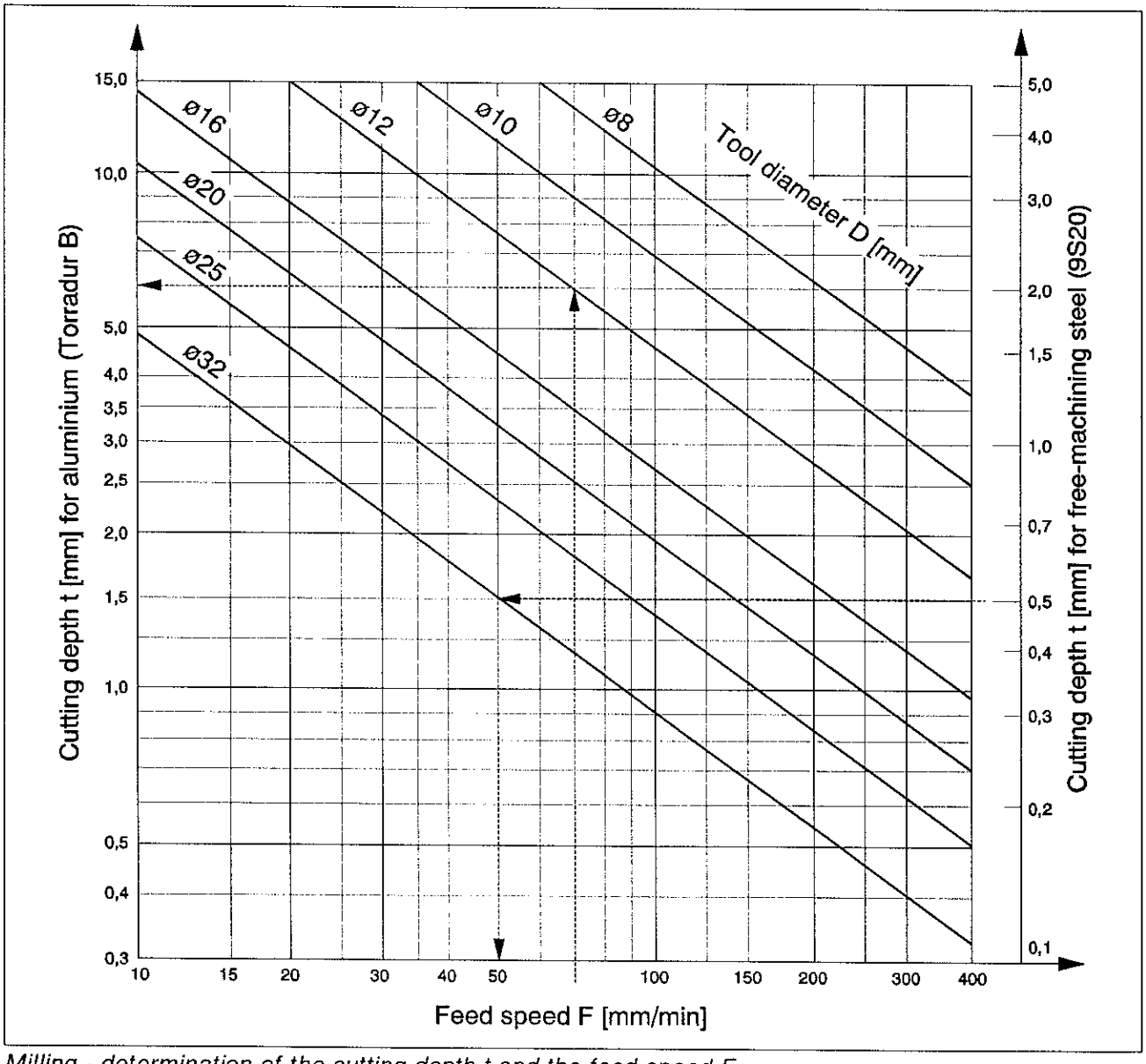
Example:

You know:

- workpiece material free-machining steel 9S20
- diameter of the milling cutter..... D = ø32 mm
- cutting depth ..... t = 0,5 mm

You want to know:

- feed speed F in [mm/min]



Milling - determination of the cutting depth t and the feed speed F

Solution:

cutting depth ..... t = 6 mm

Solution:

feed speed ..... F = 50 mm/min

Determination of the feed speed F during drilling

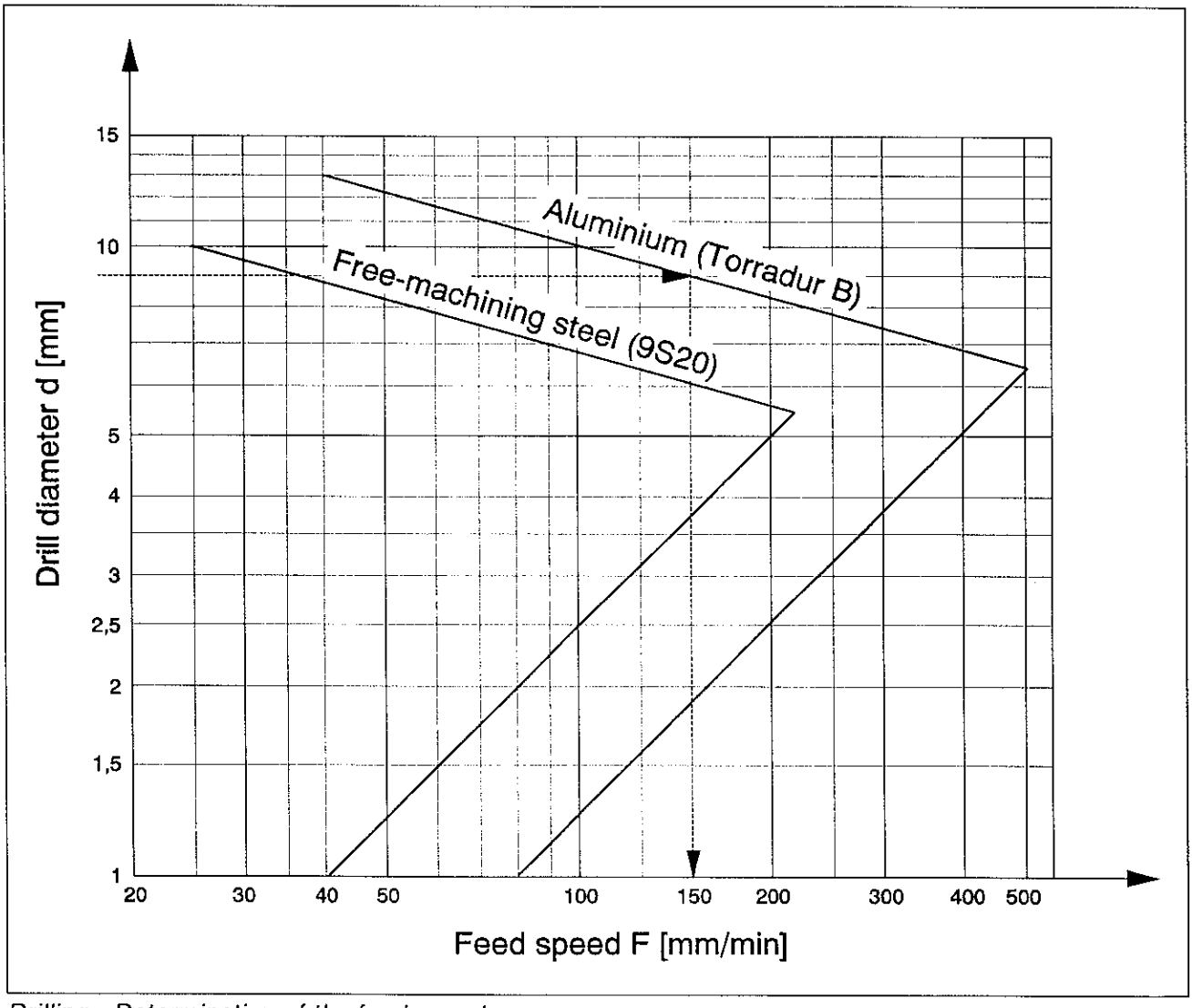
Example:

You know:

- workpiece material ..... Torradur B
- diameter of drill ..... D = ø9 mm

You want to know:

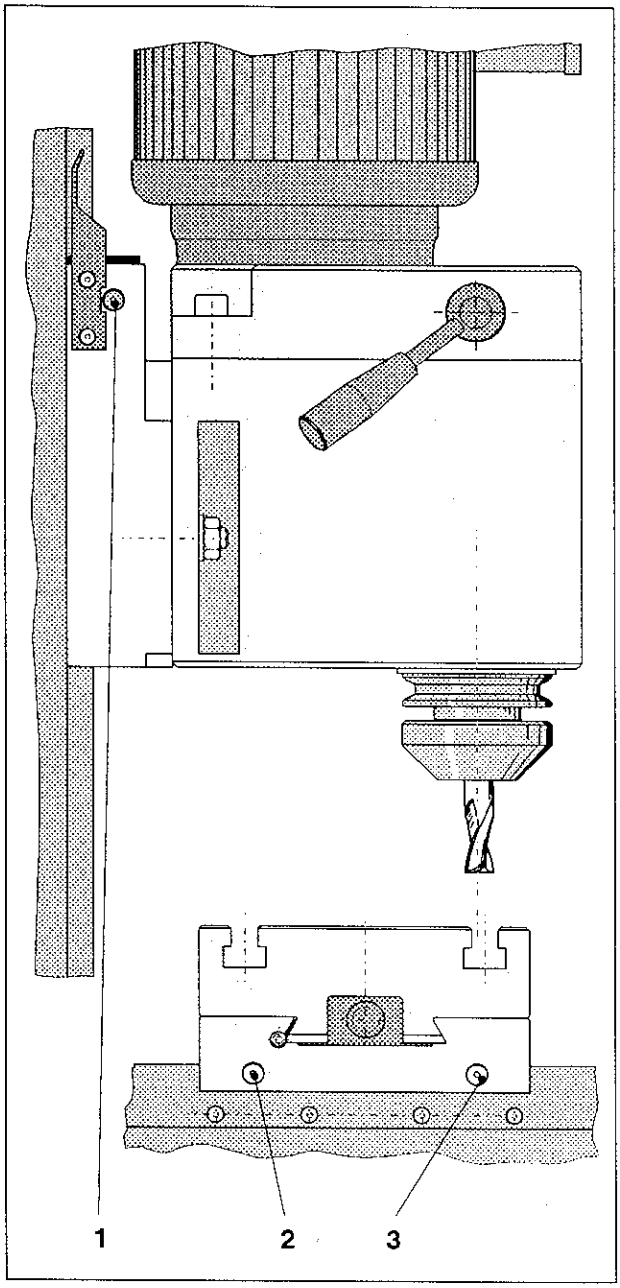
- Feed speed F in [mm/min]



Drilling - Determination of the feed speed

Solution:

feed speed ..... F = 150 mm/min



Lubricating nipples at the machine

Maintenance of the machine

Danger:
All adjustment and maintenance work may only be carried out with the machine switched off.

Clean the machine carefully from chips and other dirt after each operation.

Note:
Never clean the machine with compressed air since chips get jammed in the guides and thus could cause damages at the guides.

Slightly oil the milling table and the blank guides every day with slideway oil.

The guideways are supplied daily with slideway oil via the lubricating nipples (1), (2) and (3).

Main spindle bearing and ball screws of the slide guides are maintenance-free.

DIN
CGLP
68
51502

Slideway oil

DIN designation: CGLP DIN 51 502 ISO VG 68

e.g.:

BP	Maccurat 68
CASTROL	Magnaglide D 68
ESSO	Febis K 68
KLÜBER	Lamora Super Pollad 68
MOBIL	Vactra No. 2

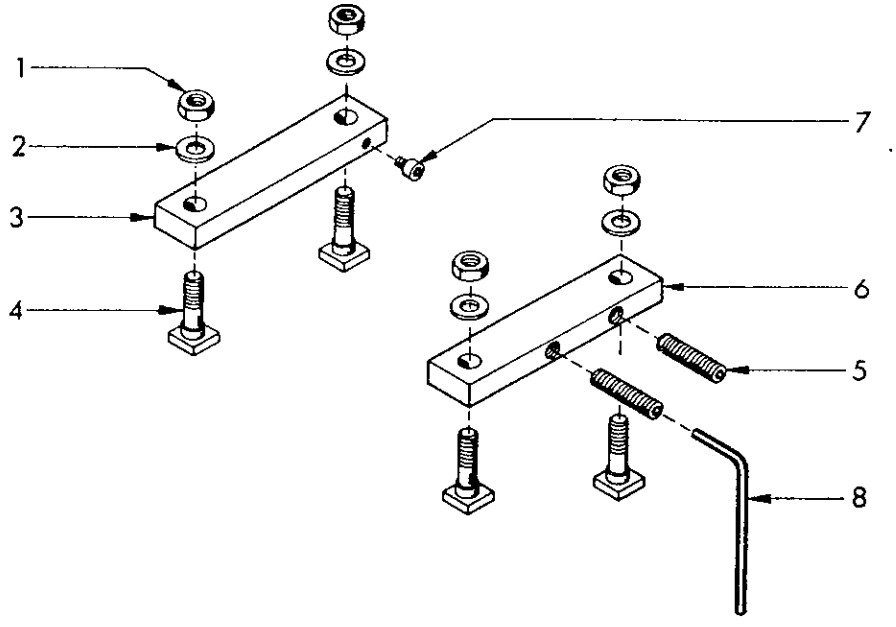
Ersatzteilliste EMCO PC MILL 55
Service parts for EMCO PC MILL 55
Pièces de service pour EMCO PC MILL 55

Ausgabe 99-11
Edition 99-11

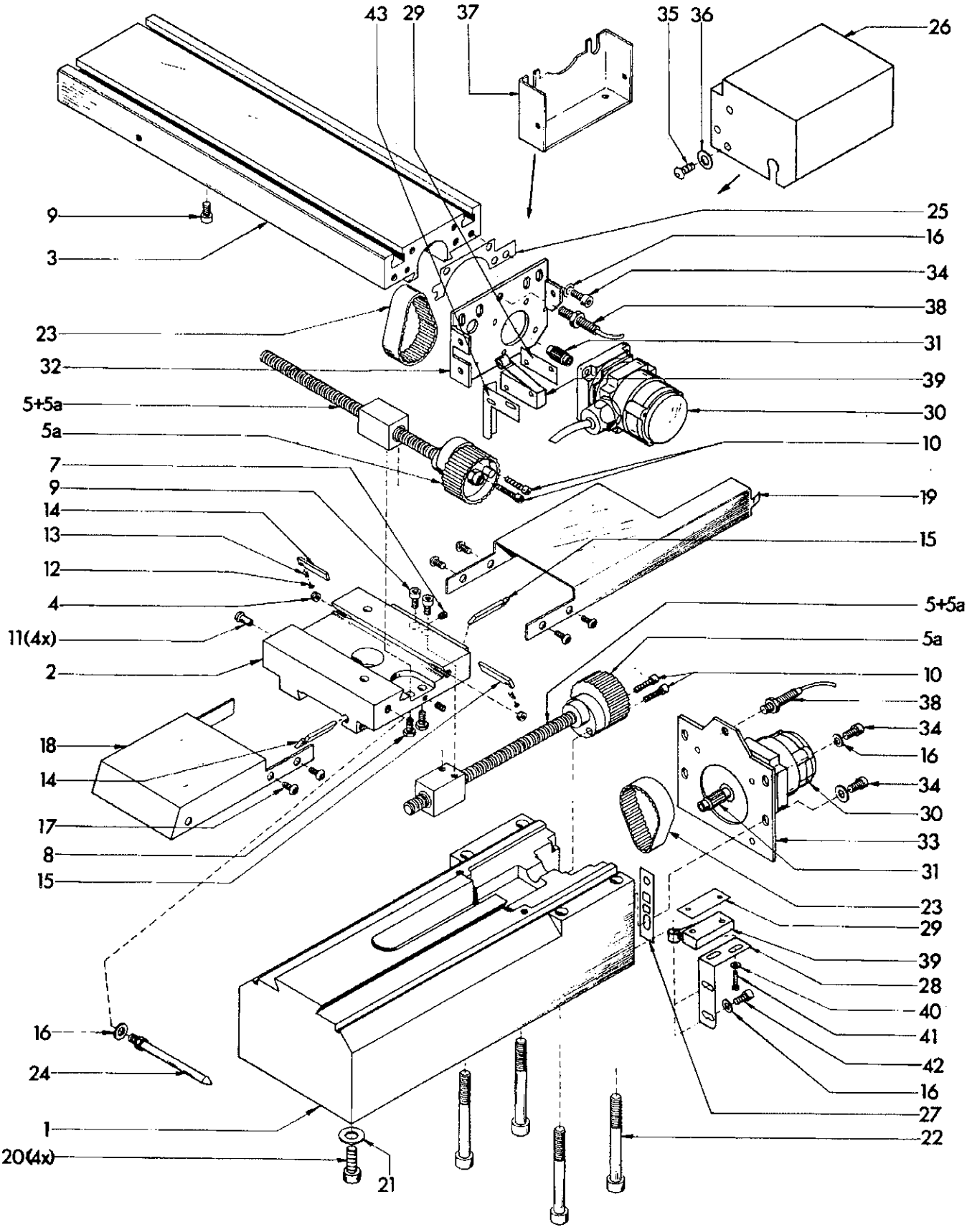
In dieser Neuauflage sind alle veränderten bzw. neuen Positionen grau markiert.
Changed resp. new positions are marked grey in this new edition.
Positions changées sont maquées en gris dans cette nouvelle édition.

EMCO MAIER Gesellschaft m.b.H. – Postfach 131 – A-5400 Hallein/Austria – Tel. (06245) 891 – Fax (06245) 86965

Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
				Werkzeuge	**Tools**	**Outils**
	ZWZ 993 010	T18012 SPMST		Stoßfettpresse	Grease gun	Pompe de graissage
	F1A 190 000			Gleitölflasche	Oil bottle	Bouteille de huile
	ZST 110 710	6 h11x100 DIN 7		Zylinderstift	Parallel pin	Tige de serrage
	ZWZ 95 1310			Doppelmaulschlüssel	Double ended spanner	Clé plate double
	ZWZ 11 0250	SW 2,5 DIN 911		Innensechskantschlüssel	Hexagonal key	Clé à six pans
	ZWZ 11 0300	SW 3 DIN 911		Innensechskantschlüssel	Hexagonal key	Clé à six pans
	ZWZ 11 0400	SW 4 DIN 911		Innensechskantschlüssel	Hexagonal key	Clé à six pans



Pos.	Ref. No.	Type		Benennung	Description	Designation
	783 100	**F1Z 060**		**Gruppe Tischspannleiste**	**Table clamping gib compl.**	**Barres de serrage**
1	ZMU 34 0800	M8 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
2	ZSB 25 0840	B8,4 DIN 125		Scheibe	Washer	Rondelle
3	F1Z 060 010			Anschlagleiste	Stop gib	Barres de butée
4	C4Z 030 020			Nutenschraube	T-nut bolt	Boulon en T
5	ZSR 99 0003	M8x35		Stiftschraube	Set screw	Vis pointeau
6	F1Z 060 020			Spannleiste	Clamping gib	Barres de serrage
7	ZSR 12 0506	M5x6 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
8	ZWZ 11 0400	SW4 DIN 911		Schraubendreher	Hexagonal key	Clé à six pans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20(4x)
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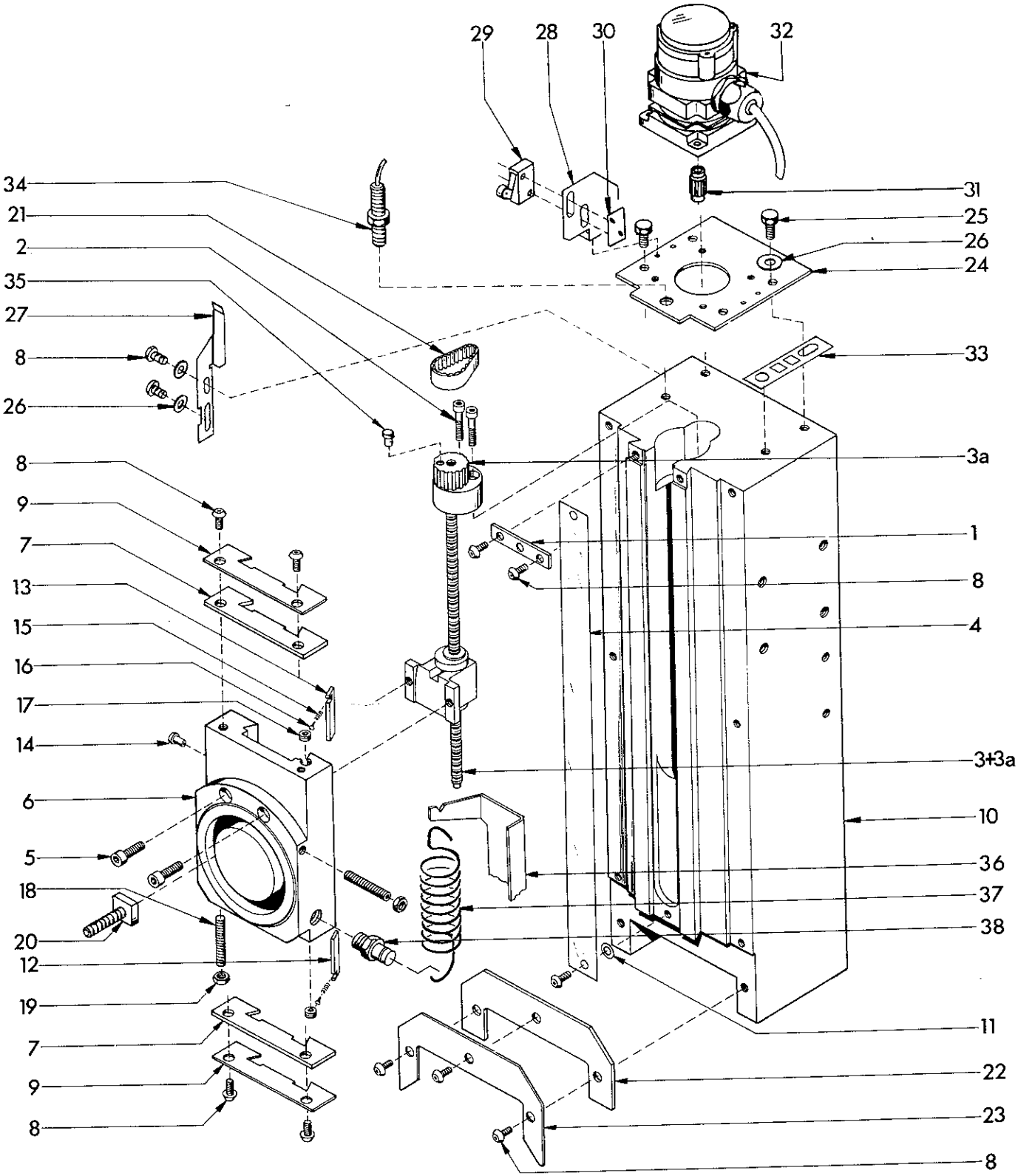
Pos.	Ref.No.	DIN		Benennung	Description	Designation
15	**F1L 030 001**			**G. Kreuzschlitten**	**Cross slide compl.**	**Ens. Chariot transversal**
1	F1A 030 011			Sockel	Base	Socle
2	F1L 030 020			Kreuzschlitten	Cross slide	Chariot transversal
3	F1A 030 030			Frästisch	Milling table	Table de fraisage
4	F1A 020 070			Stellschraube	Adjusting screw	Vis de réglage
5+5a	F1L 031 000			X/Y-Spindel komplett	X/Y-spindle complete	Ens. vis-mère X/Y
5a	F1A 020 130			Riemenscheibe 40	Pulley 40	Poulie 40
7	ZST 130 404	M4x4 DIN 913-45H		Gewindestift	Set screw	Vis pointeau
8	ZSR 340 616	M6x16 DIN 933-8.8		Sechskantschraube	Hexagon head screw	Vis hexagonal
9	ZSR 120 612	M6x12 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
10	ZSR 120 525	M5x25 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
11	ZNP 012 000	A2		Schmiernippel	Grease nipple	Graisseur
12	ZNA 760 204	2,0x4 DIN 1476-4.6		Kerbnagel	Rivet	Clou cannelé
13	ZFD 204 061	D-061		Druckfeder	Compression spring	Ressort de pression
14	F1A 020 050	4,68 mm		Keilleiste kurz links	Taper gib short left	Lardon conique à gauche
	F1A 020 060	4,55 mm		Keilleiste lang links	Taper gib long left	Lardon conique à gauche
15	F1A 020 110	4,68 mm		Keilleiste kurz rechts	Taper gib short right	Lardon conique à droite
	F1A 020 120	4,55 mm		Keilleiste lang rechts	Taper gib long right	Lardon conique à droite
16	ZSB 250 640	B6,4 DIN 125 ST		Scheibe	Washer	Rondelle
17	ZSR 880 610	M6x10 -10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
18	F1L 000 010			Schutzblech 1	Cover sheet 1	Tôle de protection 1
19	F1L 000 021			Schutzblech 2	Cover sheet 2	Tôle de protection 2
20	ZSR 121 020	M10x20 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
21	ZSB 251 050	B10,5 DIN 125-St		Scheibe	Washer	Rondelle
22	ZSR 121 090	M10x90 DIN 912-10.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
23	ZRM 525 600	600 MXL 050		Zahnriemen	Timing belt	Courroie crantée
24	F1L 000 620			Schaltstift	Switching bolt	Boulon de misen au point
25	F1L 000 630			Distanzblech X	Spacer sheet metal X	Tôle d' éspacement
26	F1C 000 430			Abdeckung X	Cover X	Couvercle X
27	F1L 000 650			Distanzblech Y	Spacer sheet Y	Tôle d' écartement Y
28	F1L 000 640			Endschalterblech Y	Support sheet Y	Tôle de support
29	A6L 000 350			Gewindeblech	Thread sheet metal	Tôle de filetage
30	ZMO 780 030*	VDRM 564-50LN		Schrittmotor X,Y,Z	Step motor X,Y,Z	Moteur pas à pas X,Y,Z
	ZMO 780 031**	VRDM366/50LHA	Bergerlahr	Schrittmotor X, Y, Z	Step motor X, Y, Z	Moteur pas à pas X, Y, Z
31	F1L 621 010*			Riemenscheibe 20	Pulley 20	Poulie 20
	A6P 090 000**			Riemenscheibe 20	Pulley 20	Poulie 20
32	F1L 000 150*			Motorplatte X	Motor plate X	Plaque de moteur X
	F1C 000 150**			Motorplatte X	Motor plate X	Plaque de moteur X
33	F1L 000 160*			Motorplatte Y	Motor plate Y	Plaque de moteur Y
	F1C 000 160**			Motorplatte Y	Motor piate Y	Plaque de moteur Y
34	ZSR 120 616	M6x16 DIN 912		Zylinderschraube	Socket head screw	Vis 6 pans creux
35	ZSR 880 510	M5x10-8.8		Linsenschraube	Filister head screw	Vis à tête lentiforme
36	ZSB 210 530	B5,3 DIN 125-St		Scheibe	Washer	Rondelle
37	F1C 000 140			Riemenschutz	Belt protection	Protection de courroie
38	ZEL 212 022	1200mm lg.		Näherungsschalter	Proximity dedector	Initiateur inductiv
39	ZEL 239 002	MILTAC		Schnappschalter	Quick break switch	Interrupteur instantané
40	ZSB 210 320	A3,2 DIN 9021-ST		Scheibe	Washer	Rondelle
41	ZSR 840 316	M3x16 DIN 84-4.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
42	ZSR 120 612	M6x12 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
43	F1L 621 020			Endschalterblech X	Limit switch sheet X	Tôle d'commutateur X

*) für Maschinen bis Maschinennummer F1C M2 025

**) für Maschinen ab Maschinennummer F1C M6 001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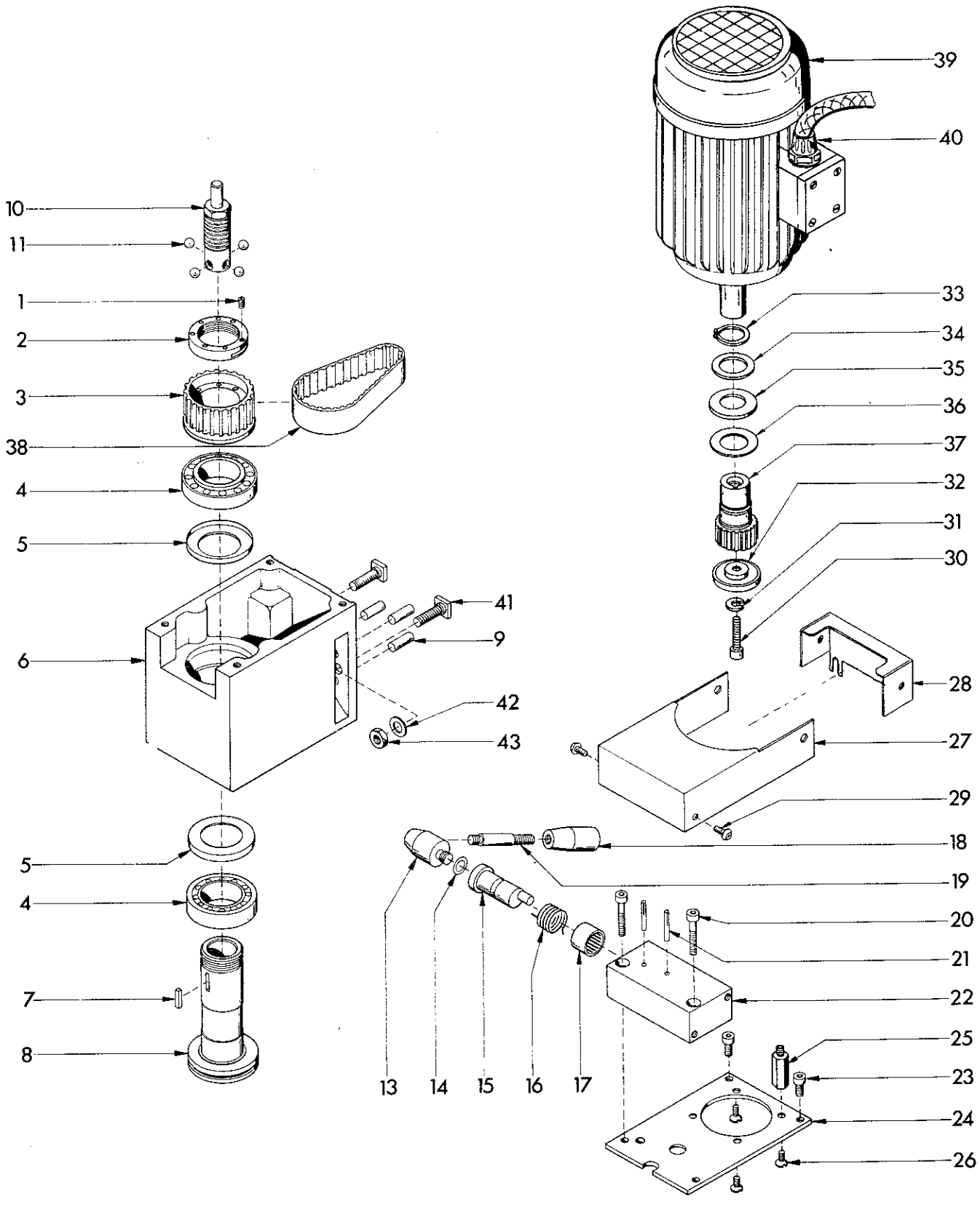
Pos.	Ref.No.	DIN		Benennung	Description	Designation
1-20	**F1L 020 000**			**G. Vertikalschlitten**	**Vertical slide compl.**	**Ens. chariot vertical**
1	F1A 020 040			Halteblech	Clamping sheet	Tôle d' arrêt
2	ZSR 120 525	M5x25 DIN912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
3+3a	F1L 021 000			Z-Spindel komplett	Z-spindle complete	Ens vis-mère Z
3a	F1A 020 130			Riemenscheibe 40	Pulley 40	Poulie 40
4	F1A 020 030			Schutzband	Protection strip	Bande de protection
5	ZSR 120 620	M6x20 DIN912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
6	F1L 020 020			Vertikalschlitten	Vertical slide	Chariot vertical
7	F1A 020 080			Abstreiffilz	Feltwiper	Feutre racleur
8	ZSR 880 610	M6x10-6.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
9	F1A 020 090			Abstreifblech	Wiper plate	Tôle racleur
10	F1A 020 010			Vertikalsäule	Vertical column	Colonne verticale
11	ZSB 120 605	PS6x12x0,5 DIN988		Paßscheibe	Shim ring	Rondelle d' ajustage
12	F1A 020 050		4,68 mm	Keilleiste	Taper gib	Lardon conique
	F1A 020 060		4,55 mm	Keilleiste	Taper gib	Lardon conique
13	F1A 020 110		4,68 mm	Keilleiste	Taper gib	Lardon conique
	F1A 020 120		4,55 mm	Keilleiste	Taper gib	Lardon conique
14	ZNP 012 000	A2		Schmiernippel	Grease nipple	Graisseur
15	ZFD 204 061	D-061		Druckfeder	Compression spring	Ressort de pression
16	ZNA 760 204	2x4 DIN 1476-4.6		Kerbnagel	Rivet	Clou cannelé
17	F1A 020 070			Stellschraube	Adjusting screw	Vis de réglage
18	ZST 150 640	M6x40 DIN915-45H		Gewindestift	Set screw	Vis pointeau
19	ZMU 340 600	M6 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
20	C4Z 030 020			Nutenschraube	T-nut bolt	Boulon en T
21	ZRM 525 600	600 MXL 050		Zahnriemen	Timing belt	Courroie crantée
22	F1A 000 350			Filzabstreifer	Felt wiper	Feutre racleur
23	F1A 000 030			Dichtblech	Wiper plate	Tôle racleur
24	F1L 000 170*			Motorplatte Z	Motor plate Z	Plaque de moteur Z
	F1C 000 170**			Motorplatte Z	Motor plate Z	Plaque de moteur Z
25	ZSR 330 616	M6x16 DIN 933-6.9		Sechskantschraube	Hexagon head screw	Vis hexagonal
26	ZSB 025 640	B6,4 DIN 125 ST		Scheibe	Washer	Rondelle
27	F1L 000 660			Schaltblech Z	Switch sheet metal Z	Tôle d' commutateur defin de course Z
28	F1L 623 000			Endschalterblech Z	Limit switch sheet metal Z	Tôle d' commutateur defin de course Z
29	ZEL 239 002	MILTAC		Schnappschalter	Quick break switch	Interrupteur instantané
30	A6L 000 350			Gewindeblech	Thread sheet metal	Tôle de filetage
31	F1L 621 010*			Riemenscheibe 20	Pulley 20	Poulie 20
	A6P 090 000**			Riemenscheibe 20	Pulley 20	Poulie 20
32	ZMO 780 030*	VDRM 564-50LN		Schrittmotor X,Y,Z	Step motor X,Y,Z	Moteur pas à pas X,Y,Z
	ZMO 780 031**	VRDM 366/50LHA		Schrittmotor X,Y,Z	Step motor X,Y,Z	Moteur pas à pas X,Y,Z
33	F1L 000 650			Distanzblech Y	Spacer sheet Y	Tôle d' écartement Y
34	ZEL 212 022	1200mm lg.		Näherungsschalter	Proximity dedector	Initiateur inductiv
35	A6L 020 090			Stift	Pin	Broche
36	F1T 000 840**			Federhalter	Support sheet	Tôle-support
37	ZFD 500 149**			Zugfeder	Tension spring	Ressort de traction
38	F1C 000 730**			Federbolzen	Bolt	Boulon

*) für Maschinen bis Maschinennummer F1C M2 025

**) für Maschinen ab Maschinennummer F1C M6 001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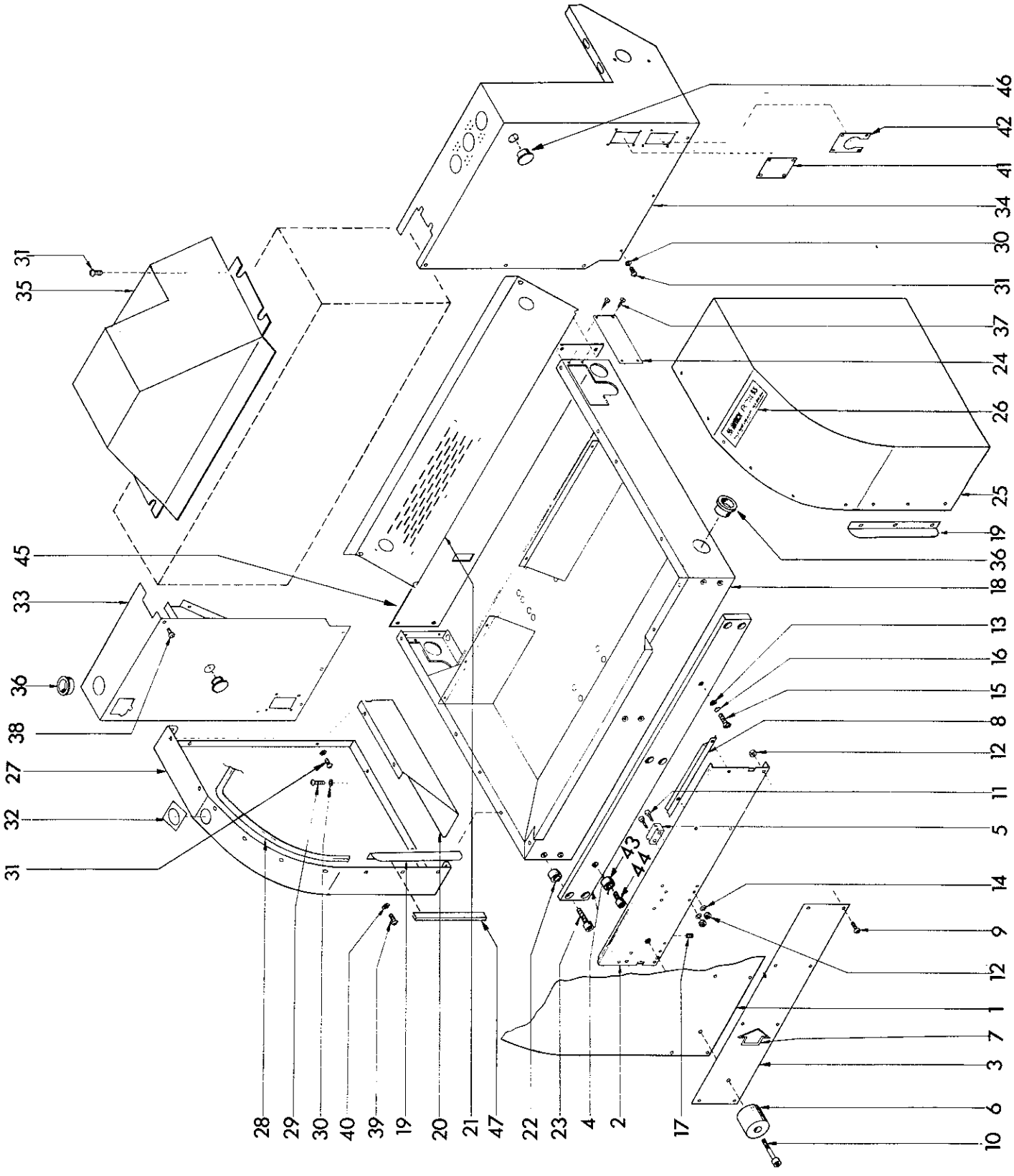
Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
1-38	**F1L 010 000***			**G. Fräskopf**	**Milling head compl.**	**Ens. tête de fraisage**
1-38	**F1C 010 000****			**G. Fräskopf**	**Milling head compl.**	**Ens. tête de fraisage**
1	ZSR 270 416	M4x16 DIN 427-5.8		Schaftschraube	Set screw	Vis pointeau
2	F1L 010 040*			Ringmutter	Ring nut	Ecrou crénelé
	F1C 010 040**			Ringmutter	Ring nut	Ecrou crénelé
3	F1L 010 030*			Riemenscheibe 38	Pulley 38	Poulie 38
	F1C 010 030**			Riemenscheibe 38	Pulley 38	Poulie 38
4	ZLG 320 076			Kegelrollenlager	Taper rolled bearing	Roulement à rouleaux coniques
5	B1A 030 060			Deckel	Cover	Couvercle
6	F1A 010 010			Fräskopf	Milling head	Tête de fraisage
7	ZFD 854 418	A4x4x18 DIN 6885		Paßfeder	Square key	Clavette parallèle
8	F1A 010 020			Frässpindel	Milling spindle	Broche de fraisage
9	ZST 070 824	8m6x24 DIN 6325		Zylinderstift	Parallel pin	Tige de serrage
10	F1A 040 000			Federeinheit	Belleville spring ass.	Unité à ressort
11	ZKG 001 071	ø 7 GK4 DIN5401		Kugel	Ball	Bille
13	F1A 000 410			Nabe	Hub	Moyeu
14	ZSB 121 001	10x16x0,1 DIN 988		Paßscheibe 0,1	Shim ring 0,1	Rondelle d' ajustage 0,3
	ZSB 121 003	10x16x0,3 DIN 988		Paßscheibe 0,3	Shim ring 0,3	Rondelle d' ajustage 0,3
15	F1A 000 070			Exzenterbolzen	Eccentric bolt	Boulon d'exentrique
16	F1A 000 100			Schenkelfeder	Torsion spring	Ressort à branches
17	ZLG 781 816	INA-HK 1816		Nadellager	Needle roller bearing	Roulement à aiguilles
18	ZGF 162 108	21M8 GN 519		Zylinderknopf	Cylindrical knob	Poignée de cylindre
19	F1A 000 080			Stange	Bar	Barre
20	ZSR 120 635	M6x35 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
21	ZST 720 530			Paßkerbstift	Grooved pin	Goupille fendue
22	F1A 000 400			Exzenterblock	Eccentric block	Bloc d'excentrique
23	ZSR 120 612	M6x12 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
24	F1L 000 050*			Motorplatte	Motor plate	Plaque de moteur
	F1C 000 050**			Motorplatte	Motor plate	Plaque de moteur
25	F1L 000 700			Distanzbolzen	Distance bolt	Boulon d'écartement
26	ZSR 790 512	M5x12 DIN 7991-8.8		Senkschraube	Counter sunk screw	Vis tête fraise
27	F1L 000 420*			Abdeckhaube	Cover	Couvercle
	F1C 000 420**			Abdeckhaube	Cover	Couvercle
28	F1L 000 710			Halter	Holder	Appui
29	ZSR 880 610	M6x10-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
30	ZSR 120 545	M5x45 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
31	ZRG 280 050	B5 DIN 127		Federring	Spring washer	Rondelle ressort
32	F1L 000 120*			Bordscheibe	Washer	Rondelle
	F1C 000 120**			Bordscheibe	Washer	Rondelle
33	ZRG 712 512*	W25x1,2 DIN 471		Sicherungsring	Retaining ring	Circlip
	ZRG 713 015**	W30x1,5 DIN 471		Sicherungsring	Retaining ring	Circlip
34	ZSB 122 503*	PS 25x35x0,3		Paßscheibe	Shim	Rondelle d'ajustage
35	ZSB 026 002*	6002/K2		Ausgleichscheibe	Compensating washer	Rondelle de compensation
	ZSB 026 004**	6004/K2		Ausgleichscheibe	Compensating washer	Rondelle de compensation
36	ZSB 108 402*	SS28x40x2		Stützscheibe	Supporting disk	Rondelle pour bague de frein
	F1C 000 130**			Anlaufscheibe	Supporting disk	Rondelle pour bague de frein
37	F1L 000 110*			Motorriemenscheibe	Motor pulley	Poulie de moteur
	F1C 000 110**			Motorriemenscheibe	Motor pulley	Poulie de moteur
38	ZRM 513 110	110 XL 075		Zahnriemen	Timing belt	Courroie dentée
39	ZMO 473 380*	0,37 kW , 1370U/min		Hauptmotor	Motor	Moteur
	ZMO 473 381**	0,55 kW , 1400U/min		Hauptmotor	Motor	Moteur
40	ZLT 500 100	LKI 11		Schlauchverschraubung	Screw-type conduit fitting	Raccord à vis pour tuyaux
41	C4Z 030 020			Nutenschraube	T-nut screw	Boulon en T
42	ZSB 25 0840	8,4 DIN 125		Scheibe	Washer	Rondelle
43	ZMU 33 0801	M8 DIN 934-10B1E		Mutter	Nut	Ecrou

*) für Maschinen bis Maschinennummer F1C M2 025

**) für Maschinen ab Maschinennummer F1C M6 001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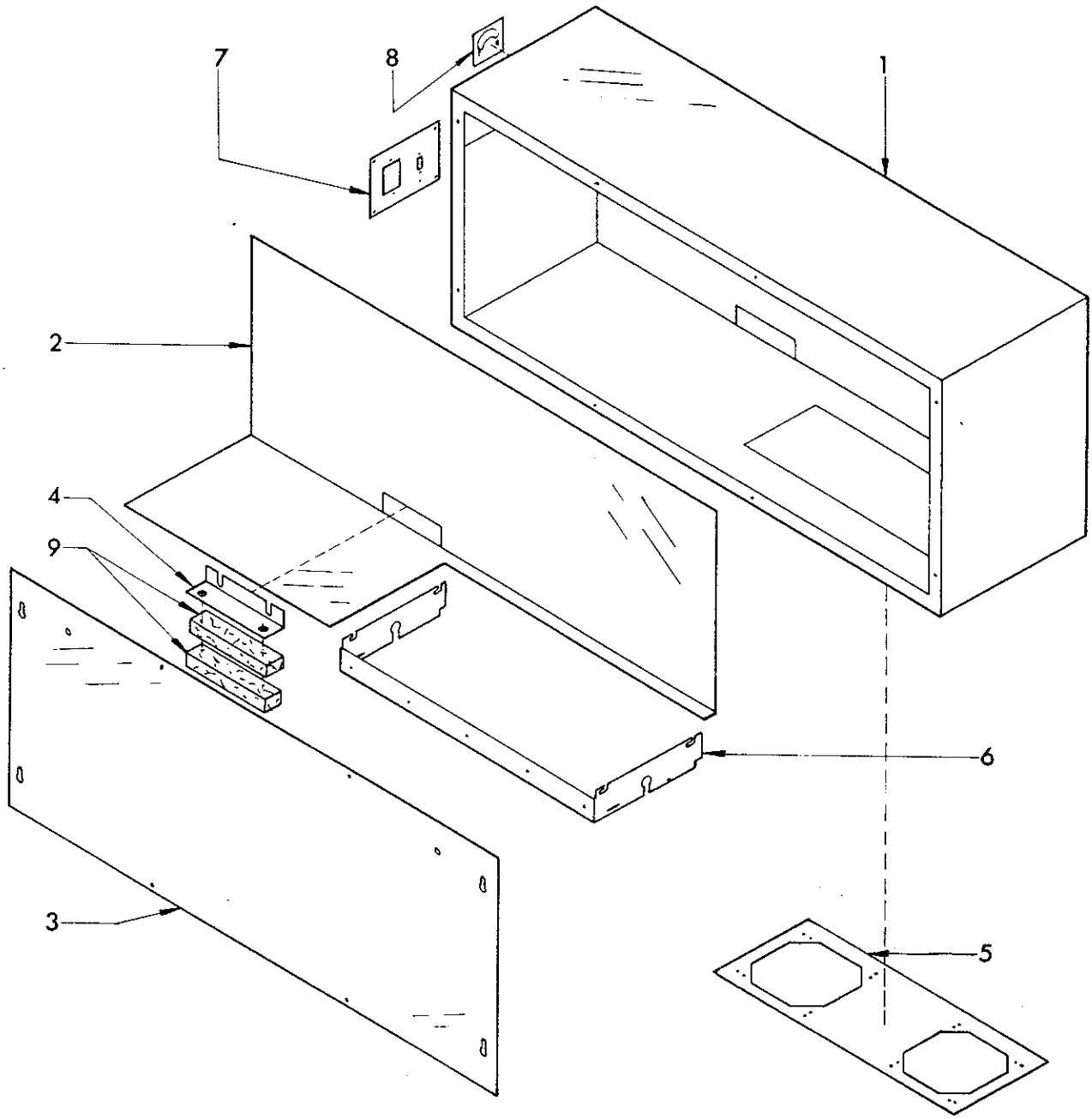
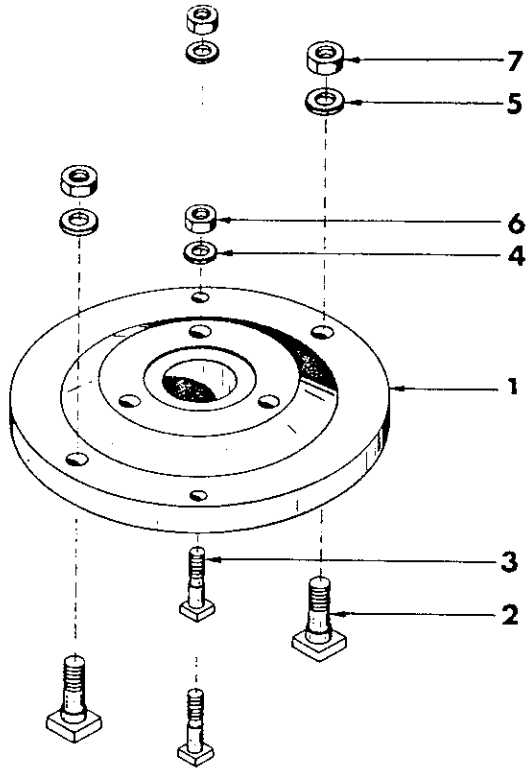
Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
				Blechaufbau	**Sheet metal assembly**	**Assemblage en tôle**
1-17	**F1L 290 000**			**G. Tür**	**Door compl.**	**Ens. Porte**
1	F1A 000 240			Tür	Door	Porte
2	F1L 000 450			Türblech	Door sheet	Tôte de porte
3	F1L 000 460			Frontblech	Front sheet metal	Capot en tôle
4	F1A 000 480			Führungsschiene	Safeguard	Glissière
5	F1A 000 490			Führungsleiste	Giuide bead	Barre conductrice
6	F1A 000 510			Griff	Handle	Poignée
7	F1L 000 570			Pfeil	Arrow	Flèche
8	F1L 291 000			Schaltblech	Switch sheet metal	Tôle d'interrupteur
9	ZSR 880 520	M5x20 - 10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
10	ZSR 120 855	M8x55 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
11	ZSR 120 520	M5x20 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
12	ZMU 340 500	M5 DIN 934-5		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
13	ZSB 250 530	B5,3 DIN 125-ST		Scheibe	Washer	Rondelle
14	ZSB 980 530	A5,3 DIN 6798		Fächerscheibe	Serrated lock washer	Rondelle éventail
15	ZSR 790 512	M5x12 DIN 7991-8.8		Senkschraube	Countersunk screw	Vis tête fraise
16	ZOR 006 030	OR 6 - 3		O-Ring	O-ring	Joint tonique
17	ZST 130 506	M5x6 DIN 913-45H		Gewindestift	Set screw	Vis pointeau
18	F1L 060 000			Spänetasse	Chip tray	Plateau à copeaux
19	F1L 000 720			Deckwinkel	Angle covering	Corniére couvre
20	F1L 000 670			Deckblech	Cover plate	Coiffe
21	F1L 000 230			Rückwand	Back cover	Paroi arrière
22	F1A 000 500			Distanzring	Spacer ring	Bague d'ecartement
23	ZSR 120 520	M5x20 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
24	F1A 000 293			Durchführungsblech	Sheet	Tôle de traverse
25	F1L 140 000			Verkleidungsblech 2	Side guard 2	Tôle d'habillage
26	F1C 000 550			Namensschild	Adhesive label	Etiquette
27	F1L 130 000			Verkleidungsblech 1	Side guard 1	Tôle d'habillage
28	ZGU 770 631	KS 6/20-00, 1200mm		Kantenprofil	Edge protection	Bordure de protection
29	ZSR 880 516	M5x16-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
30	ZSB 210 530	A5,3 DIN 9021-ST		Scheibe	Washer	Rondelle
31	ZSR 880 510	M5x10-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
32	Y1A 010 100			Kontrastfläche	Plate	Plaquette
33	F1C 340 000			Seitenwand 1	Side wall 1	Paroi latérale 1
34	F1C 350 000			Seitenwand 2	Side wall 2	Paroi latérale 2
35	F1C 360 001			Abdeckhaube	Cover	Couvercle
36	ZXM 012 240			Schnappdurchführung	Ring	Traversée
37	ZSR G14 295	B4,2x9,5 DIN 7981		Blechschraube	Sheet metal screw	Vis à tôle
38	ZSR 880 610	M6x10-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
39	ZSR 880 406	M4x6-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
40	ZSB 250 430	B4,3 DIN 125 ST		Scheibe	Washer	Rondelle
41	F1A 000 370			Abdeckblech	Cover	Couvercle
42	F1A 000 310			Kabelblech 1	Cable sheet metal 1	Tôle de câble
43	ZPU 10 0090	5J 5009		Elastikpuffer	Resilient pad	Coussin élastique
44	ZSR 12 0510	M5x10 DIN 912		Zylinderschraube	Socket head screw	Vis 6 pans creux
45	F1A 000 330			Rückwand 2	Back cover 2	Paroi arrière 2
46	ZDK 031 430	ø14,3×16,7×10,3		Abdeckkappe	Cap	Couvercle
47	ZGU 770 622	KS 6/20-00, 338mm		Kantenprofil	Edge protection	Bordure de protection



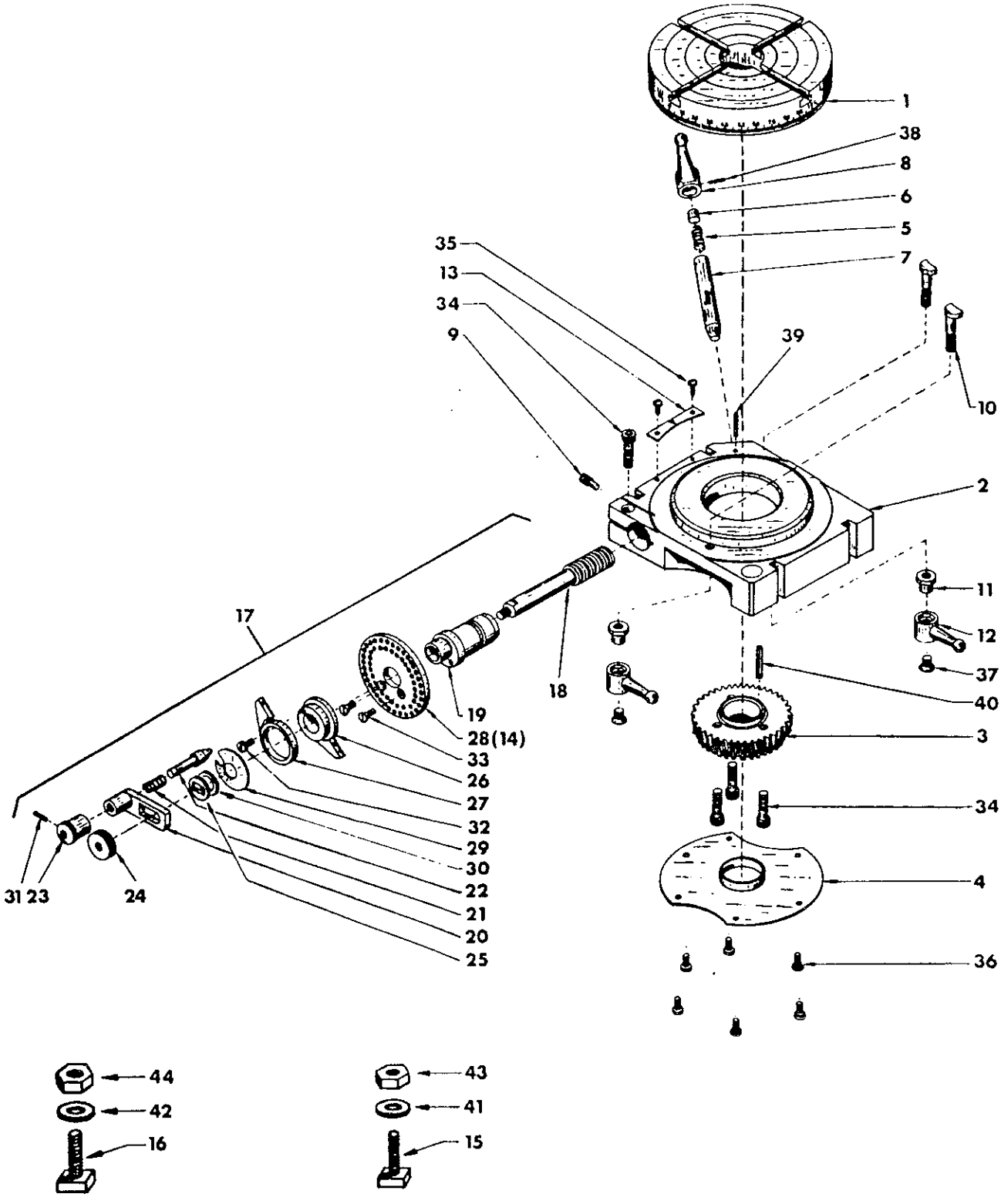
Pos.	Ref.No.	DIN		Benennung	Description	Designation
				Blechaufbau E-Kasten	**Assembly switch cabinet**	**Assemblage du montant de boîte electrique**
1	A6L 301 000*			Gehäuse	Housing	Caisse
	A6P 301 000**			Gehäuse	Housing	Caisse
2	A6L 306 000*			Montageplatte	Mounting plate	Plaque de montage
	A6P 306 000**			Montageplatte	Mounting plate	Plaque de montage
3	A6L 311 010			Abdeckung	Cover	Couvercle
4	A6L 311 020			Klemmblech	Clamping sheet metal	Tôle de serrage
5	A6L 311 030*			Ventilatorblech	Fan sheet metal	Tôle de ventilateur
6	A6L 311 041*			Träger	Carrier	Support
7	A6L 311 050*			Steckerblech	Connector sheet metal	Tôle de connecteur
	A6P 311 050**			Steckerblech	Connector sheet metal	Tôle de connecteur
8	A6L 311 080			Aufkleber 0-1	Transfer picture 0-1	Image à décalquer 0-1
9	ZGU 783 011			Neopren	Neoprene	Néoprène

*) für Maschinen bis Maschinennummer F1C M2 025

**) für Maschinen ab Maschinennummer F1C M6 001



Pos.	Ref. No.	Type		Benennung	Description	Designation
	346 510			**Gruppe Supportflansch**	**Cross slide adaptor compl.**	**Ens. bride support**
1				Supportflansch	Cross slide adaptor	Bride support
2	C4Z 030 020			Nutenschraube M8	T-nut bolt M8	Boulon en T M8
3	B2Z 310 070			Nutenschraube M6	T-nut bolt M6	Boulon en T M6
4	ZSB 25 0640	B6,4 DIN 125		Scheibe	Washer	Rondelle
5	ZSB 25 0840	B8,4 DIN 125		Scheibe	Washer	Rondelle
6	ZMU 34 0600	M6 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
7	ZMU 34 0800	M8 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal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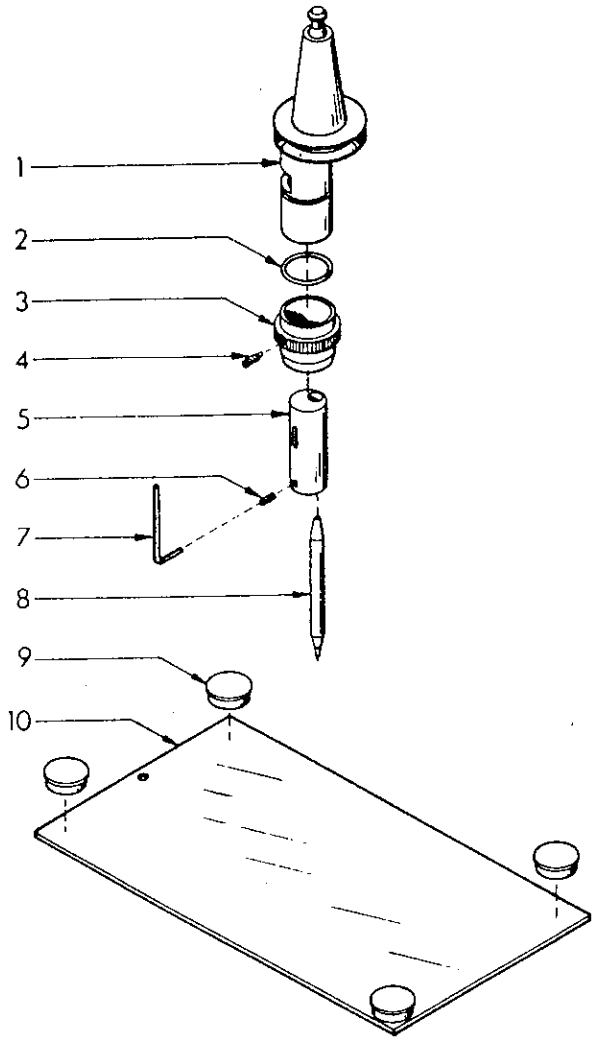
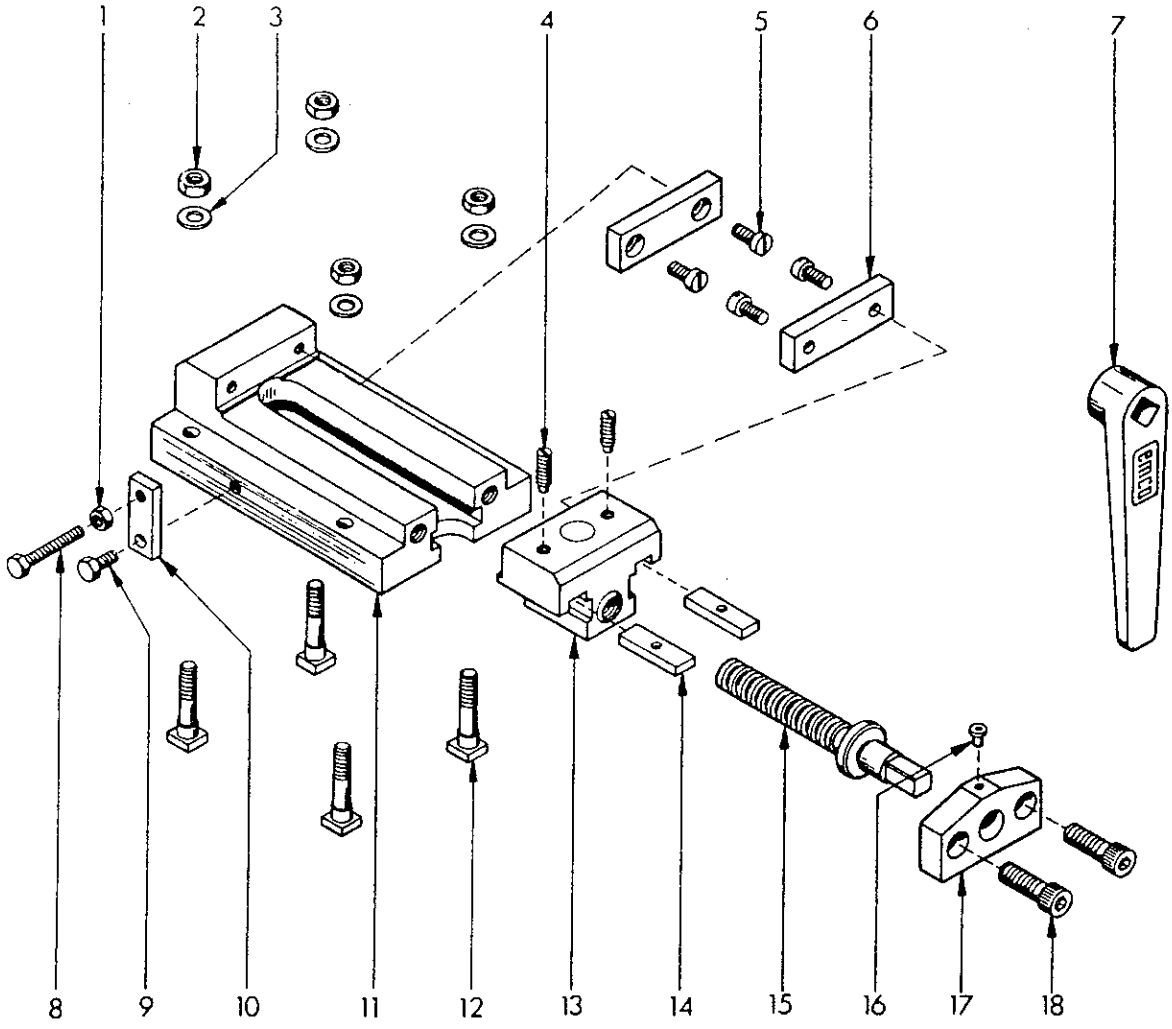
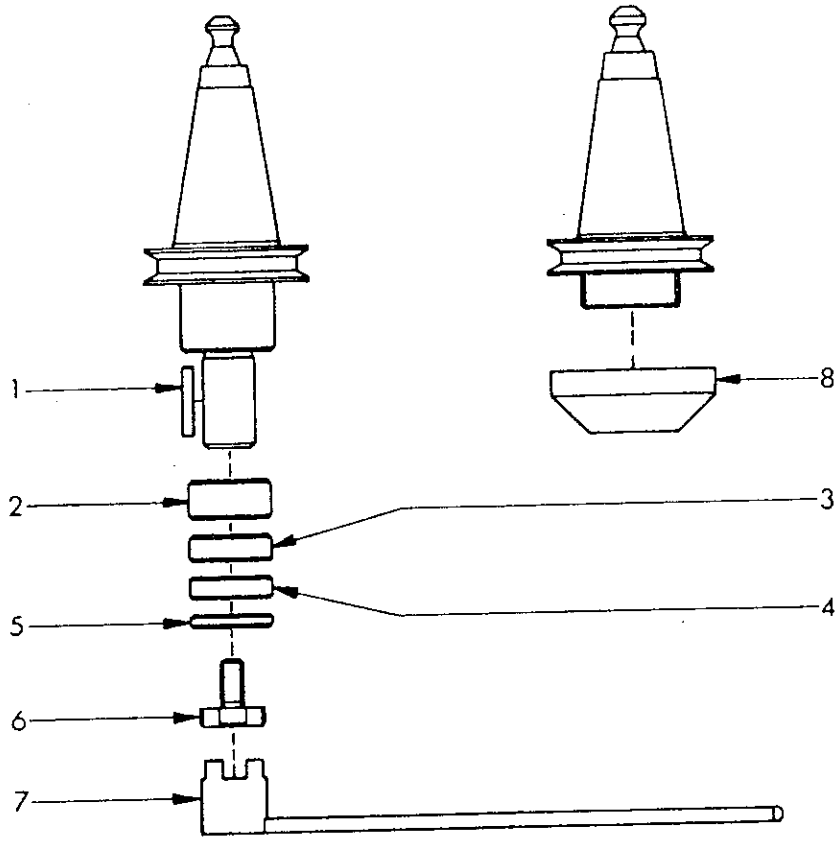
	745 000			G. Teilapparat	Dividing head
Pos	Ref.No.	DIN		BENENNUNG	DESCRIPTION
1	B2Z 320 010			Rundtisch	Table
2	B2Z 320 020			Gehäuse	Housing
3	B2Z 320 030			Teilrad	Table flange
4	B2Z 320 040			Deckblech	Cover mount
5	B2Z 320 050			Druckfeder	Compression spring
6	B2Z 320 060			Druckbolzen	Bolt
7	B2Z 320 070			Index	Locking pin
8	B2Z 320 080			Knebelgriff	Lever
9	B2Z 320 090			Anschlagschraube	Bushing
10	B2Z 320 100			Klemmschraube	Locking bolt
11	B2Z 320 110			Mutter	Nut
12	B2Z 320 120			Knebelgriff	Lever
13	B2Z 320 130			Zeiger	Guide
14	B2Z 320 140			Lochscheibe 33-36-39	Indexing plate
	B2Z 320 150			Lochscheibe 38-40	Indexing plate
15	B2Z 320 160	M 6		Nutenschraube	T-Nut
16	B2Z 320 170	M 8		Nutenschraube	T-Nut
17	B2Z 321 000			Gr. Schnecke	Worm shaft
18	B2Z 321 010			Schnecke	Worm shaft
19	B2Z 321 020			Exzenter	Assembly arbor
20	B2Z 321 030			Kurbel	Crank
21	B2Z 321 040			Druckfeder	Compression spring
22	B2Z 321 050			Absteckbolzen	Bolt
23	B2Z 321 060			Hülse	Sleeve
24	B2Z 321 070			Rändelmutter	Knurled nut
25	B2Z 321 080			Scheibe	Plate
26	B2Z 321 090			Schere rechts	Section arm r. h.
27	B2Z 321 100			Schere links	Section arm l. h.
28	B2Z 321 120			Lochscheibe 27-36-42	Indexing plate
29	B2Z 321 130			Tellerfeder	Spring washer
30	B2Z 321 140			Scheibe 1,8	Plate 1,8
	B2Z 321 150			Scheibe 2,0	Plate 2,0
	B2Z 321 160			Scheibe 2,2	Plate 2,2
31	ZHL 81 0212	2x12 DIN 1481		Spannhülse	Pin
32	ZSR 85 0406	AM4x6 DIN 85		Zylinderschraube	Flat head screw
33	ZSR 63 0410	M4x10 DIN 963		Senkschraube	Flat head screw
34	ZSR 12 0625	M6x25 DIN 912		Innensechskantschraube	Allen head screw
35	ZSR 84 0304	M3x4 DIN 84		Zylinderschraube	Flat head screw
36	ZSR 84 0406	M4x6 DIN 84		Zylinderschraube	Flat head screw
37	ZSR 63 0608	M6x8 DIN 963		Senkschraube	Flat head screw
38	ZHL 81 0214	2x14 DIN 1481		Spannhülse	Pin
39	ZHL 81 0322	3x22 DIN 1481		Spannhülse	Pin
40	ZHL 81 0530	5x30 DIN 1481		Spannhülse	Pin
41	ZSB 25 0640	86,4 DIN 125		Scheibe	Washer
42	ZSB 25 0840	88,4 DIN 125		Scheibe	Plate
43	ZMU 34 0600	M6 DIN 934		Mutter	Nut
44	ZMU 34 0800	M8 DIN 934		Mutter	Nut



Pos.	Ref. No.	DIN		Benennung	Description
	770 300			Plotter	Plotter
1	F1Z 3oo o1o			Aufnahmedorn	Arbor
2	ZOR o2 3324	OR 23,3 - 2,4		O-Ring	O-Ring
3	F1Z 3oo o3o			Einstellring	Adjusting ring
4	ZST 15 o412	M4x12 DIN 915-45H		Gewindestift	Set screw
5	F1Z 3oo o2o			Exzenterhülse	Eccentric sleeve
6	ZST 13 o4o8	M4x8 DIN 913-45H		Gewindestift	Set screw
7	ZWZ 11 o2oo	SW2 DIN 911		6-Kant Schraubendreher	Hexagonal key
8	ZST 99 1ooo			Faserstift	Plotter pen
9	ZXM oo 2oo8	Ø 20x8		Haltemagnet	Magnetic disc
10	F1Z 3o1 ooo			Aufspannplatte	Clamping plate



Pos.	Ref. No.	DIN		Benennung	Description
	77o 31o			Maschinenschraubstock	Machine vice
1	ZMU 34 o6oo	M6 DIN 934-6		Sechskantmutter	Hexagonal nut
2	ZMU 34 o8oo	M8 DIN 934-6		Sechskantmutter	Hexagonal nut
3	ZSB 25 o84o	8,4 DIN 125		Scheibe	Washer
4	ZST 17 o515	M5x15 DIN 417-5.8		Gewindestift	Set screw
5	ZSR 84 o512	M5x12 DIN 84-4.8		Zylinderschraube	Flat head screw
6	B2Z 31o o5o			Aufsatzbacke	Jaw
7	B2Z 31o o8o	SW10		Schlüssel	Key
8	ZSR 33 o64o	M6x4o DIN 933-5.6		Sechskantschraube	Hexagon head bolt
9	ZSR 33 o612	M6x12 DIN 933-5.6		Sechskantschraube	Hexagon head screw
10	F1Z 31o o3o			Anschlagplatte	Stop plate
11	F1Z 31o o1o			Körper	Body
12	F1Z 31o o2o			Nutenschraube	T-bolt
13	B2Z 31o o2o			Backe	Moving jaw
14	B2Z 31o o6o			Einstelleiste	Adjusting gib
15	B2Z 31o o4o			Spindel	Operating screw
16	ZNP o1 1ooo			Schmiernippel	Grease nipple
17	B2Z 31o o3o			Spindelträger	Screw mount
18	ZSR 12 o825	M8x25 DIN 912-8.8		Zylinderschraube	Socket head screw



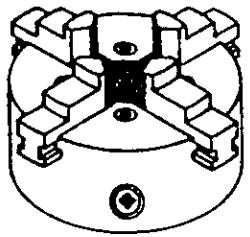
Pos.	Ref. No.	DIN		Benennung	Description
1	ZFD 85 4422	A4x4x22 DIN 6885		Paßfeder	Square key
2	F1Z o2o o5o			Fräsdornring 12 mm	Collar 12 mm
3	F1Z o2o o4o			Fräsdornring 8 mm	Collar 8 mm
4	F1Z o2o o3o			Fräsdornring 6 mm	Collar 6 mm
5	F1Z o2o o2o			Fräsdornring 4 mm	Collar 4 mm
6	ZSR 67 o8oo	M8 DIN 6367		Schraube	Screw
7	ZWZ 58 16oo	16 DIN 6368		Schlüssel	Key
8	A5Z o4o o2o			Spannmutter	Nut

4-BACKEN-FUTTER, SELBSTZENTRIEREND
4-JAW-CHUCK, SELF-CENTERING
MANDRIN À 4 MORS, SERRAGE CONCENTRIQUE

* Am Außenring des Zahnkranzes ist eine Ziffer (o,1,2,3 ...) eingraviert. Bei Bestellung zusätzlich zur Bestellnummer diese Ziffer angeben.

* On the outside ring of the scroll a number (o,1,2 or 3) is engraved. Please state this number also when ordering a scroll.

* Sur l'anneau extérieur de la couronne dentée est gravé un chiffre (o,1,2 ou 3). Prière d'indiquer en plus ce chiffre ensemble avec le numéro de référence.



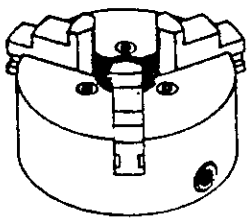
	Futter-durchmesser / Dia of chuck / Dia du mandrin	A Satz von 4 nach außen abgestuften Backen Set of 4 inside jaws Jeu de 4 mors interieurs		B Satz von 4 nach innen abgestuften Backen Set of 4 outside jaws Jeu de 4 mors exterieurs		C Satz von 4 Umkehrbacken. Set of 4 reversible jaws. Jeu de 4 mors reversibles.		D Zahnkranz Scroll Couronne		E Triebling Pinion Pignon		F Schlüssel Key(Wrench) CLE	
		A (mm)	Ref. No.	B (mm)	Ref. No.	C (mm)	Ref. No.	D (mm)	Ref. No.	E (mm)	Ref. No.	F (mm)	Ref. No.
V1C 328	∅ 110 mm	42	V3Z 070	42	V3Z 080			79	ZME 301 140	37	V3L 000 030	78	V3L 000 070 V2C 000 080

3-BACKEN-FUTTER, SELBSTZENTRIEREND
3-JAW-CHUCK, SELF-CENTERING
MANDRIN À 3 MORS, SERRAGE CONCENTRIQUE

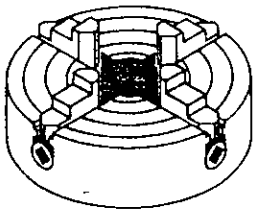
* Am Außenring des Zahnkranzes ist eine Ziffer (o,1,2,3 ...) eingraviert. Bei Bestellung zusätzlich zur Bestellnummer diese Ziffer angeben.

* On the outside ring of the scroll a number (o,1,2 or 3) is engraved. Please state this number also when ordering a scroll.

* Sur l'anneau extérieur de la couronne dentée est gravé un chiffre (o,1,2 ou 3). Prière d'indiquer en plus ce chiffre ensemble avec le numéro de référence.

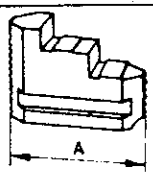
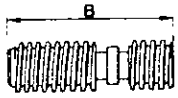
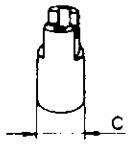
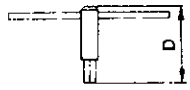


	Futterdurch-messer / Dia of chuck / Dia du mandrin	A Satz von 3 nach außen abgestuften Backen Set of 3 inside jaws Jeu de 3 mors interieurs		B Satz von 3 nach innen abgestuften Backen Set of 3 outside jaws Jeu de 3 mors exterieurs		C Satz von 3 Umkehrbacken. Set of 3 reversible jaws. Jeu de 3 mors reversibles		D Zahnkranz Scroll Couronne		E Triebling Pinion Pignon		F Schlüssel Key(Wrench) CLE	
		A (mm)	Ref. No.	B (mm)	Ref. No.	C (mm)	Ref. No.	D (mm)	Ref. No.	E (mm)	Ref. No.	F (mm)	Ref. No.
V1C 326	∅ 110 mm	42	V3Z 050	42	V3Z 060			79	ZME 301 140	37	V3L 000 030	78	V3L 000 070 V2C 000 080



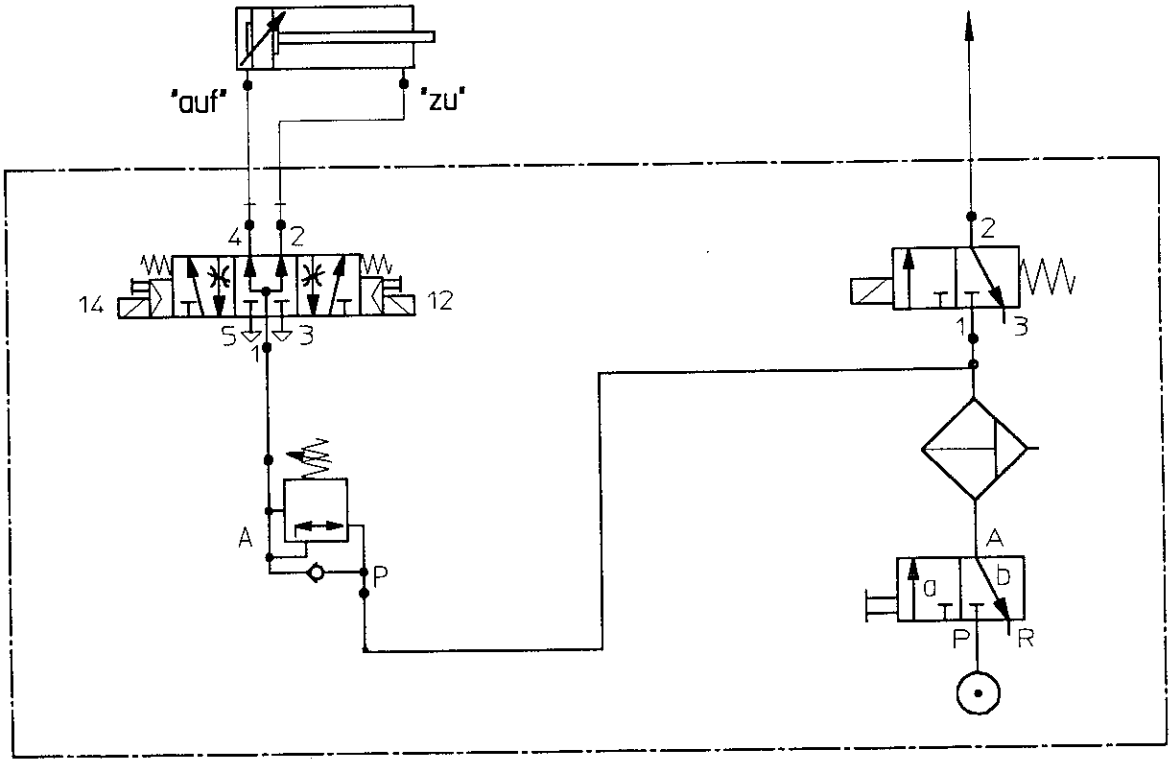
P3E 324

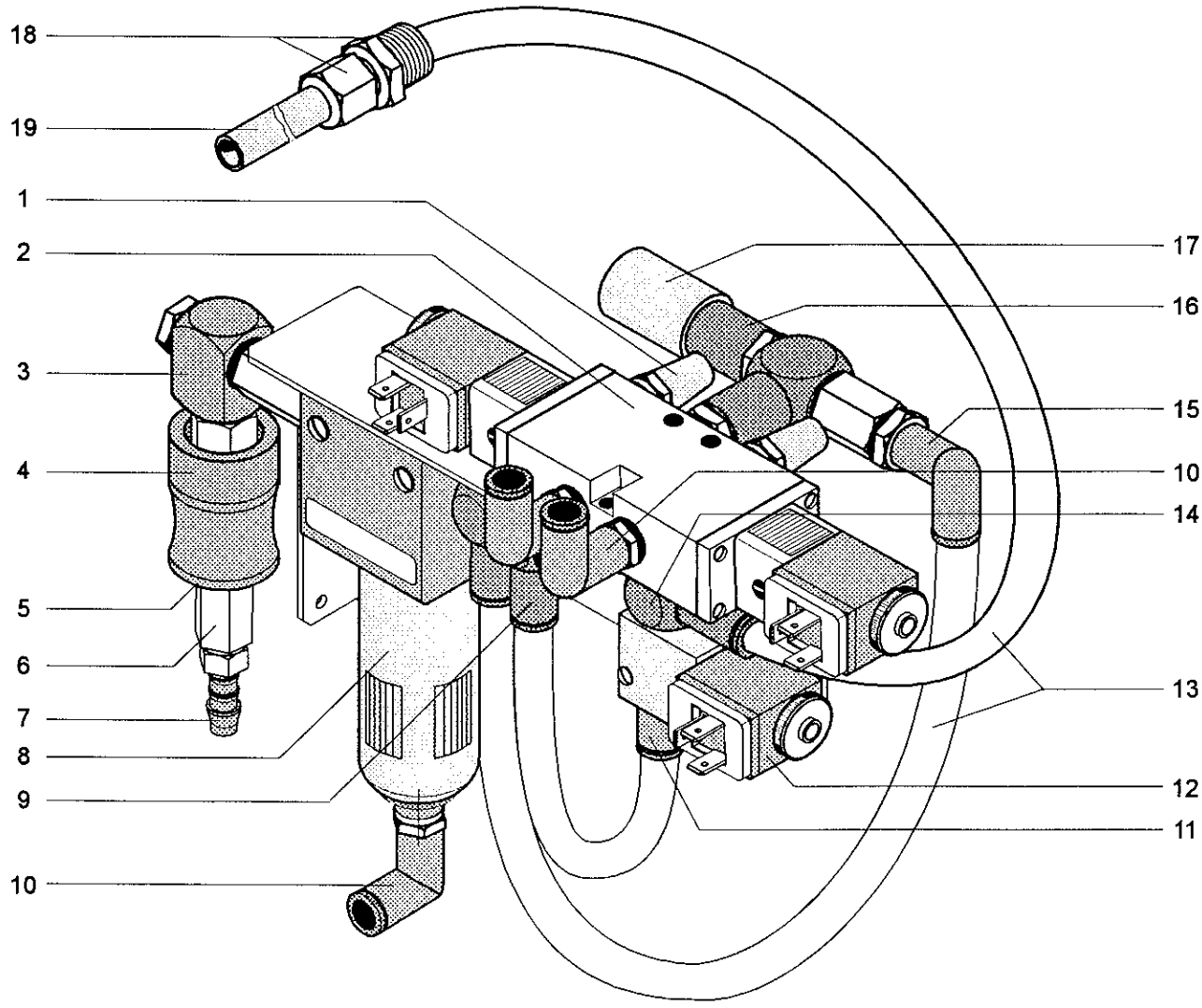
PLANSCHEIBE MIT 4 BACKEN
4-JAW INDEPENDEND CHUCK
PLATEAU DE TOUR À 4 MORS

D (mm)	 Satz von 4 Umkehrbacken Set of 4 reversible jaws Jeu mors revers.		 Spindel Spindle Broche		 Gabelbolzen Bolt Axe a couble fourche		 Schlussel Key (Wrench) CLE	
	A (mm)	Ref. No.	B (mm)	Ref. No.	C (mm)	Ref. No.	D (mm)	Ref. No.
∅ 152 mm ∅ 6"	51	P1E 004	48	P0E 000 030	18	P1E 000 150	90	P0E 001 000

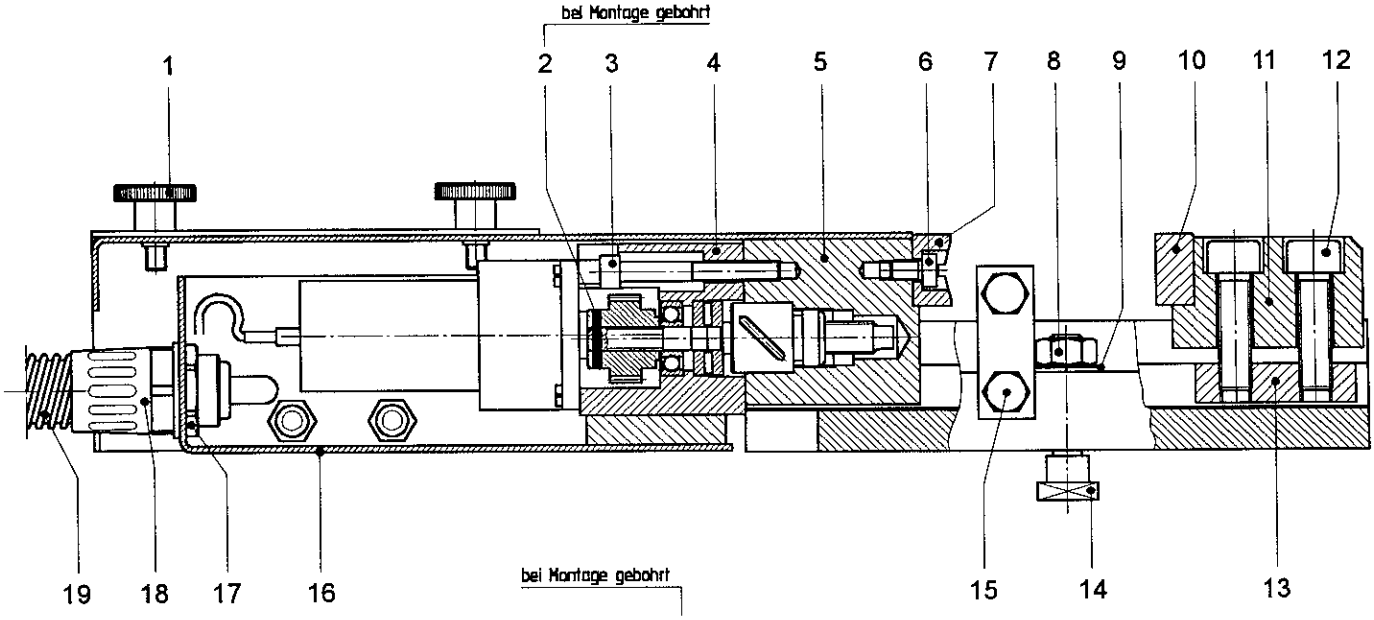
Türautomatik
Automatic door
Porte automatique

Schraubstock ausblasen (Pos 18,19)
Vice puff blowing (Pos 18,19)





Pos.	Ref. No. EMCO	Ref. No. Hersteller Manufacturer	Type	Benennung	Description	Designation
1-16	**783 550**	**Fa. Bosch**	**F1Z 550**	**Pneumatikausrüstung**	**Pneumatic Equipment**	**Equipement pneumatique**
1		AV-395028	1/8" kurz	Schalldämpfer	Sound absorber	Silencieux
2	ZME 280 649	0 820 034 151	1/8" 24V=	5/3 Wegeventil	5/3 Valve	5/3 Soupape
3		1-823-391-048	G 1/4"	Schwenkverschraubung	Knee hose fitting	Raccord de tuyau
4	ZME 200 401	0-820-405-001	NG 6 1/4"	Handschiebeventil	Slide type valve	Robinet à soupape
5		1-820-209-014	G 1/4"	Dichtung	Gasket ring	Joint d' étanchéité
6		1-823-300-001	G 1/4"	Muffe	Socket joint	Manchon
7		1-823-386-055	10 R 1/4"	Gerade Verschraubung	Stright hose fitting	Raccord droite
8	ZME 200 461	0 821 303 400		Filter	Filter	Filtre
9		1-823-391-171	1/4" ø6	Verteilerring	Distributing ring	Bague de distribution
10	ZME 280 654	1-823-391-237	1/8" ø6	Winkelverschraubung	Knee hose fitting	Raccord de tuyau
11	ZME 200 705	1-823-391-157	1/8" ø6	Gerade Verschraubung	Stright hose fitting	Raccord droite
12	ZME 200 460	0-820-019-301		3/2 Wegventil	3/2 Valve	3/2 Soupape
13	ZLT 99 0059		1700mm6x1	Kunststoffrohr	Hose	Tuyau flexible
14		1-823-391-165		Winkelverschraubung	Knee hose fitting	Raccord de tuyau
15	ZME 200 702	1-823-391-238	1/4" ø6	Winkelverschraubung	Knee hose fitting	Raccord de tuyau
16		0-821-302-029	NG6 G1/4"	Druckregler	Pressure controller	Manocontact
17	F1Z 550 020			Kappe	Cap	Chapeau
18	ZVR 950 040			Schottanschluß	Hose fitting	Raccord de tuyau
19	ZLT 311 010		6x1 125mm	Kupferrohr	Copper tube	Tube de cuivre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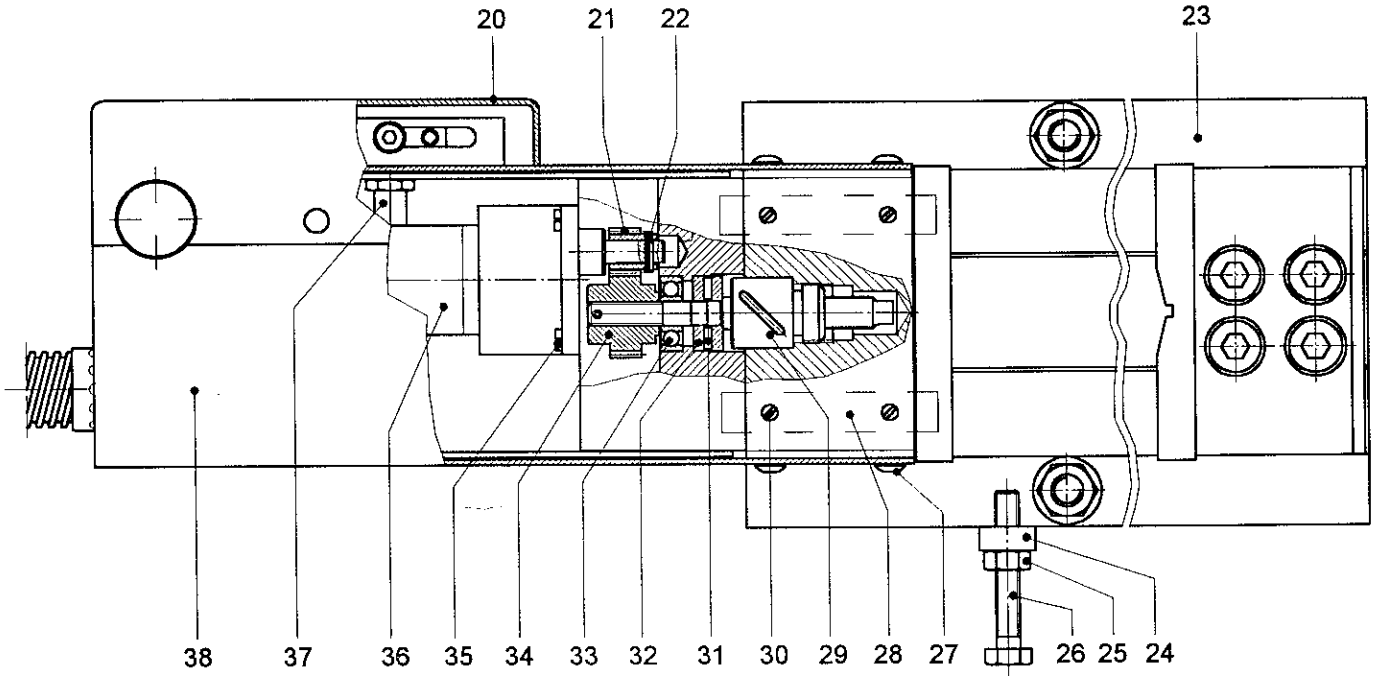
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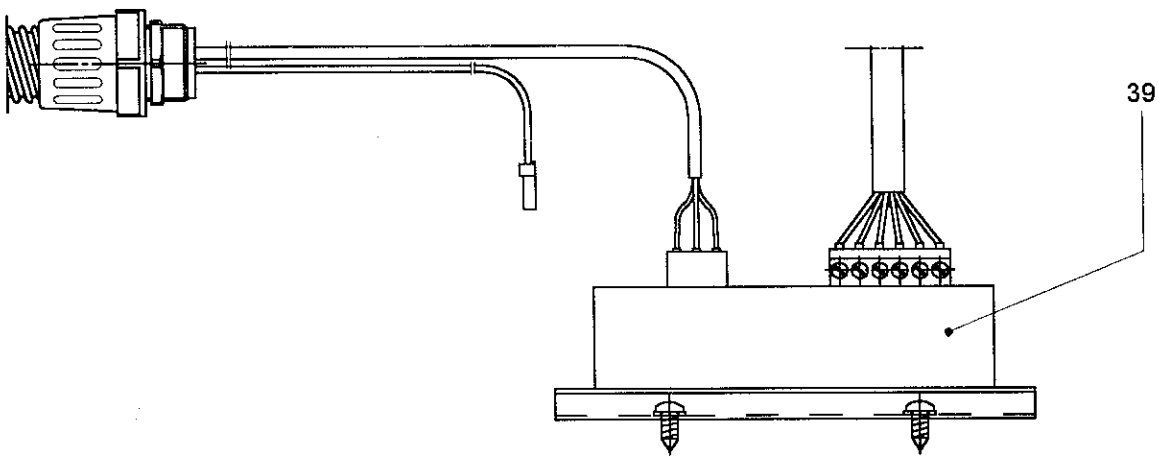
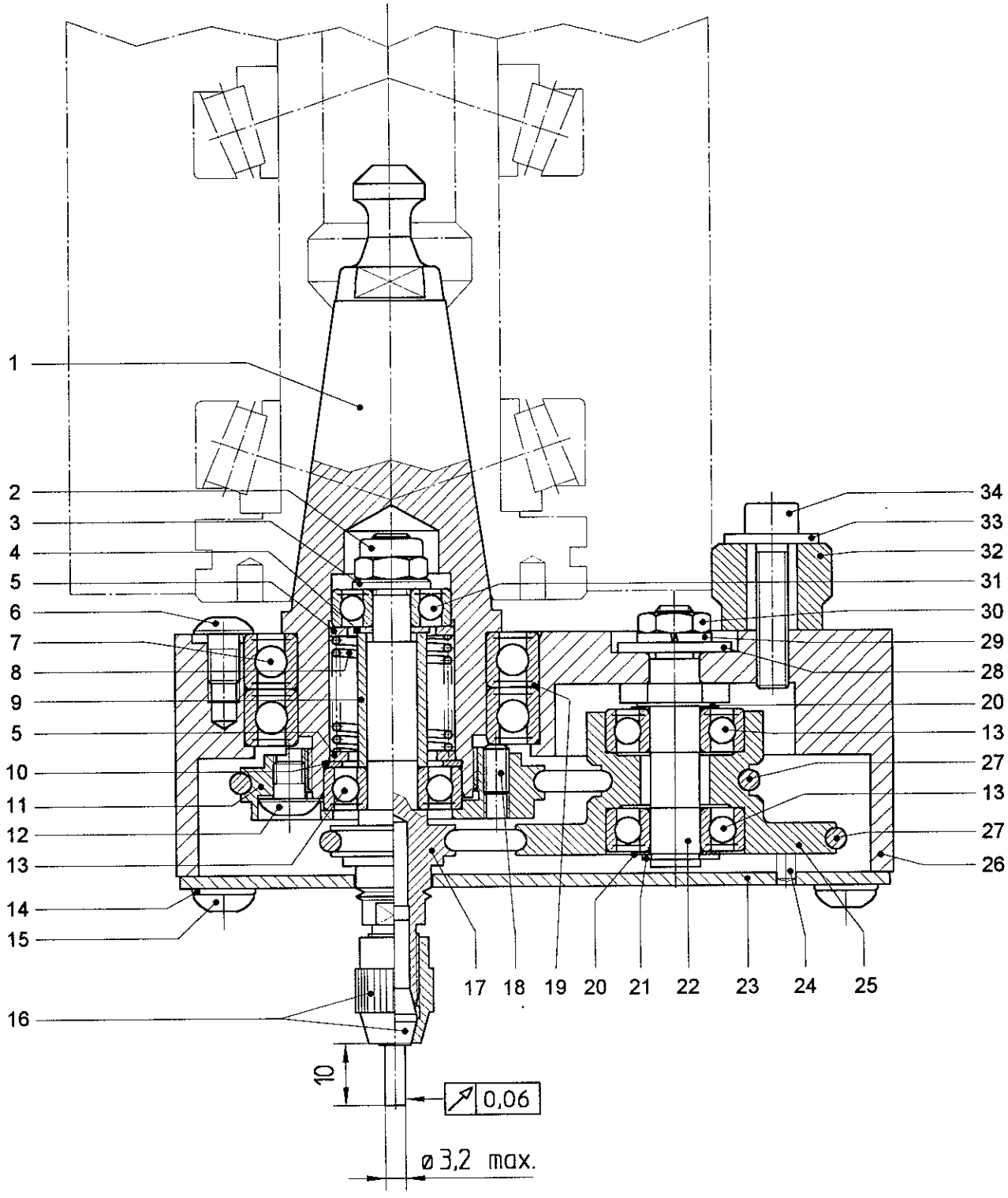

39

Pos.	Ref. No.	Type		Benennung	Description	Designation
1-39	**783 520**	**F1Z 520**		**Elektr. Schraubstock**	**Vice complete**	**Etau-machine complete**
1	ZSR 64 0511	M5x10 DIN 464	Böllhofer	Rändelschraube	Knurled screw	Vis moletée
2	ZHL 81 0214	2x14 DIN 1481		Spannhülse	Lock pin	Douille de serrage
3	ZSR 12 0540	M5x40 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
4	F1Z 320 120			Lagerbock	Bracket	Support
5	F1Z 320 060			Spannbacke	Clamping jaw	Mors de serrage
6	ZSR 80 0508	M5x8 DIN 7984-8.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
7	F1Z 320 050			Prismenbacke 1	Jaw 1	Mors 1
8	ZMU 34 0800	M8 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
9	ZSB 25 0840	B8,4 DIN 125		Scheibe	Washer	Rondelle
10	F1Z 320 130			Prismenbacke 2	Jaw 2	Mors 2
11	F1Z 320 030			Verstellbacke	Moving jaw	Mors mobile
12	ZSR 12 0830	M8x30 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
13	F1Z 320 040			Klemmstück	Plate	Plaque
14	F1Z 310 020			Nutenschraube	T-nut screw	Boulon en T
15	ZSR 33 0612	M6x12 DIN 933-5.6		Sechskantschraube	Hexagon head screw	Vis hexagonal
16	F1Z 520 090			Montagegehäuse	Housing	Boîte
17	ZPG 20 1100	PG 11 Nr.8011		Gegenmutter	Nut	Ecrou
18	ZLT 500 100	PG 11		Schlauchverschraubung	Hose fitting	Raccord de tuyau
19	ZLT 99 0001	FPS 13x17		Flex. PVC Schlauch	Hose	Tuyau flex.
20	F1Z 520 140			Haube	Cover	Couvercle
21	F1Z 320 110			Ritzel	Gear	Engrenage
22	ZHL 81 0210	2x10 DIN 1481		Spannhülse	Lock pin	Douille de serrage
23	F1Z 320 020			Körper	Body	Corps
24	F1Z 310 030			Anschlagplatte	Stop plate	Plaque de butée
25	ZMU 34 0600	M6 DIN 934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
26	ZSR 33 0640	M6x40 DIN 933-5.6		Sechskantschraube	Hexagon head screw	Vis hexagonal
27	ZSR 88 0406	M4x6-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
28	F1Z 320 100			Einstelleiste	Plate	Plaque
29	F1Z 321 000			Spindel mit Montagehülse	Lead screw compl.	Broche compl.
30	ZST 17 0515	M5x15 DIN 417-5.8		Gewindestift	Set screw	Vis pointeau
31	ZLG 76 0619	AXK 0619 TN		Axial-Nadelkranz	Roller-collar	Cage d'aiguille de roulem.
32	ZLG 77 0004	LS 0619		Axiallagerscheibe	Axial washer	Rondelle axiale
33	ZLG 062 601	626-Z		Rillenkugellager	Ball bearing	Roulement à billes
34	F1Z 320 080			Zahnrad 27	Gear 27	Engrenage 27
35	ZSR 84 0258	M2.5x8 DIN 84 A4.8		Zylinderschraube	Flat head screw	Vis à tête cylindrique
36	ZMO 78 0124	12 V		Gleichstrommotor	Motor	Moteur
37	ZEL 21 2023			Ind. Näherungsschalter	Proximity detector	Initiateur inductif
38	F1Z 520 070			Deckel	Cover	Couvercle
39	Y4A 035 000			Spannmittelplatine	Circuit board	Carte de régulation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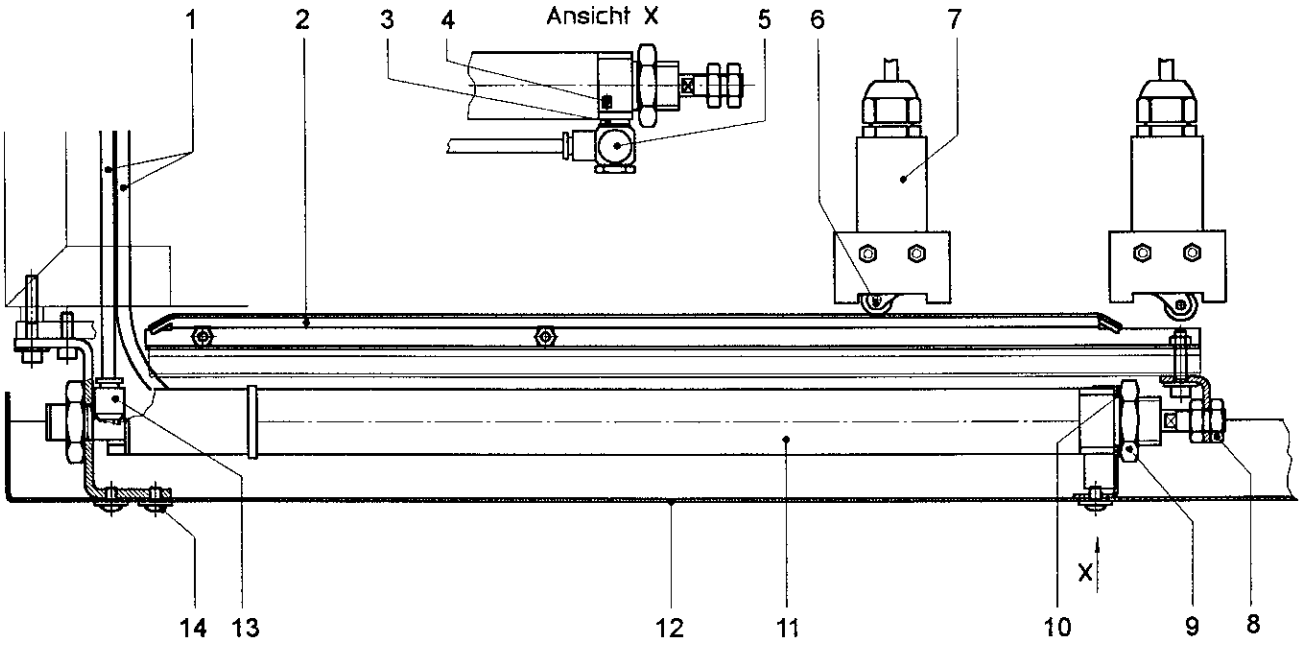
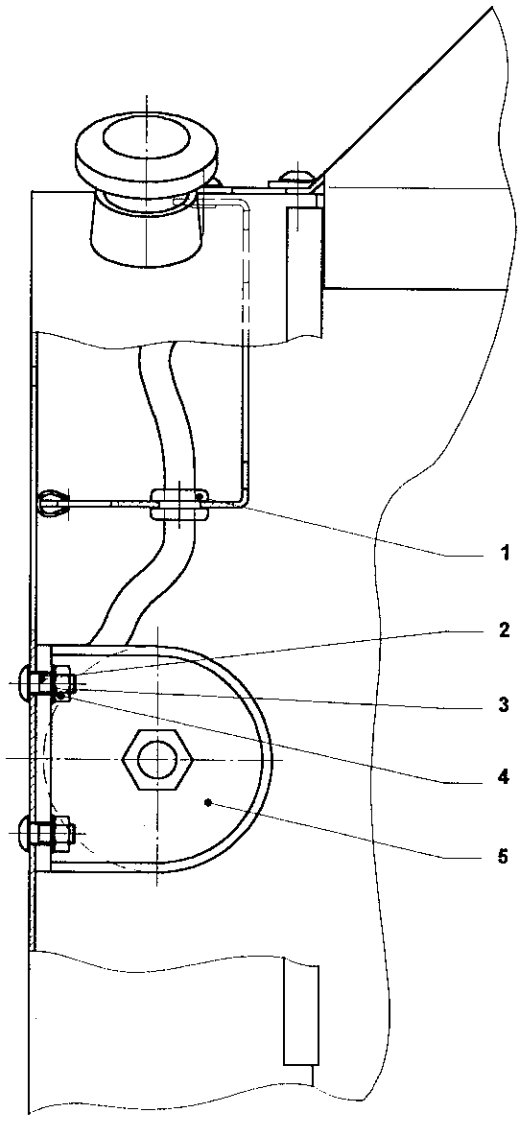
Pos.	Ref. No.	Type		Benennung	Description	Designation
1-34	**F1Z 590**			**Gravierspindel**	**Graving spindle**	**Broche de graveur**
1	F1Z 590 010			Aufnahme	Mandrin	Porte
2	ZMU 80 0600	NM6 DIN 980		Sicherungsmutter	Securing nut	Ecrou de sûreté
3	ZSB 25 0640	B6,4 DIN 125		Scheibe	Washer	Rondelle
4	ZSB 12 0610	PS6x12x1		Paßscheibe	Shim	Rondelle d'ajustage
5	ZSB 10 4201	SS14x20x1,5		Stützscheibe	Supporting disk	Rondelle pour bague de frein
6	ZSR 88 0508	M5x8-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
7	ZME 200 720	61906-2RZ	SKF	Rillenkugellager	Ball bearing	Roulement à billes
8		D-180Y-01	Gutekun	Druckfeder	Compression spring	Ressort de pression
9	F1Z 590 050			Hülse	Sleeve	Douille
10	ZSB 12 1610	PS16x22x1		Paßscheibe	Shim	Rondelle d'ajustage
11	F1Z 590 040			Riemenscheibe 1	Pulley 1	Poulie 1
12	ZSR 88 0506	M5x6-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
13	ZLG 06 0801	608-Z	SKF	Rillenkugellager	Ball bearing	Roulement à billes
14	ZSB 25 0530	B5,3 DIN 125		Scheibe	Washer	Rondelle
15	ZSR 88 0512	M5x12-10.9		Linsenschraube	Filister head screw	Vis à tête lentiforme
16		Proxxon Ref. Nr.28940	Proxxon	Spannzangensatz 7-teilig	Set of 6 collets with nut	Jeu de 6 pinces avec ecrou
17	F1Z 590 030			Gravierspindel	Graving spindle	Broche de graveur
18	ZST 13 0408	M4x8 DIN 913		Gewindestift	Set screw	Vis pointeau
19		PS37x47x0,1		Paßscheibe	Shim	Rondelle d'ajustage
20	ZSB 12 0802	PS 8x14x0,2		Paßscheibe	Shim	Rondelle d'ajustage
21	ZRG 71 0808	W 8x0,8 DIN 471		Sicherungsring	Retaining ring	Circlip
22	F1Z 590 080			Achse	Arbor	Arbre
23	F1Z 590 070			Deckblech	Cover sheet	Couvercle
24		3m6x8 DIN 7		Zylinderstift	Parallel pin	Tige de serrage
25	F1Z 590 060			Riemenscheibe 2	Pulley 2	Poulie 2
26	F1Z 590 020			Gehäuse	Housing	Boîte
27	ZME 200 721	53,57x3,53; 2-227; C557-70	Parker	Antriebsriemen	O-ring	Bague-O
28	ZSB 21 0640	A6,4 DIN 9021		Scheibe	Washer	Rondelle
29	ZRG 27 0060	A6 DIN 127		Federring	Spring washer	Rondelle ressort
30	ZMU 39 0600	BM6 DIN 439 04		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
31	ZLG 06 2601	626-Z	SKF	Rillenkugellager	Ball bearing	Roulement à billes
32	F1Z 590 090			Verdrehsicherung	Locking piston	Disp. de sécurité de torsion
33	ZSB 21 0530	A5,3 DIN 9021		Scheibe	Washer	Rondelle
34	ZSR 12 0525	M5x25 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux



Pos.	Ref. No.	Type		Benennung	Description	Designation
1-12	**783 510**	**F1Z 510**		**Türautomatik**	**Automatic door**	**Porte automatique**
1	ZLT 35 3250	6x1x2500mm		Kunststoffrohr	Hose	Tuyau flexible
2	F1Z 511 000			Schaltblech	Switching sheet	Tôle de connexions
3	F1Z 510 070			Scheibe	Washer	Rondelle
4	ZST 130 506	M5x6 DIN 913-45H		Gewindestift	Set screw	Vis pointeau
5	ZVR 095 219	ø6 1/8"		Winkelverschraubung	Knee hose fitting	Raccord de tuyau
6	ZEE 470 231			Rollenhebel	Roller lever	Levier à galet
7	ZEL 21 2030	ZS 236-11Z		Endschalter	Limit switch	Commutateur de fin de course
8	ZMU 39 1012	M10x1,25 DIN 439-4		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
9	ZMU 91 2215	M22x1,5	Bosch	Sechskantmutter	Hexagonal nut	Ecrou hexagonal
10	ZSB 12 2215	PS 22x32x1,5	Seeger	Paßscheibe	Shim	Rondelle d'ajustage
11	ZVE 42 5255	ø25-500 (0-822-234-012)	Bosch	Pneumatikzylinder	Pneumatic Cylinder	Vérin pneumatique
12	F1Z 510 040			Abdeckung	Cover	Couvercle
13	ZVR 057 532	ø6 R1/8"		Winkelverschraubung	Knee hose fitting	Raccord de tuyau
14	ZSR 88 0508	M5x8-10.9		Linsenschraube	Filister head screw	Vis lentiforme



Pos.	Ref. No.	Type		Benennung	Description	Designation
1-6	**F1Z 570**			**G. Maschinenleuchte**	**Machine lamp compl.**	**Ens. Lampe machine**
1	ZEL 15 0008	LA 8		Durchführtülle	Grommet	Douille
2	ZSR 88 0512	M5×12-6.9		Linsenkopfschraube	Lens head screw	Vis à tête lentiforme
3	ZSB 25 0530	A5,3 DIN125-St		Scheibe	Washer	Rondelle
4	ZMU 34 0500	M5 DIN934-6		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
5	ZEE 53 1130	SRL 111		Leuchte komplett	Lamp compl.	Lampe complet
5a	ZME 00 0110	11W		Leuchtstoffröhre	Fluorescent tube	Tube fluorescent
5b	ZME 00 0111			Schutzrohr	Protection tube	Tube protecteur
6	ZEK 22 0799			Betätigungswerkzeug	Actuating tool	Outillage d'actionnement

Ersatzteilliste für elektrische und elektronische Teile
Service parts for electrical and electronical parts
Pièces de service pour electriques et electroniques pièces

EMCO PC Mill 55

Ausgabe 99-9 V01
Edition 99-9 V01

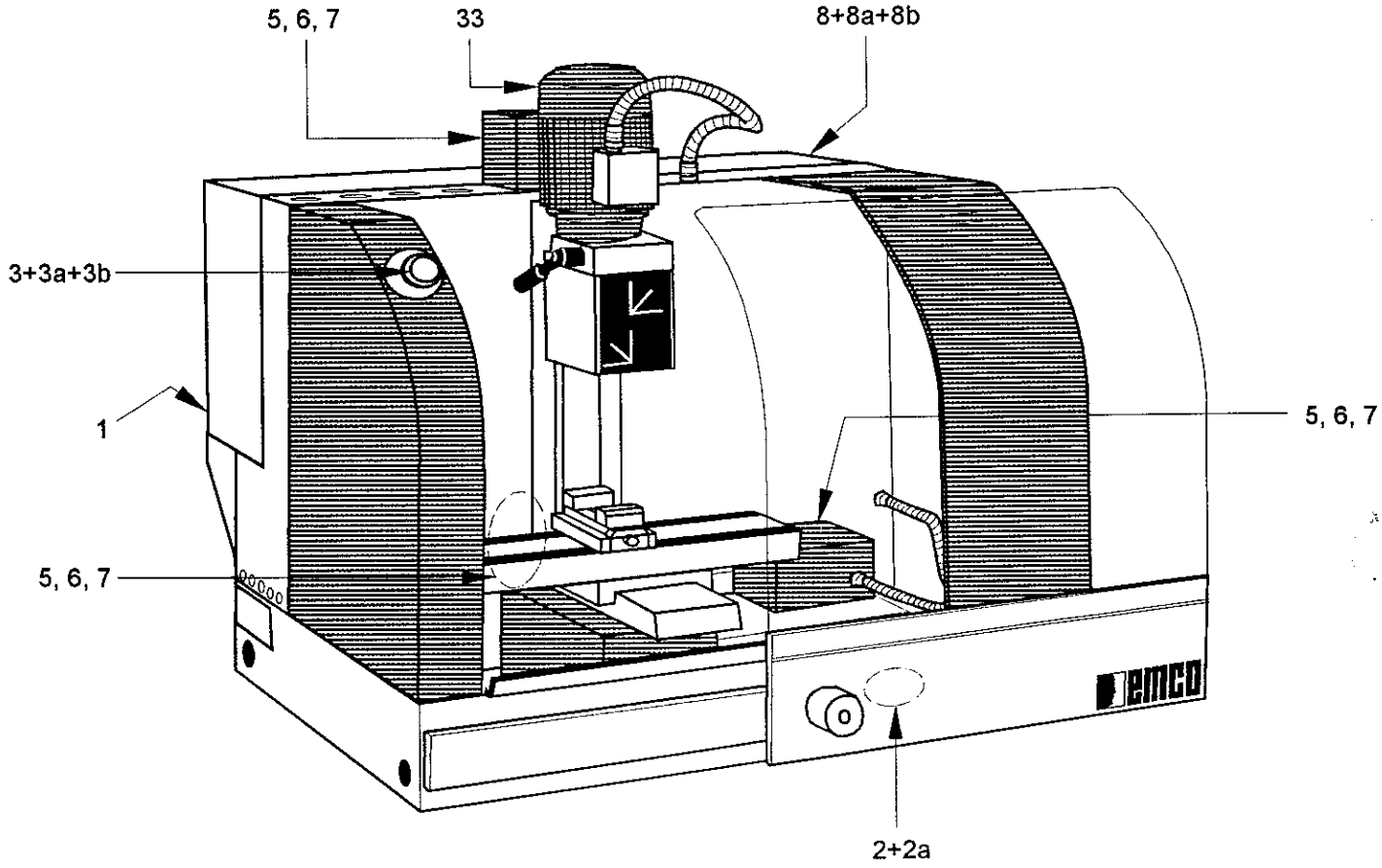
Hinweis:

Diese Ersatzteilliste ist ein Auszug aus der Elektro-Dokumentation. Vergleichen Sie die beiden Ausgaben! Bei unterschiedlichen Ausgaben (V...) ist nur die Elektro-Dokumentation verbindlich für die elektrische Ausführung Ihrer Maschine.

Note:

This service parts list is an extract from the electrical documentation. Compare both editions! In case of different versions (V...) only the electrical documentation is correct for the electrical execution of your machine.

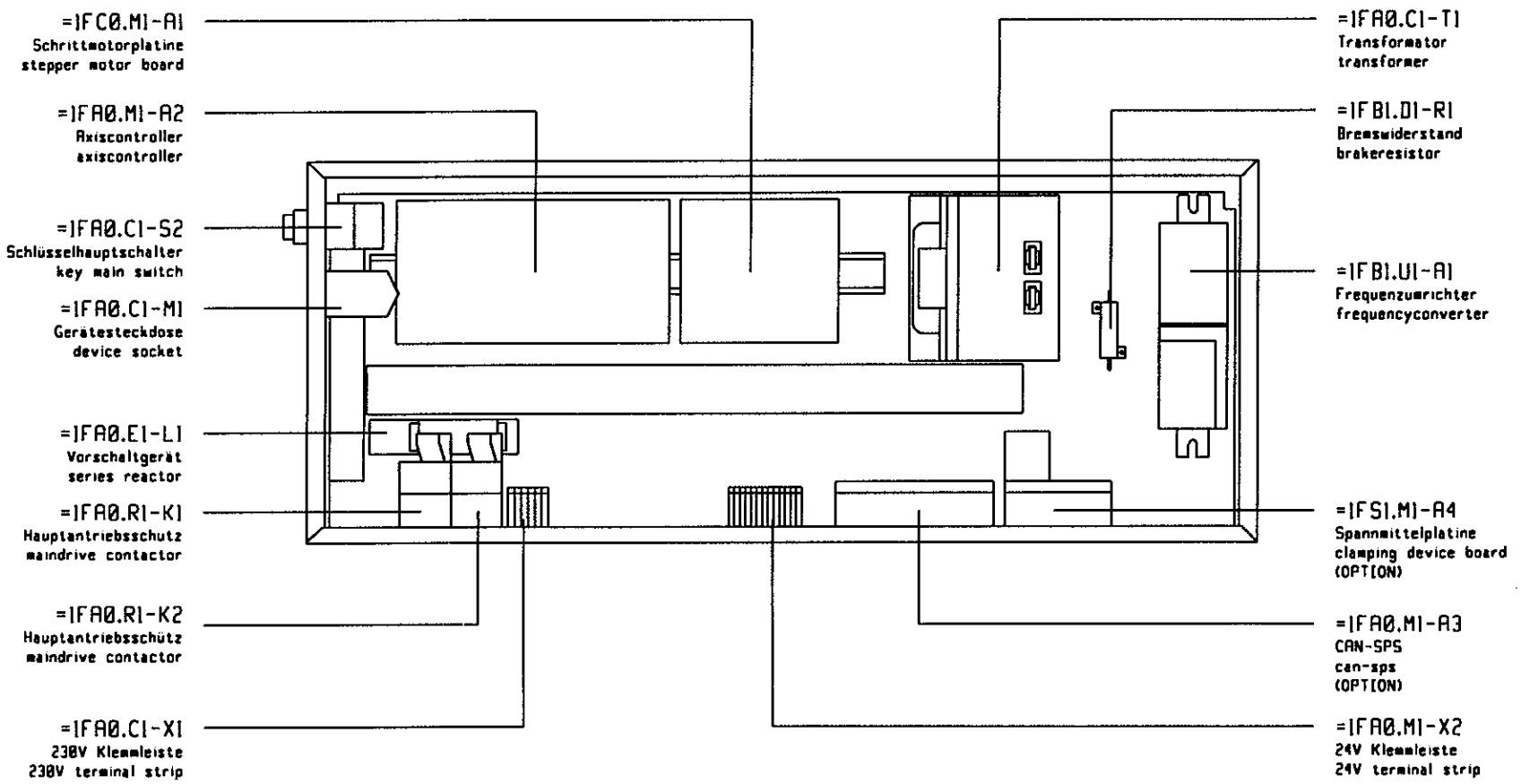
EMCO MAIER Gesellschaft m.b.H. – P.O. Box 131 – A-5400 Hallein/Austria – Tel. (06245) 891 – Fax (06245) 86965



Pos.	Ref. No. EMCO	Ref. No. Hersteller Manufacturer	Ref. No. Hersteller Manufacturer	Benennung	Description	Designation
				Elektrische Teile	**Elektrical parts**	**Pieces electriques**
1	ZMO 789 220*			Axialventilator	Fan	Ventilateur
2	ZEL 212 030	ZS 236-11Z	Schmersal	Endschalter	Limit switch	Commutateur de fin de course
2a	ZEE 470 231	ZR231-11Y	Schmersal	Rollenhebel	Roller lever	Levier à galet
3	ZEL 401 010	1.30043.551/030	RAFI	Not-Aus Taste	Emergency off button	Touche arret d'urgence
3a	ZEL 491 040	GHV 87066002P4	ABB	Kontaktelement	Contact unit	Umité de contact
3b	ZEE 710 701	GHV 87066002P2	ABB	Kupplung	Intermediate part	Piéce intermediaire
4	ZMO 473 380*	0,37 kW-1370min^{-1}		Hauptmotor	Motor	Moteur
	ZMO 473 381**	0,55 kW-1400min^{-1}	Elin	Hauptmotor	Motor	Moteur
5	ZMO 780 030*	VDRM 564-50LN		Schrittmotor X, Y, Z	Step motor X, Y, Z	Moteur pas à pas X, Y, Z
	ZMO 780 031**	VRDM366/50LHA	Bergerlahr	Schrittmotor X, Y, Z	Step motor X, Y, Z	Moteur pas à pas X, Y, Z
6	ZEL 212 023	BES 516-324-EOL	Balluf	Ind. Näherungsschalter	Proximity switch	Commutateur capacitif
7	ZEL 239 002	V-10FL2-1C2	Omron	Schnappschalter	Quick base switch	Interrupteur instantané
8	ZEL 440 022	ZB2 BG2	Telemecanique	Schlüsseltaster	Key switch	Commutateur à clè
8a	ZEL 491 103	ZB2 BZ103	Telemecanique	Kontaktelement 2-fach	Contact unit double	Umité de contact
8b	ZEL 491 101		Telemecanique	Kontaktelement 1-fach	Contact unit single	Umité de contact

*) für Maschinen bis Maschinennummer F1C M2 025

**) für Maschinen ab Maschinennummer F1C M6 001



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Datum	19.08.99
Bearb.	Schörghofer
Gepr.	
Norm	

emco Gesellschaft m.b.H.

Benennung: MONTAGEPLATTE
MOUNTING PANEL

= 1FA0.A0 + 1FL1

Blatt 1 v. 1 Bl.

Zeichnungs-Nr. FIC_V01

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No. ‹ ›

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**********************************************************************************************
* G E R Ä T E S T Ü C K L I S T E          F1C_V01                    Datum: 29.06.99
* appliance list                                                     date
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*EMCO Maier GMBH                          *                                  *      Seite     *
*Salzachtal Bundesstraße Nord 58          * Projektbez: PC MILL 55           *      page      *
*A-5400 HALLEIN-TAXACH                    * Zeichn.Nr.: F1C_V01              *        1       *
*Tel.: 06245/891-0                        *                                  *                *
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Anlage Ort BMK install loc equ.	Pfad path	SachNr. parts no	Technische Beschreibung technical description Funktionstext/description	Hersteller/manufact Bestellnr./ordernumber
=1FA0.C1+1FL1-F1	1.3	ZEE750028	GLASROHRSICHERUNG 10 AT 5x20 glas tube fuse 10 AT time-lag 5x20	WICKMANN
=1FA0.C1+1FL1-S2	1.2	ZEL440022	SCHLOSSTASTE ZB2 BG2 2 Stellungen rastend, links abziehbar key-switched-button ZB2 BG2 two positions grided, strippable left	TELEMECANIQUE ZB2 BG2
=1FA0.C1+1FL1-S2	1.2	ZEL491103	KONTAKTELEMENT ZB2 BZ103 2 Schließer contact element ZB2 BZ103 two NO contacts	TELEMECANIQUE ZB2 BZ103
=1FA0.C1+1FL1-S2	1.2	ZEL491101	KONTAKTBLOCK 1 SCHLIESSER contactbloc 1 nc	TELEMECANIQUE
=1FA0.C1+1FL1-T1	1.2	ZET000386	TRANSFORMATOR PRIM.SPARWICKLUNG: 110V/10 A, 230V/3A SEKUNDÄR: 24VDC/4A, 30VDC/15A tranformer prim.autotransformer: 110V/10 A, 230V/3A sec.: 24Vdc/4A, 30Vdc/15A	HABERMANN
=1FA0.E1+1FL1-E1	1.4	ZEE531130	SCHUTZROHRLEUCHTE SRL111 IN PLEXIGLASAUSF., 1X11W ENERGIESPARRÖHRE, OHNE DROSSEL, IP67, 354MM LÄNGE protective tube lamp SRL111, 1X11W power saving tube, without choke, IP67, 354MM length	WALDMANN 101961000
=1FA0.E1+1FL1-L1	1.4	ZEG200111	VORSCHALTGERÄT 230V/50HZ LOSE ZUM EINBAU FÜR MASCHINENLEUCHTE SRL111 TYP: 7-9-11/23SY-V120 series reactor 230V/50Hz for machine lamp SRL111 type: 7-9-11/23SY-V120	WALDMANN 309105010
=1FA0.M1+1FL1-A2	1.4	Y4A080000	G.AXISCONTROLLER AC95 MONTAGEPLATTE g.axiscontroller AC95 mounting panel	EMCO
=1FA0.M1+1FL1-A2	1.4	Y4A091000	G.STECKERPL. AC95 MONTAGEPLATTE FREMD FU g.plug-board AC95 mounting panel buy FC	EMCO

Fortsetzung auf Seite 2

Anlage Ort BMK / install loc equ.	Pfad / path	SachNr. / parts no	Technische Beschreibung / technical description / Funktionstext/description	Hersteller/manufact / Bestellnr./ordernumber
=1FA0.M1+1FL1-A3	5.2	Y4A029000	G.SPS-ERWEITERUNG g.sps-extension board	EMCO
=1FA0.M1+1FL1-A4	1.3	Y4A085000	G.FILTERPLATINE g.filter-board	EMCO
=1FA0.M1+1FL1-A8	1.2	ZES150061	GERÄTESTECKER 1-POLIG 10A/250V TYP:KEC MIT STECKKONTAKTEN 4,8x0,8 single-pole plug 10A/250V type:KEC with male contacts 4,8x0,8	SCHURTER 4303.0091
=1FA0.M1+1FP1-A300	2.2	Y4A083000	G.PC-EINSCHUB RS422 g.PC insert-card RS422	EMCO
=1FA0.R1+1FL1-K1	1.2	ZEL590210	WECHSELSTROMSCHÜTZ alternating current contactor	SIEMENS 3TJ5001-0BB4
=1FA0.R1+1FL1-K1	1.2	ZED450200	ENTSTÖRDIODE 3TX4490-4A FÜR HILFSSCHÜTZ 3TH2.. supression diode for relay type 3TH2..	SIEMENS 3TX4490-4A
=1FA0.R1+1FL1-K2	1.3	ZEL590210	WECHSELSTROMSCHÜTZ alternating current contactor	SIEMENS 3TJ5001-0BB4
=1FA0.R1+1FL1-K2	1.3	ZED450200	ENTSTÖRDIODE 3TX4490-4A FÜR HILFSSCHÜTZ 3TH2.. supression diode for relay type 3TH2..	SIEMENS 3TX4490-4A
=1FA0.R1+1FU1-S1	1.2	ZEL401010	PILZTASTE mushroom button	RAFI 1.30043.551/030
=1FA0.R1+1FU1-S1	1.2	ZEL491040	KONTAKTELEMENT Aufschnappkontakt 1ÖFFNER contact-element snapp-on-contact one NC-contact	ABB GHV 8706606P4
=1FA0.R1+1FU1-S1	1.2	ZEE710701	KUPPLUNG 45294/0 coupling 452940	ABB GHV 8706602P2

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Anlage Ort BMK install loc equ.	Pfad path	SachNr. parts no	Technische Beschreibung technical description Funktionstext/description	Hersteller/manufact Bestellnr./ordernumber
=1FA0.R1+1FU1-S3	1.2	ZEL212030	ENDSCHALTER IEC947 VDE660 IP67 CSA UL AC-15 UE 230/220VAC IE 3,8/4A zwangsöffnender Öffner limit-switch IEC947 VDE660 IP67 CSA UL AC-15 UE 230/220VAC IE 3,8/4A positive-operated break-contact	SCHMERSAL ZS 236-11Z
=1FA0.R1+1FU1-S3	1.2	ZEE470231	ROLLENHEBEL roll-lever	SCHMERSAL ZR231-11Y
=1FB1.D1+1FU1-M1	1.4	ZMO473381	DREHSTROMMOTOR 0.55KW 1400U/MIN 220/380V BAUGRÖSSE 71,BAUFORM B14 KL.FLANSCH three-phase-motor 0,55KW 1400upm 220/380V size 71, design B14 small flange	ELIN
=1FB1.U1+1FL1-A1	1.2	ZEG905075	FREQUENZUMRICHTER 230V 0,75KW TYP:E82EV751 VECTOR Frequency converter 230V 0,75kW typ:E82EV751 VECTOR	LENZE
=1FC0.M1+1FL1-A1	1.2	Y4B031000	3-PHASEN SCHRITTMOTORPLATINE FÜR 3 ACHSEN 3-phase steppermotorboard for 3 axis	EMCO
=1FC1.G1+1FU1-M1	1.4	ZMO780031	SCHRITTMOTOR VRDM366/50LHA 3-PHASIG 40V 5,8A 0,9NM Steppermotor VRDM366/50LHA 3-phase 40V 5,8A 0,9NM	BERGERLAHR
=1FC1.M1+1FU1-B1	1.6	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER PNP-Schließer M8x1 7m Kabel inductance proximity switch PNP-closer M8x1 7m cable	BALLUF BES 516-324-EO
=1FC1.M1+1FU1-S1	1.5	ZEL239002	BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18 microswitch V-10FL2-1C2 V3L-E9001M-D18	OMRON
=1FC2.G1+1FU1-M1	1.4	ZMO780031	SCHRITTMOTOR VRDM366/50LHA 3-PHASIG 40V 5,8A 0,9NM Steppermotor VRDM366/50LHA 3-phase 40V 5,8A 0,9NM	BERGERLAHR

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Anlage Ort BMK	Pfad	SachNr.	Technische Beschreibung	Hersteller/manufact
install loc equ.	path	parts no	technical description	Bestellnr./ordernumber
			Funktionstext/description	
=1FC2.M1+1FU1-B1	1.7	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER	BALLUF
			PNP-Schließer M8x1	BES 516-324-EOL
			7m Kabel	
			inductance proximity switch	
			PNP-closer M8x1	
			7m cable	
=1FC2.M1+1FU1-S1	1.6	ZEL239002	BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18	OMRON
			microswitch V-10FL2-1C2 V3L-E9001M-D18	
=1FC3.G1+1FU1-M1	1.4	ZMO780031	SCHRITTMOTOR VRDM366/50LHA 3-PHASIG	BERGERLAHR
			40V 5,8A 0,9NM	
			Steppermotor VRDM366/50LHA 3-phase	
			40V 5,8A 0,9NM	
=1FC3.M1+1FU1-B1	1.6	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER	BALLUF
			PNP-Schließer M8x1	BES 516-324-EOL
			7m Kabel	
			inductance proximity switch	
			PNP-closer M8x1	
			7m cable	
=1FC3.M1+1FU1-S1	1.5	ZEL239002	BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18	OMRON
			microswitch V-10FL2-1C2 V3L-E9001M-D18	
=1FP1.M1+1FU1-S1	1.5	ZEL212030	ENDSCHALTER	SCHMERSAL
			IEC947 VDE660 IP67 CSA UL AC-15	ZS 236-11Z
			UE 230/220VAC IE 3,8/4A	
			zwangsöffnender Öffner	
			limit-switch	
			IEC947 VDE660 IP67 CSA UL AC-15	
			UE 230/220VAC IE 3,8/4A	
			positive-operated break-contact	
=1FP1.M1+1FU1-S1	1.5	ZEE470231	ROLLENHEBEL	SCHMERSAL
				ZR231-11Y
			roll-lever	
=1FS1.M1+1FL1-A4	1.2	Y4A035000	G.SPANNMITTELPLATINE	EMCO
			g.clamping device board	
=1FS1.M1+1FL1-M1	1.2	ZMO780122	DC-MOTOR 2332.909-13.151-050 MIT	MAXON
			GETRIEBE 2938.804-0100.0-000 100:1	
			DC-motor 2332.909-13.151-050 with	
			transmission 2938.804-0100.0-000 100:1	

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Anlage Ort BMK install loc equ.	Pfad path	SachNr. parts no	Technische Beschreibung technical description Funktionstext/description	Hersteller/manufact Bestellnr./ordernumber
=1FS1.M1+1FU1-B2	1.5	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER PNP-Schließer M8x1 7m Kabel inductance proximity switch PNP-closer M8x1 7m cable	BALLUF BES 516-324-EOL
=1FS1.M1+1FU1-B3	1.6	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER PNP-Schließer M8x1 7m Kabel inductance proximity switch PNP-closer M8x1 7m cable	BALLUF BES 516-324-EOL

Ende der Liste