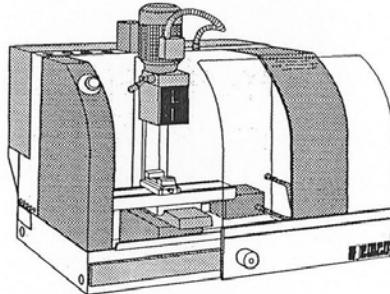


Machine description

EMCO PC MILL 50 Milling machine



Edition 1994

Ref. No. EN 4325

Machine description
EMCO PC MILL 50
A94-07 EN 4325



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 four decades EMCO has been developing wood and 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 which 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 their fitting possibilities.

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

EC conformity



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**



Industrie Auszeichnung 1994
Forum für gutes Design
Design Award
Hannover for good industrial design

Contents

Adequate use	5	Dismounting the toolholder	17	
Warranty conditions for new EMCO machines	5	Collet holder	18	
Safety recommendations	6	Maintenance of collets and collet holders	18	
Technical data of the machine	7	Mounting the collets	18	
PC configuration	8	Dismounting the collets	18	
A Machine installation				
Machine acceptance	9	Clamping the tools in the collet holder	19	
Scope of supply	9	Clamping ranges	19	
Dimensions of the machine	10	Milling spindle	20	
Transport of the machine	10	Clamping the tools in the milling spindle	20	
Installation requirement	10	Clamping rails	21	
Electrical connection of the machine	11	Mounting the clamping rails	21	
Adjustment of the required supply voltage	11	Clamping the workpieces	21	
1. 110V and 230V mains supply	11	Chuck	21	
2. 100V mains supply	11	3-jaw chuck	21	
Connection of the power cable	12	4-jaw chuck	21	
Installation of the interface card into the PC	12	Clamping plate	21	
PC connection to the machine	13	Support flange	22	
Initial start-up	13	Mounting chuck on the support flange	22	
B Description of machine				
Operating elements	14	Mounting the support flange on the milling table	22	
Key switch	14	The machine vice	22	
EMERGENCY-OFF key	15	Mounting the machine vice	22	
Safety package	15	Technological data	23	
The step motors	15	1. Cutting speed V	23	
Limitation of traversing paths	15	2. Speed S	23	
The milling head	16	3. Feed F	23	
Swivelling the milling head	16	Summary	23	
Vertical-horizontal milling	16	Determination of the speed S	24	
The toolholder	17	Determination of the cutting depth t	25	
Mounting the toolholder	17	Determination of the feed speed F during milling	25	
Speed-torque characteristic line				27
Points at the machine - coordinate system				28
Maintenance of the machine				29
Slideway oil				29
Declaration of conformity				

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. Occurring defects must be immediately reported to the EMCO representative 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 representative, 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 occurred 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 alterations 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 EMCO's 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 perfect 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 standstill 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]	90
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]	370/550
Nominal motor speed	[rpm]	1370
Speed range (infinitely variable)	[rpm]	200-2500
maximum torque on milling spindle	[Nm]	4,25
Drilling capacity in aluminium	[mm]	ø10
Thread-cutting capacity in aluminium	[mm]	M6x15
Feed drives		
Step resolution/output resolution	[mm]	0.001
Operating feed in X/Y/Z (infinitely variable)	[mm/min]	0-750
Rapid feed in X/Y/Z	[mm/min]	750
max. feed force (up to 500 mm/min)	[N]	600

Subject to technical modifications!

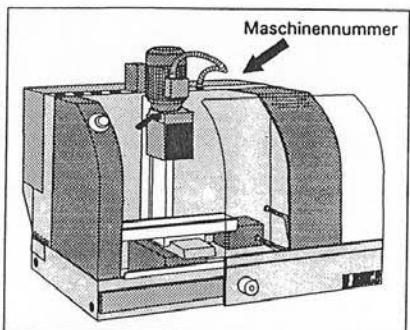
Electrical connection	
Power supply	[V] 100/110/230
maximum voltage fluctuations	[%) +5/-10
Frequency	[Hz] 50/60
Connected load	[kVA] 0.6
Main fuse	[A-slow] 6.3
Machine dimensions	
total length x total depth x total height	[mm] 840 x 865 x 710
total weight of machine	[kg] 160
Sound level	
mean sound level	[dB(A)] 70
With the following conditions:	
<ul style="list-style-type: none"> - measuring method: enveloping surface method according to DIN 45 635 - operating method: maximum speed during idle running 	

PC Configuration

	minimum configuration	recommended configuration
IBM or IBM compatible	PC 80386SX	PC 80486DX
Hard disk	40MB	100MB
Disk drive	3.5" and/or 5.25"	
Operating system	MS DOS version 5.0	
Main storage	1MB	4MB
Graphics card	VGA color graphics card	
Display	color display 14"	
Keyboard	MF-2	
BUS (free slot)	ISA or EISA Bus (no Microchannel-IBM PS2) for installing the interface card RS485 (8 bit slot)	

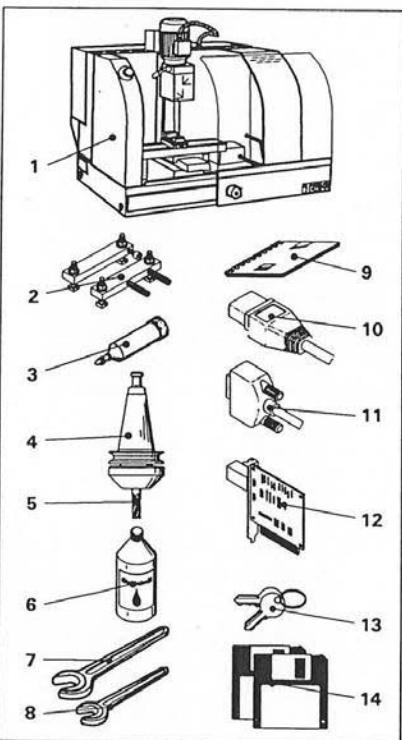
Subject to technical modifications!

A Machine installation



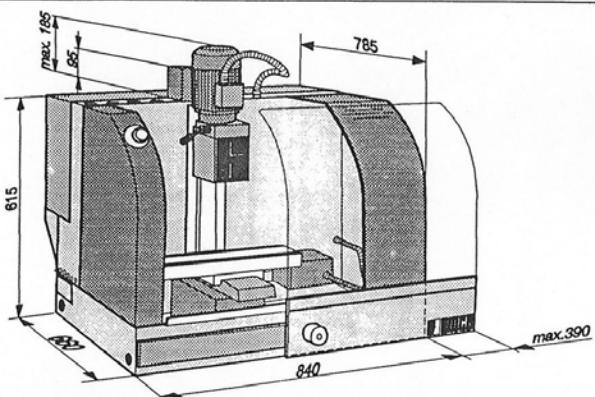
Machine acceptance

- 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 is on the machine side below the key switch.



Scope of supply

Dimensions of the machine



Dimensions of the machine

Transport of the machine

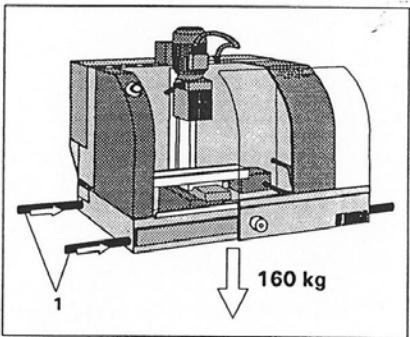
For transporting the machine two bars can be pushed through the holes (1).

Weight of machine approx. 160 kg



Safety Instruction:

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.



Transport of 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:

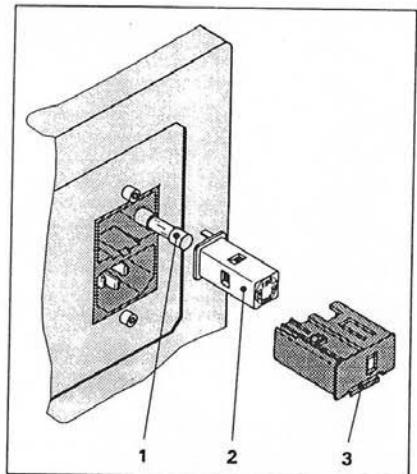
Mind that the ventilation slots on the electric cabinet are not blocked or covered.

In case of insufficient ventilation disturbances on the machine due to too high temperature might occur.

Electrical connection of the machine


Safety instruction:

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



Adjustment of the supply voltage

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: 0.6 kVA
Preliminary fuse: max. 6.3 A slow
Max. voltage fluctuations: +5/-10%

Adjustment of the required supply voltage

1. 110V and 230V mains supply

- 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
110V mains	setting 100V
230V mains	setting 220V

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

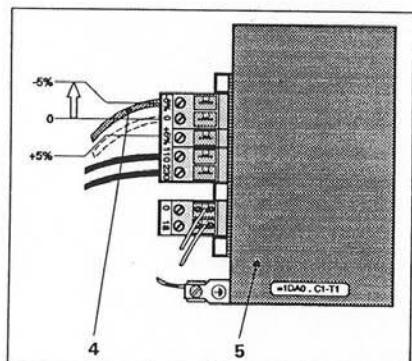
2. 100V mains supply

For setting the machine to a 100V mains supply the voltage allowance set on the transformer has to be modified.

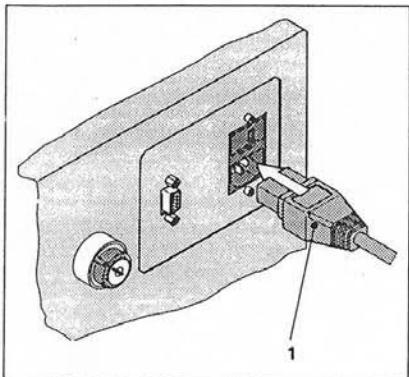

Safety instruction:

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

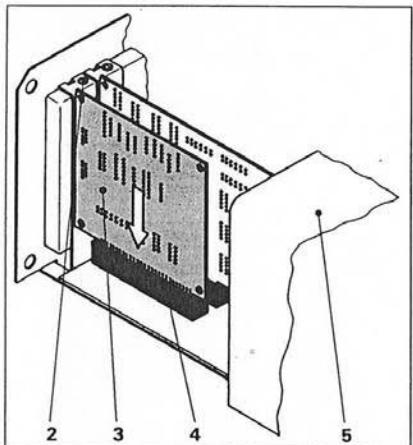
- Unscrew cover of the electric cabinet on the rear side of the machine.
- Connect blue core (4) on the transformer (5) from setting "0" to setting "-5%".
- Remount cover of electric cabinet.
- Adjust the pin selector (2) in such a way that in the control window of the casing (3) the voltage setting 100V can be read (procedure see item 1 above on this page).



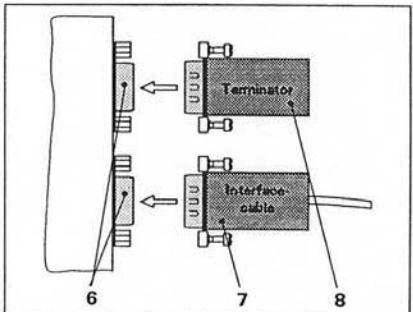
100V-voltage adjustment on the transformer



Power connection of the machine



Einbau der Schnittstellenkarte



Anschluß des Schnittstellenkabels

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.

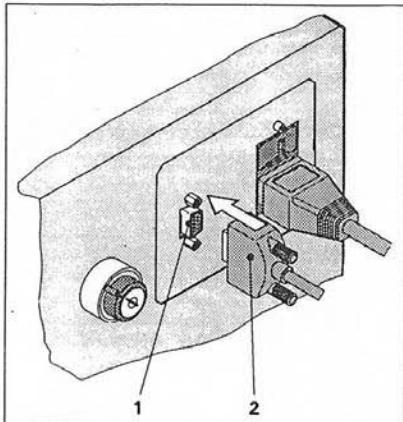
The interface is a serial interface RS 485 and is used for connecting the computer with the machine.



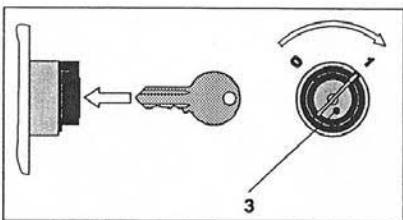
Safety instructions:

- 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.
- Connect end plug (terminator-8) to one of either sockets (6) on the interface card.
- Connect the interface cable (7) to the second socket of the interface card.



PC connection to the machine



Key switch on the machine

PC connection to the machine

- Plug the free end of the interface cable (2) into the socket (1) at the electric cabinet of the machine.

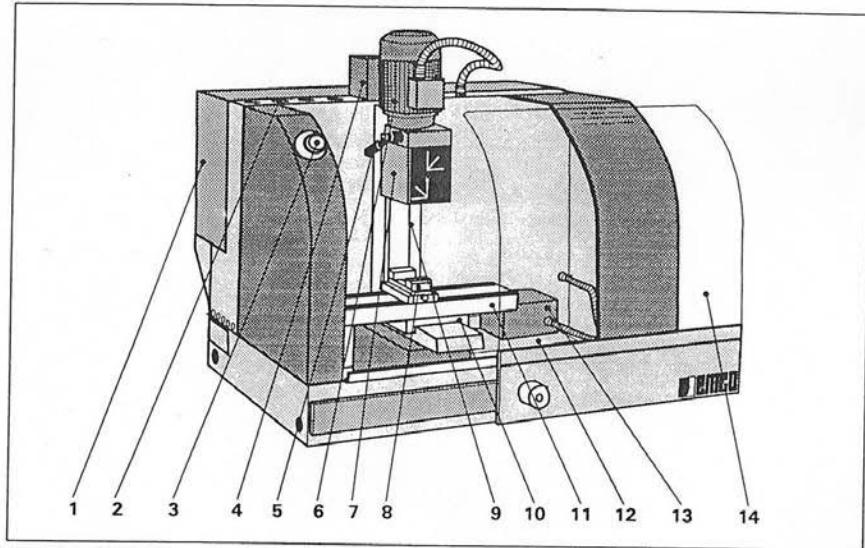
Initial start-up

- Machine is to be cleaned from rust preventive agent with a clean cloth.
- Establish power connection.
- Switch on machine at key switch (5).

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

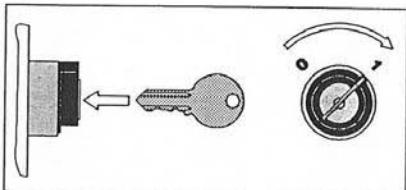


EMCO PC MILL 50

1. Electric cabinet
2. Tool support for 4 tools
3. EMERGENCY-OFF key
4. Step motor Z-axis
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



Safety instruction:
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.

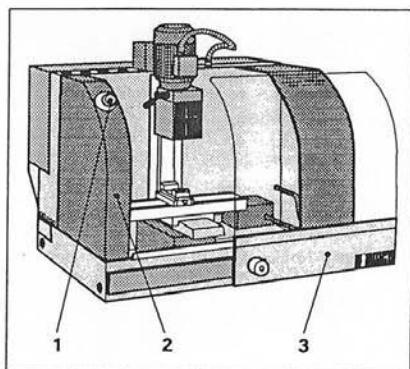
The main and feed motors are supplied with power.

EMERGENCY-OFF key



Safety instruction:

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



Safety package

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 instruction:

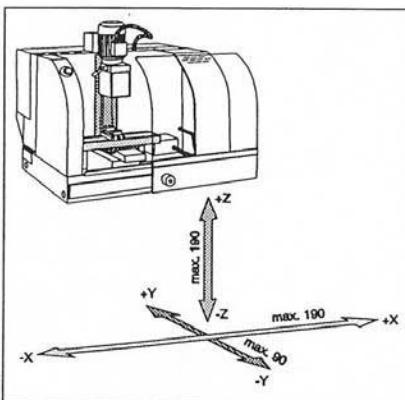
Modifications on safety devices as well as bridging of control devices are prohibited!

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)
- Chip guard door with limit switch (3)



Traversing areas of the slides

The step motors

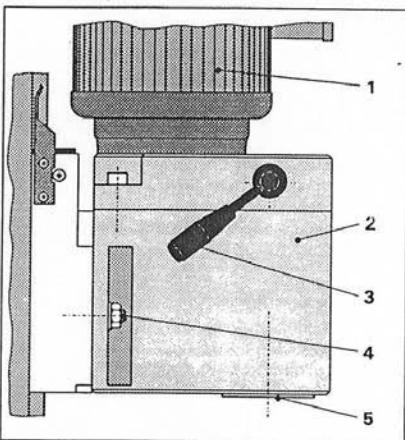
The step motors are used for driving the slides in X-, Y- and Z-direction.

Feed speed X/Y/Z	0-750 mm/min
Step resolution	0.001 mm
Traversing path X-slide	190 mm
Traversing path Y-slide	90 mm
Traversing path Z-slide	190 mm
Feed force	max. 600 N

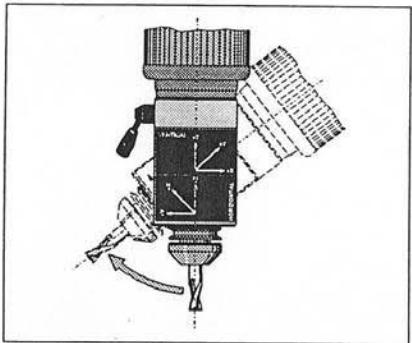
Limitation of traversing paths

The limitation of traversing paths is effected by means of the "software limit switch". When reaching a software limit switch the respective feed motor stops.

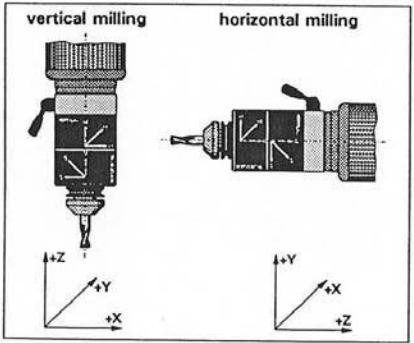
By means of the software limit switches a mechanical overload of the axis spindles due to fixed stops is avoided.



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



Safety instruction:

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

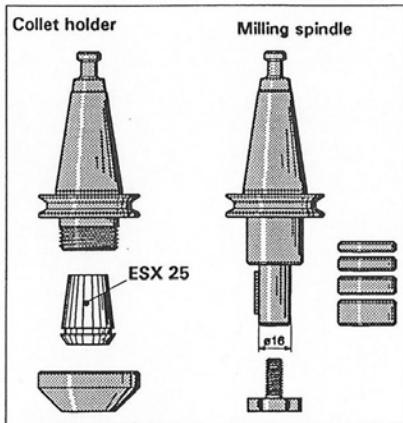
- Untighten the clamping nuts SW13 (4) on both sides of the milling head (2).
- Swivel milling head (2) together with drive motor (1) into the desired direction to the stop. For changing the machine from vertical to horizontal milling the milling head must be swivelled to the right, when changing to vertical milling swivel the milling head to the left.
- Tighten clamping nuts (4).

Notes:

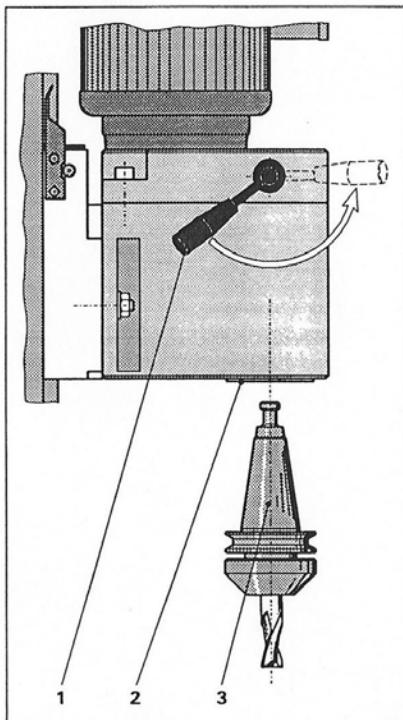
- Mind during swivelling that the milling head does not knock too hard against the stop bolts in order to avoid damages at the stop bolts and milling head.
- After swivelling the milling head the setting data in the software must be reset since the coordinate axes change (see "Programming and operation").

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



Safety instructions:

- Mounting and dismantling 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-weighted 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.

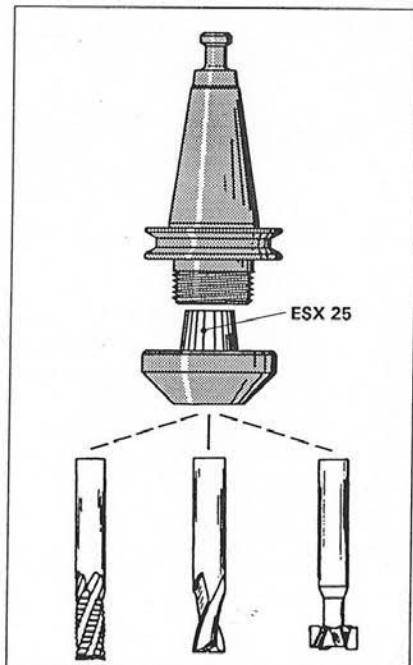
Note:

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. 770 010
 Clamping range 1.5 up to 16 mm
 Collet type ESX 25

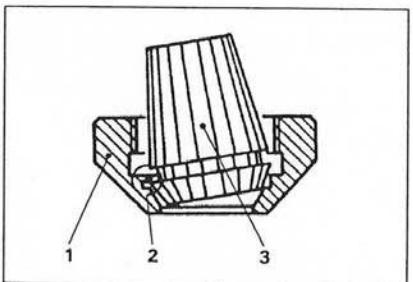
Maintenance of collets and collet holders

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.

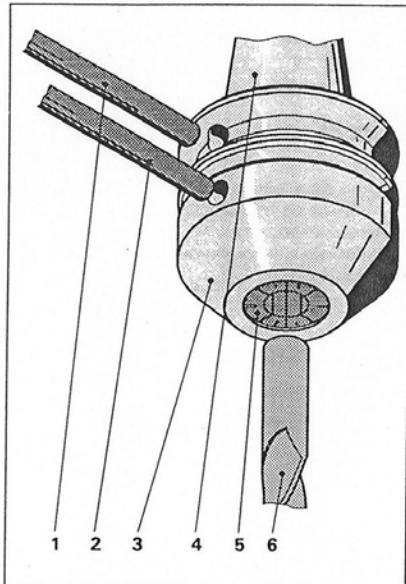


Safety instruction:

Mounting and dismantling 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).



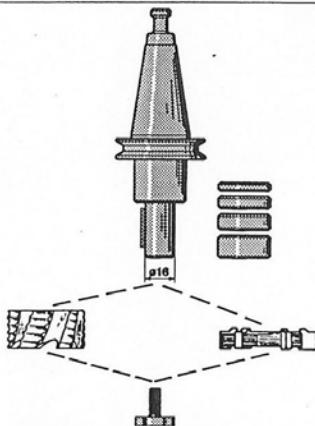
Safety instructions:

- 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.

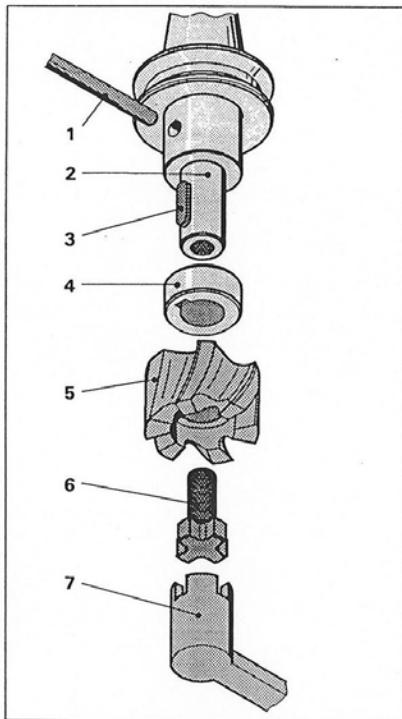
Nominal diameter of the collet	Clamping range	
	[mm]	[inch]
2.0	1.5-2.0	1/16-5/64
2.5	2.0-2.5	3/32
3.0	2.5-3.0	7/64
4.0	3.0-4.0	1/8-9/64-5/32
5.0	4.0-5.0	11/64-3/16
6.0	5.0-6.0	13/64-7/32-15/64
7.0	6.0-7.0	1/4-17/64
8.0	7.0-8.0	9/32-19/64-5/16
9.0	8.0-9.0	21/64-11/32
10.0	9.0-10.0	23/64-3/8-25/64
11.0	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. 770 020
 Tool support shaft ø16 mm

*Clamping the tools in the milling spindle*

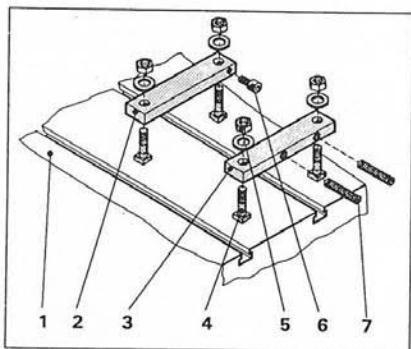
Clamping the tools in the milling spindle



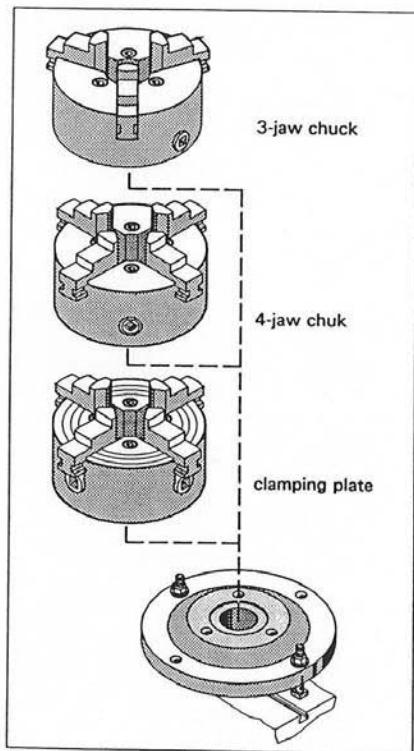
Safety instructions:

- 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).



Mounting the clamping rails



Chucks

Clamping rails

The clamping rails are included in the scope of supply of the machine.

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).



Safety instructions:

- 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..

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

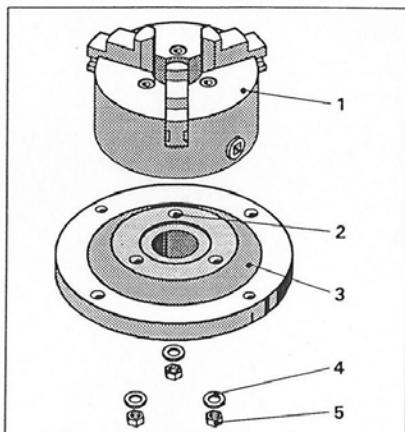
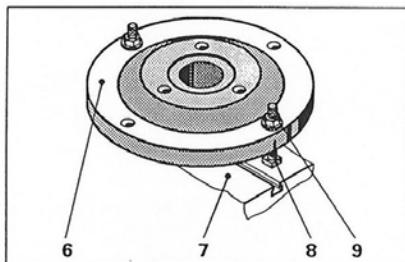
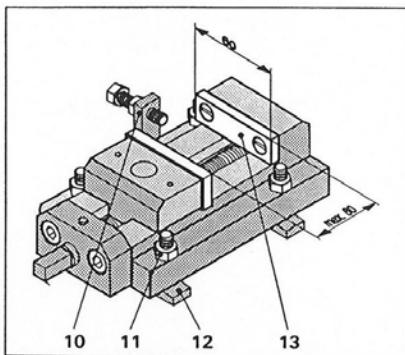
Order no. V1C 328

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.

*Mounting the chuck**Mounting the support flange**Machine vice*

Support flange

Order no. 346 510

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 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).

The 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. 770 310
 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).

Technological data

1. Cutting speed V

$$V \text{ [m/min]} = \frac{D \text{ [mm]} \times \pi \times S \text{ [rpm]}}{1000}$$

V [m/min] cutting speed
 D [mm] dia. of workpiece
 S [rpm] speed of main spindle

The max. admissible cutting speed depends on:

- **Material of workpiece**

The higher the strength of the material, the lower the cutting speed.

- **Material of tool**

Hard metal tools allow for a higher cutting speed than HSS-tools.

- **Feed value**

The larger the feed the lower the cutting speed.

- **Depth of cut**

The larger the depth of cut the smaller the cutting speed.

Cutting speed for programming exercises on the EMCO PC MILL 50:

Aluminium (Torradur B) 44 m/min
 Steel (9S20),

tender synthetic material 35 m/min
 hard synthetic material 25 m/min

2. Speed S

$$S \text{ [rpm]} = \frac{V \text{ [m/min]} \times 1000}{D \text{ [mm]} \times \pi}$$

The cutting speed and the tool diameter enable you to calculate the speed of the main spindle.

3. Feed F

On the EMCO PC MILL 50 the feed F is programmed in [mm/min].

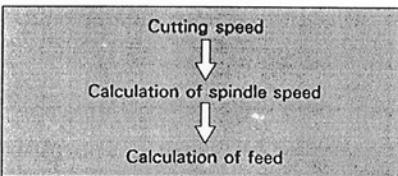
$$F \text{ [mm/min]} = S \text{ [rpm]} \times F \text{ [mm/ref.]}$$

F [mm/min] feed in [mm/min]

F [mm/rev.] feed in [mm/rev.]

S [rpm] speed of main spindle

Summary



The charts on the following page save the calculation work.

Determination of the speed S during milling and drilling

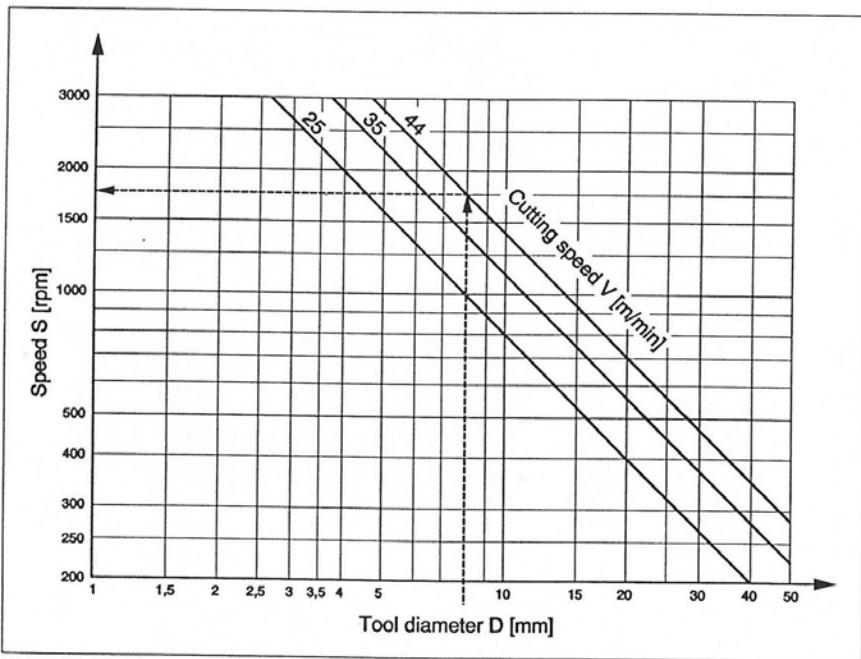
Example:

You know:

- tool diameter $D = \varnothing 8 \text{ mm}$
- cutting speed $V = 44 \text{ m/min}$

You want to know:

- speed S in [rpm]



Determination of the speed

Solution:

speed $S = 1750 \text{ rpm}$

Determination of the cutting depth t during milling

Example:

You know:

- workpiece material Torradur B
- diameter of milling cutter $D = \varnothing 12 \text{ mm}$
- feed speed $F = 70 \text{ mm/min}$

You want to know:

- cutting depth t in [mm]

Determination of the feed speed F during milling

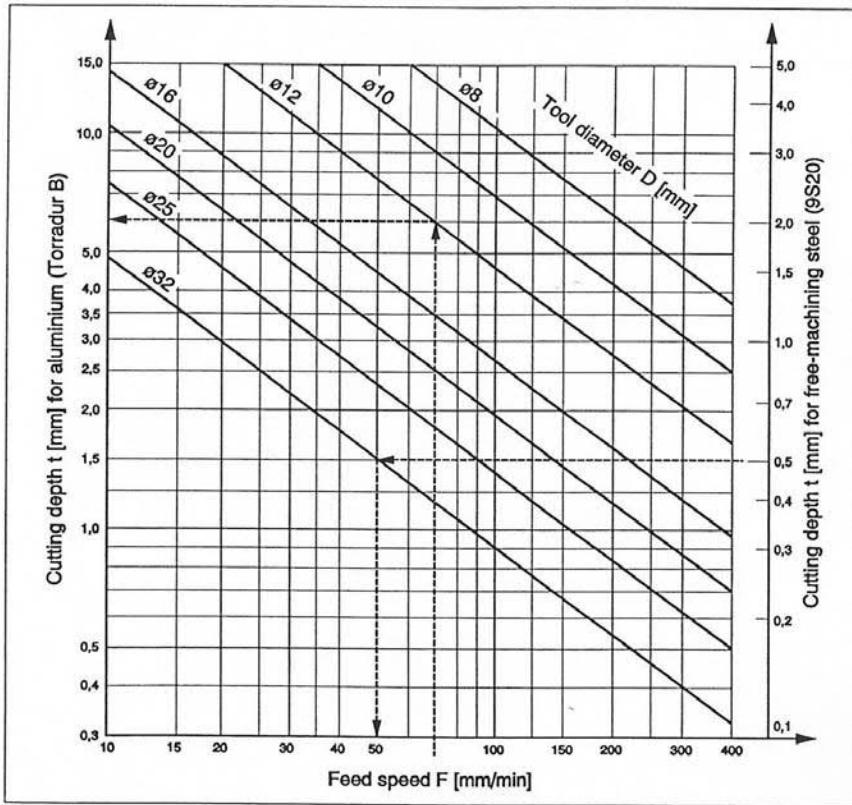
Example:

You know:

- workpiece material . free-machining steel 9S20
- diameter of the milling cutter $D = \varnothing 32 \text{ mm}$
- cutting depth $t = 0,5 \text{ mm}$

You want to know:

- feed speed F in [mm/min]



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

Solution:

$$\text{cutting depth} \dots \dots \dots t = 6 \text{ mm}$$

Solution:

$$\text{feed speed} \dots \dots \dots F = 50 \text{ mm/min}$$

Determination of the feed speed F during drilling

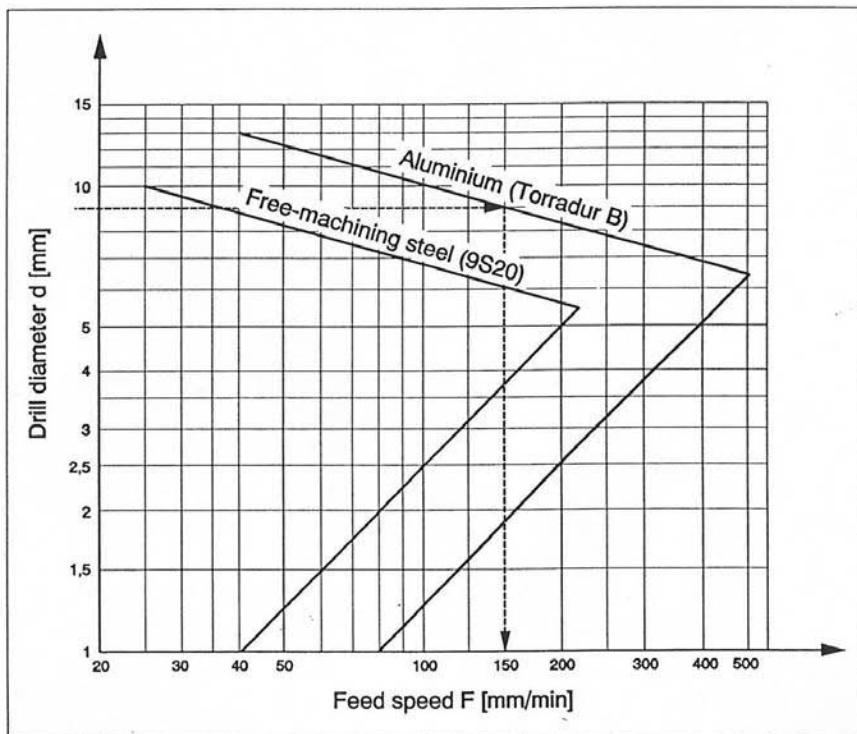
Example:

You know:

- workpiece material Torradur B
- diameter of drill $D = \varnothing 9 \text{ mm}$

You want to know:

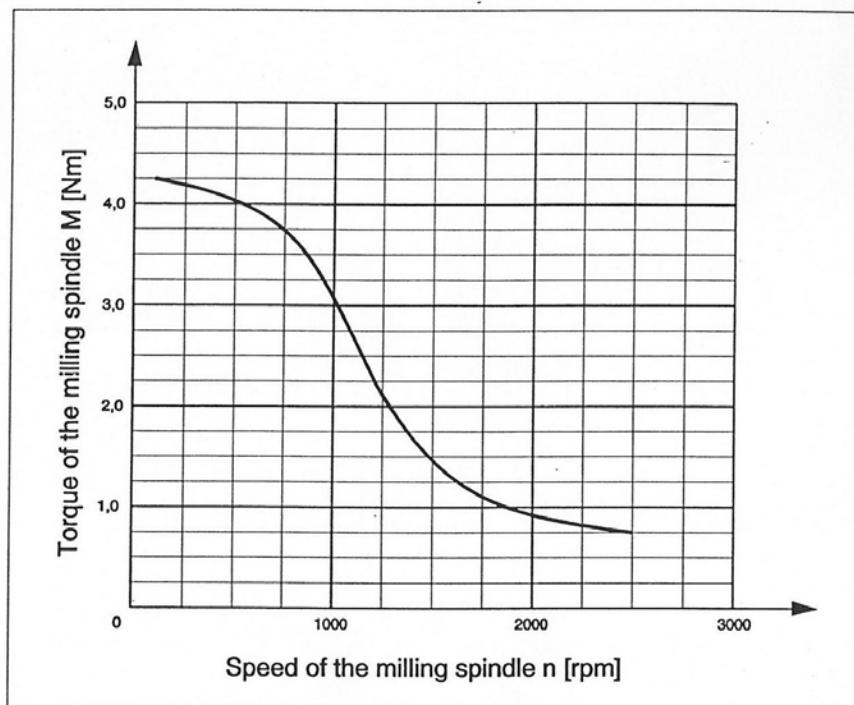
- Feed speed F in [mm/min]



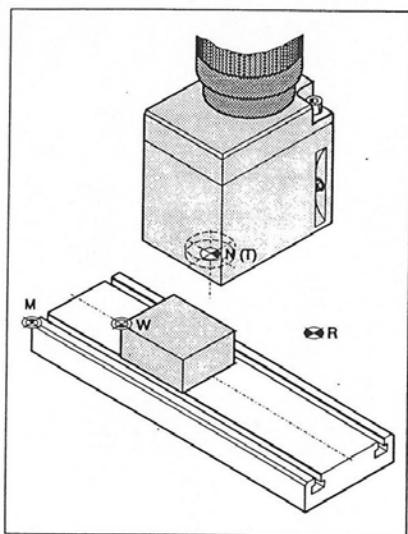
Drilling - Determination of the feed speed

Solution:

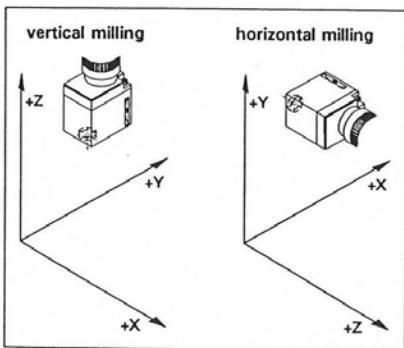
feed speed $F = 150 \text{ mm/min}$

Speed-torque characteristic line

Points at the machine - coordinate system



Points at the machine



Coordinate system

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.

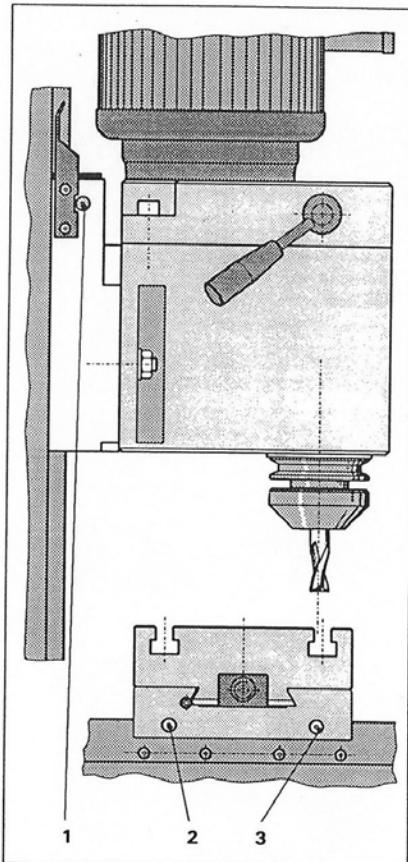
Coordinate system

The coordinate system is right-handed (clockwise). The origin lies in the machine zero point M or in the workpiece zero point W.

Note:

After changing the machine from vertical milling to horizontal milling or vice versa the coordinate system changes.

This change has to be entered in the setting data of the respective software.



Lubricating nipples at the machine

Maintenance of the machine



Safety instruction:

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.

Slideway oil

DIN designation: CGLP DIN 51 502 ISO VG 68

e.g.:

BP Maccurat 68

CASTROL Magna BTH 68

ESSO Febis K 68

KLÜBER Lamora Super Pollad 68

Declaration of conformity

Product: PC-controlled milling machine for training

Machine data: *Model* **Type**
EMCO **PC MILL 50**

Address of manufacturer: Emco Maier Ges.m.b.H
Friedmann-Maier-Str. 9
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 (BGBI. Nr. 306/1994, 27.4.94)

Test certificates:

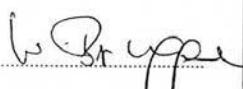
Particular notes , enclosures: Electrical documentation as applicable

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, 21.12.95

Authorized person: Head of quality department Dr. Wilfried Brugger





Ersatzteilliste EMCO PC MILL 50

Spare part list EMCO PC MILL 50

Pièces de service pour EMCO PC MILL 50

Ausgabe 94-10

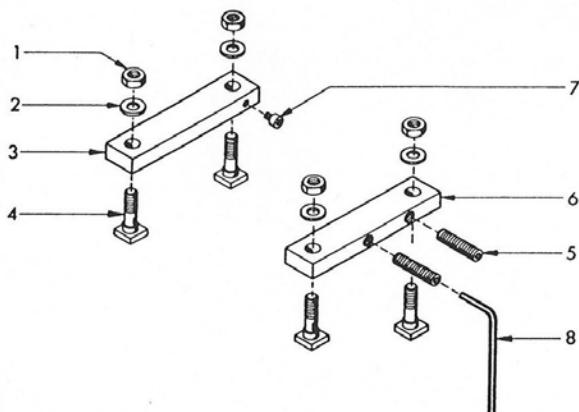
Edition 94-10

Edition 94-10

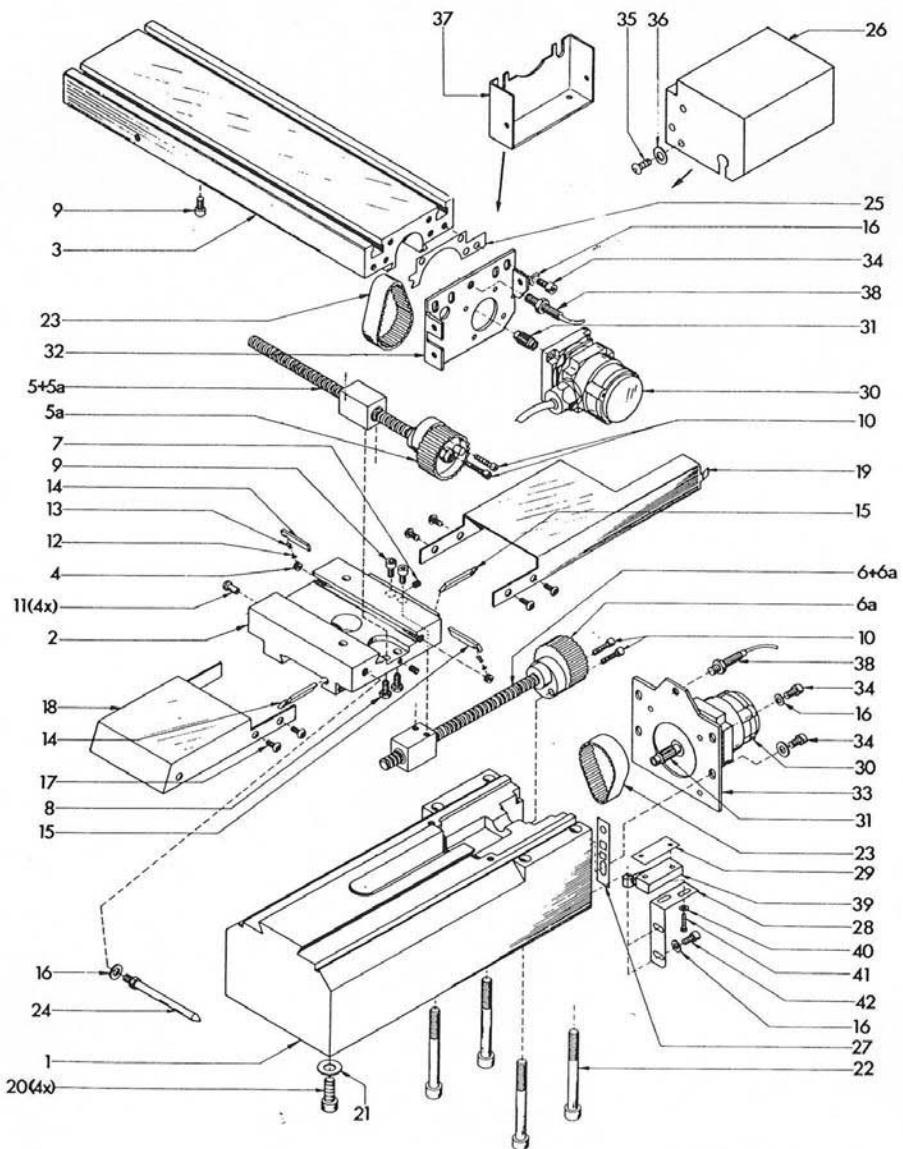


Seite Page	Inhaltsverzeichnis	Contents	Table des matières
3	Werkzeuge	Tools	Outils
4	G. Kreuzschlitzen	Cross slide compl.	Ens. Chariot transversal
6	G. Vertikalschlitzen	Vertical slide compl.	Ens. Chariot vertical
8	G. Fräskopf	Milling head compl.	Ens. tête de fraisage
10	Blechaufbau/G. Tür	Sheet metal assembly/Door compl.	Assemblage en tôle/Ens. Porte
12	Blechaufbau E-Kasten	Assembly switch cabinet	Assemblage du montant de bolte électrique
13	G. Supportflansch	Cross slide adapter compl.	Bride de chariot
14	G. Teilkapparat	Dividing head	Appareil diviseur
16	Plotter	Plotter	Traceur de courbes
17	Maschinenschraubstock	Machine vice	Étau de machines
18	Werkzeughalter	Tool holder	Porte outils
19	3- und 4 Backenfutter	3- And 4 jaw chuck	Mandrin à 3- et 4 mors
20	Pfanscheibe mit 4 Backen	4-jaw independent chuck	Plateau de tour à 4 mors
21	Elektrische Teile	Electronical parts	Pièces électriques
23	Ersatzteile für elektrischen und elektronischen Teil	Service parts for electrical and electronical part	Pièces de service pour électriques et électroniques pièces

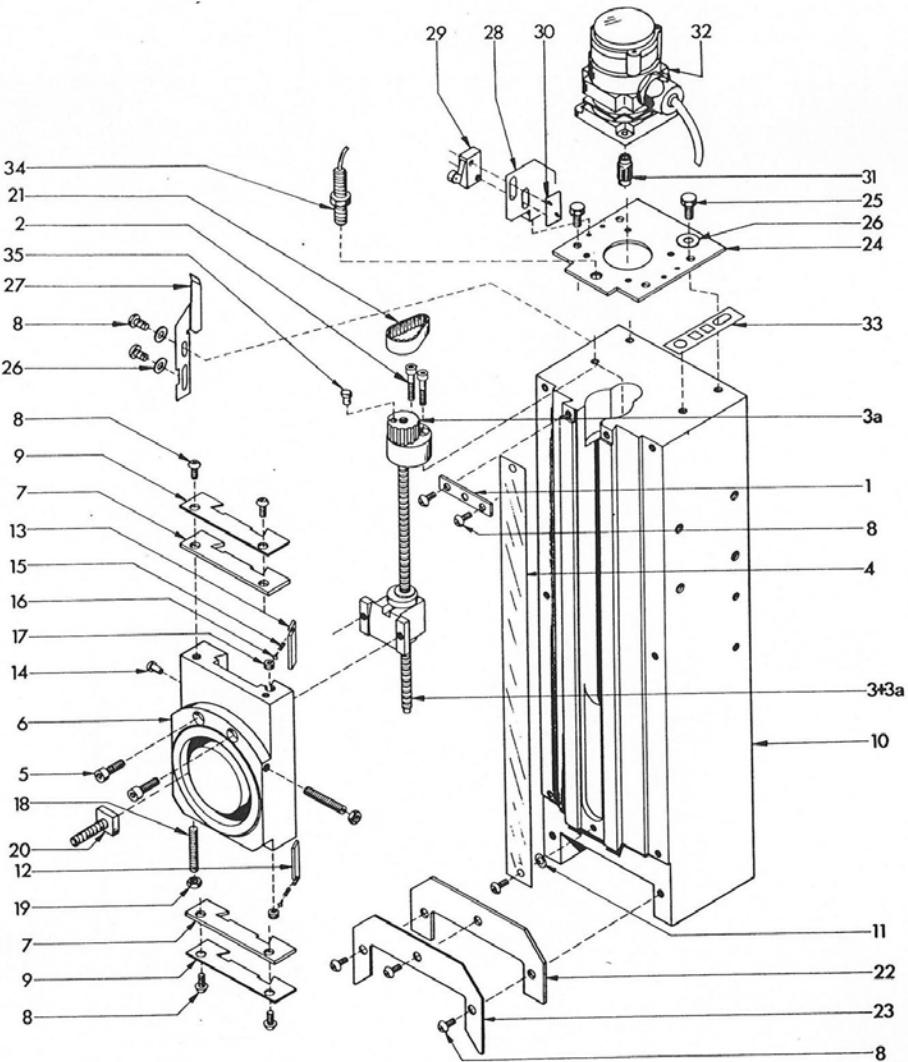
Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
1	ZWZ 893 010	T18012 SPMST		Werkzeuge	Tools	Outils
2	F1A 190 000			Stoßfett presse	Grease gun	Pompe de graissage
3	F1A 180 000			Gleitölflasche	Oil bottle	Bouteille de huile
4	F1A 170 000			G. Tischspannleiste	Table clamping gib compl.	Ens. Barre de tension
5	ZWZ 560 100	A10 Nr.44 DIN 844		G. Spannzangenhalter	Collet holder	Porte-pince
6	ZWZ 021 010	ESX 25 10 mm		Fräser	Milling cutter	Fraise
7	ZST 110 710	6 h11x100 DIN 7		Spannzange	Collet	Pince à serrage
				Zylinderstift	Parallel pin	Tige de serrage



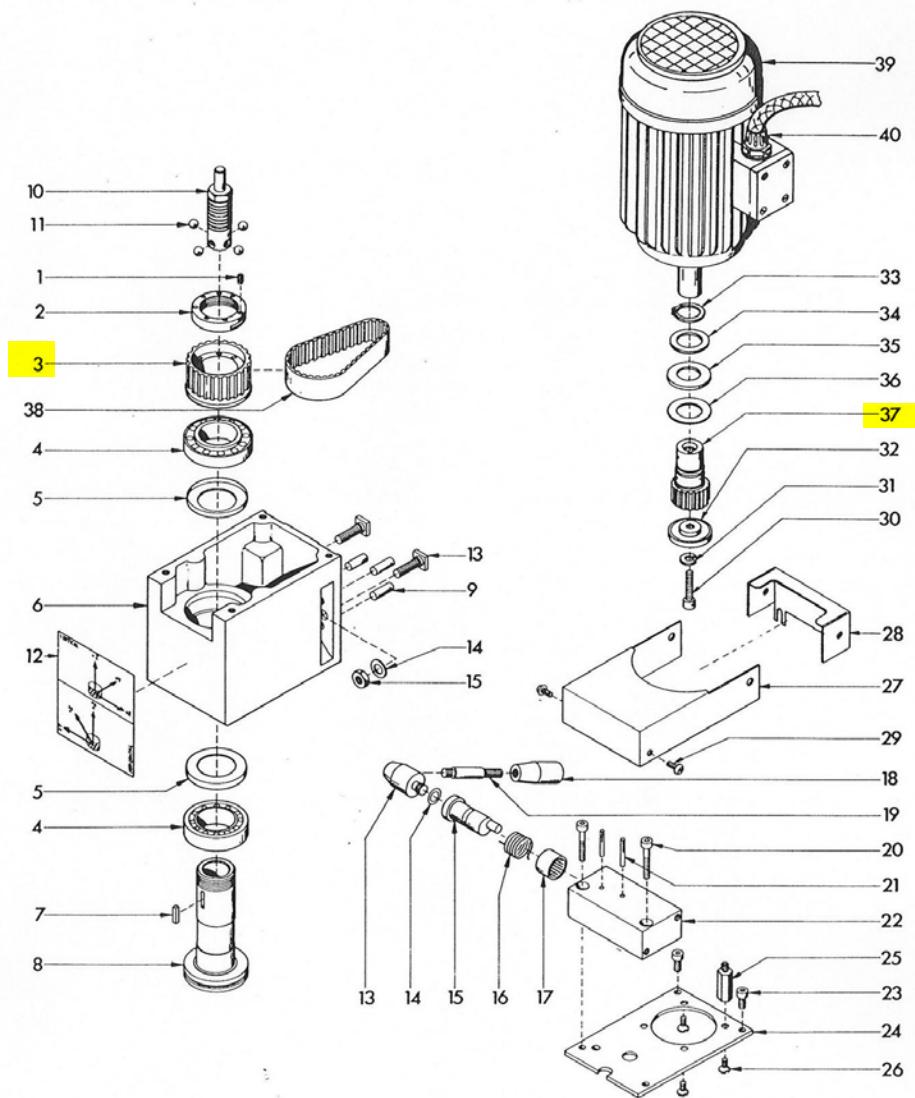
Pos.	Ref. No.	DIN		Benennung	Description
	<u>F1A 160 000</u>			<u>Gruppe Tischspann-</u> <u>Teiste</u>	<u>Table clamping gib</u> <u>complete</u>
1	ZHU 34 0800	M8 DIN 934-6		Sechskantmutter	Hexagonal nut
2	ZSB 25 0840	88,4 DIN 125		Scheibe	Washer
3	F1Z 060 010			Anschlagleiste	Stop gib
4	C4Z 030 020			Nutenschraube	T-nut bolt
5	ZSR 99 0003	M8x35		Stiftschraube	Set screw
6	F1Z 060 020			Spannleiste	Clamping gib
7	ZSR 12 0506	M5x6 DIN 912-6.9		Zylinderschraube	Socket head screw
8	ZWZ 11 0400	SW4 DIN 911		Schraubendreher	Hexagon socket scr.key



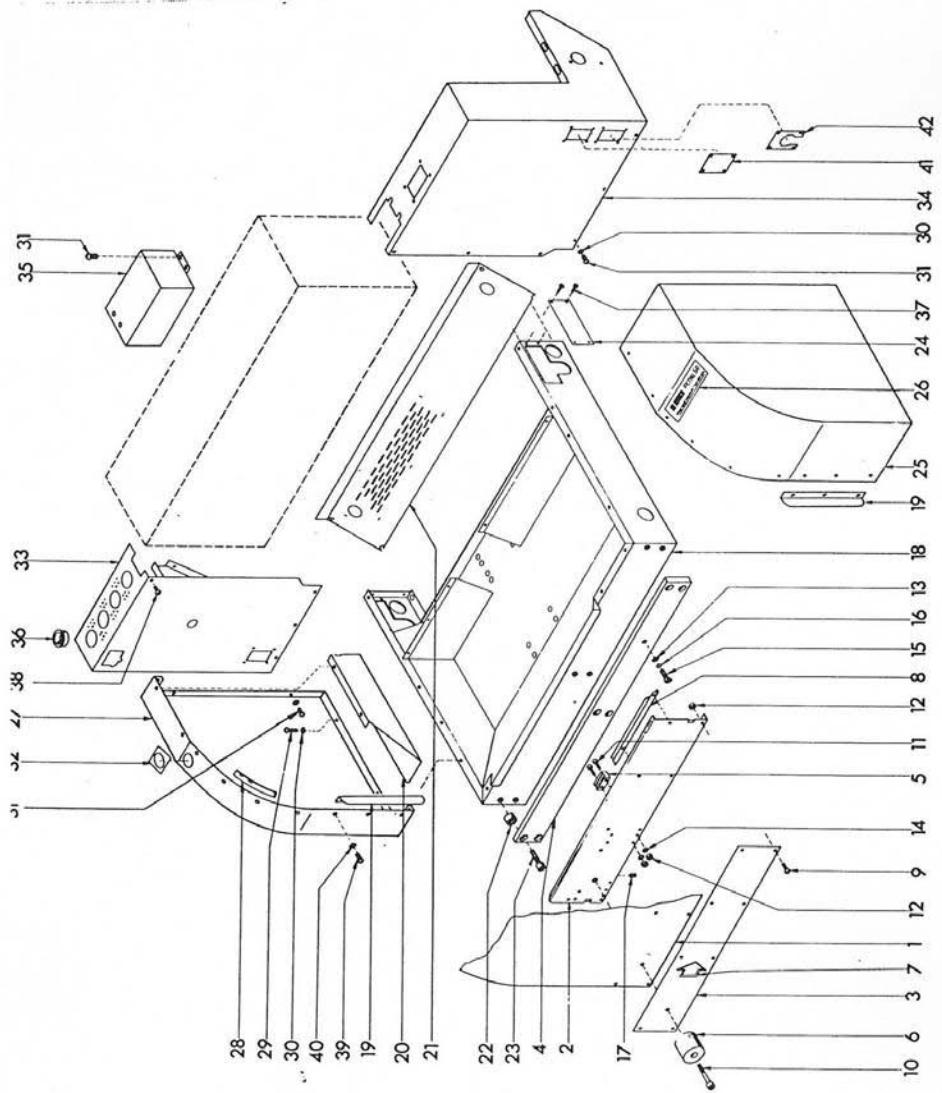
Pos.	Ref.No.	DIN		Benennung	Description	Designation
1-15	F1L 030 000			G. Kreuzschlitten	Cross slide compl.	Ens. Chariot transversal
1	F1A 030 011			Sockel	Base	Socle
2	F1L 030 020			Kreuzschlitten	Cross slide	Chariot transversal
3	F1A 030 030			Frästisch	Milling table	Table de fraisage
4	F1A 020 070			Stellschraube	Adjusting screw	Vis de réglage
5+6a	F1L 031 000			X-Spindel komplett	X-spindle complete	Ens. vis-mère X
6a	F1A 020 130			Riemenscheibe 40	Pulley 40	Poulie 40
6+6a	F1L 032 000			Y-Spindel komplett	Y-spindle complete	Ens. vis-mère Y
6a	F1A 020 130			Riemenscheibe 40	Pulley 40	Poulie 40
7	ZBT 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 120 625	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 lenticulaire
18	F1A 000 011			Schutzblech 1	Cover sheet 1	Tôle de protection 1
19	F1L 000 020			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	800 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'espacement
26	F1L 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	Limit switch sheet	Tôle d'commutateur
					metal Y	defin de course Y
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
31	F1L 621 010			Riemenscheibe 20	Pulley 20	Poulie 20
32	F1L 000 150			Motorplatte X	Motor plate X	Plaque de moteur X
33	F1L 000 160			Motorplatte Y	Motor plate Y	Plaque de moteur Y
34	ZSR 120 618	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 lenticulaire
36	ZSB 210 530	B5,3 DIN 125-St		Scheibe	Washer	Rondelle
37	F1L 000 140			Riemenschutz	Belt protection	Protection de courroie
38	ZEL 212 022	1200mm lg.		Näherungsschalter	Proximity detector	Initiateur inductif
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 840 318	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



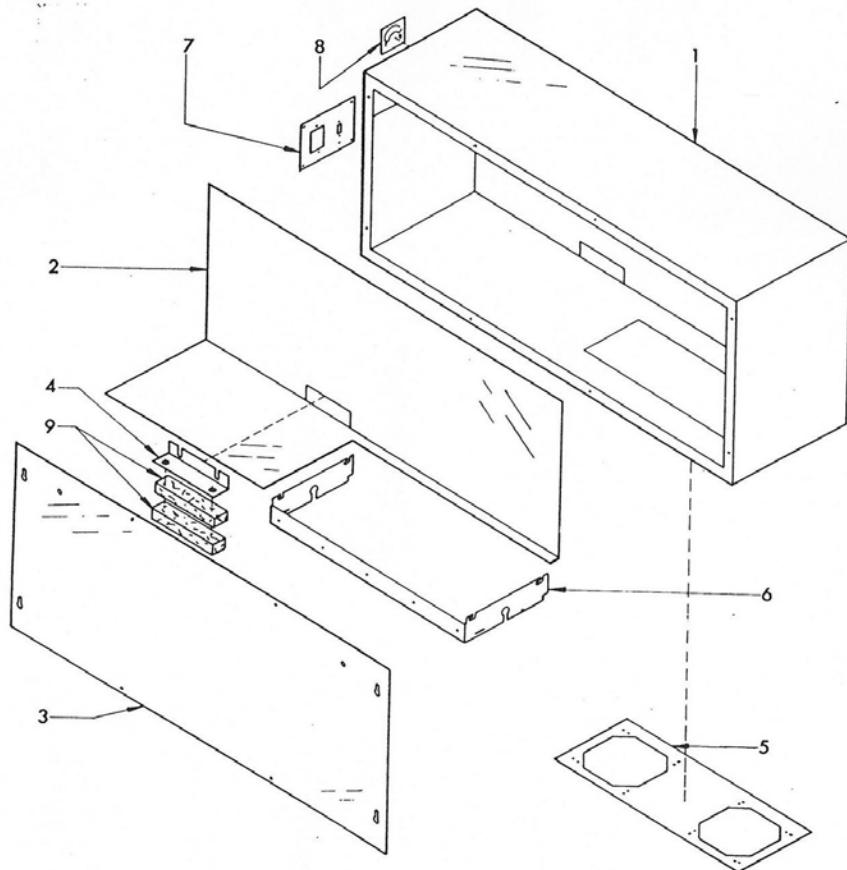
Po.	Ref.No.	DIN		Benennung	Description	Designation
1-20	F1L 020 000			G. Vertikalschlitten	Vertical slide compl.	Ens. chariot vertical
1	F1A 020 040			Halteblech	Clamping sheet	Tôle d' arrêt
2	ZSR 120 525	M5x25 DIN912-6.9		Zylinderschraube	Socket head screw	Vie 6 pans creux
3+3a	F1L 021 000			Z-Spindel komplett	Z-spindle complete	Ens vis-mère Z
3a	F1A 020 130			Riemen scheibe 40	Pulley 40	Poulie 40
4	F1A 020 030			Schutzband	Protection strip	Band de protection
5	ZSR 120 620	M6x20 DIN912-6.9		Zylinderschraube	Socket head screw	Vie 6 pans creux
6	F1L 020 020			Vertikalschlitten	Vertical slide	Chariot vertical
7	F1A 020 080			Abstreifbl	Feltwiper	Feutre racleur
8	ZSR 880 610	M6x10-6.9		Linsen schraube	Flister head screw	Vis à tête en forme
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	Kailleiste	Taper gib	Lardon conique
	F1A 020 060		4,55 mm	Kailleiste	Taper gib	Lardon conique
13	F1A 020 110		4,68 mm	Kailleiste	Taper gib	Lardon conique
	F1A 020 120		4,55 mm	Kailleiste	Taper gib	Lardon conique
14	ZNP 012 000	A2		Schniernippel	Grease nipple	Graisseur
15	ZFD 204 061	D-061		Druckfeder	Compression spring	Ressort de pression
16	ZNA 760 204	2x4 DIN 1476-4.8		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	Ecro 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			Filtatzubereiter	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
25	ZSR 330 616	M6x10 DIN 933-6.9		Schakelschraube	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
28	F1L 623 000			Endschalterblech Z	Limit switch sheet	defin de course Z
					metal Z	Tôle d' commutateur
29	ZEL 239 002	MILTAC		Schnappeschalter	Quick break switch	defin de course Z
30	A6L 000 350			Gewindeblech	Threadsheet metal	Interrupteur instantané
31	F1L 621 010			Riemen scheibe 20	Pulley 20	Tôle de filetage
32	ZMO 780 030	VDRM 584-50LN		Schrittmotor X,Y,Z	Step motor X,Y,Z	Poulie 20
33	F1L 000 650			Distanzblech Y	Spacer sheet Y	Moteur pas à pas X,Y,Z
34	ZEL 212 022	1200mm lg.		Näherungs schalter	Proximity detector	Tôle d' écartement Y
	A6L 020 090			Schaft	Pin	Initiateur inductif
						Broche



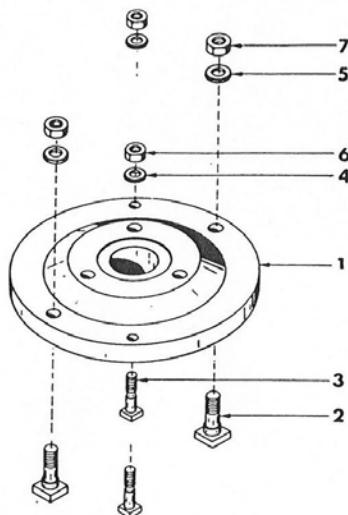
Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
1-38	F1A 010 000			G. Fräskopf	Milling head compl.	Ens. tête de fraisage
1	ZSR 270 416	M4x16 DIN 427-5.8		Schaftschraube	Set screw	Vis pointeau
2	F1L010 040			Ringmutter -	Ring nut	Ecrou crénelé
3	F1L 010 030			Riemenscheibe 38	Pulley 38	Poulie 38
4	ZLG 320 076			Kegelrollenlager	Taper rolled bearing	Boulement 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	s 7		Kugel	Ball	Bille
12	F1A 000 580			Frontplatte	Front plate	Platine avant
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'excentrique
16	F1A 000 100			Schenkelfeder	Torsion spring	Ressort à branches
17	ZLG 781 816			Nadelager	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
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
28	F1L 000 710			Halter	Holder	Appui
29	ZSR 880 610	M6x10-10.9		Linsenschraube	Filiser head screw	Vis à tête lenticulaire
30	ZSR 120 545	M5x45 DIN 912-6.9		Zylinderschraube	Socket head screw	Vis 6 pans creux
31	ZRG 280 050	B5 DIN 127		Federling	Spring washer	Rondelle ressort
32	F1L 000 120			Bordscheibe	Washer	Rondelle
33	ZRG 712 512	W25x1,2 DIN 471		Sicherungsring	Retaining ring	Circlip
34	ZSB 122 503	PS 25x35x0,3		Paßscheibe	Shim	Rondelle d'ajustage
35	ZSB 026 002	6002/K2		Ausgleichsscheibe	Compensating washer	Rondelle de compensation
36	ZSB 108 402	SS28x40x2		Stützscheibe	Supporting disk	Rondelle pour bague de frein
37	F1L 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
40	ZLT 500 100	LKI 11		Schlauchverschraubung	Screw-type conduit fitting	Raccord à vis pour tuyaux



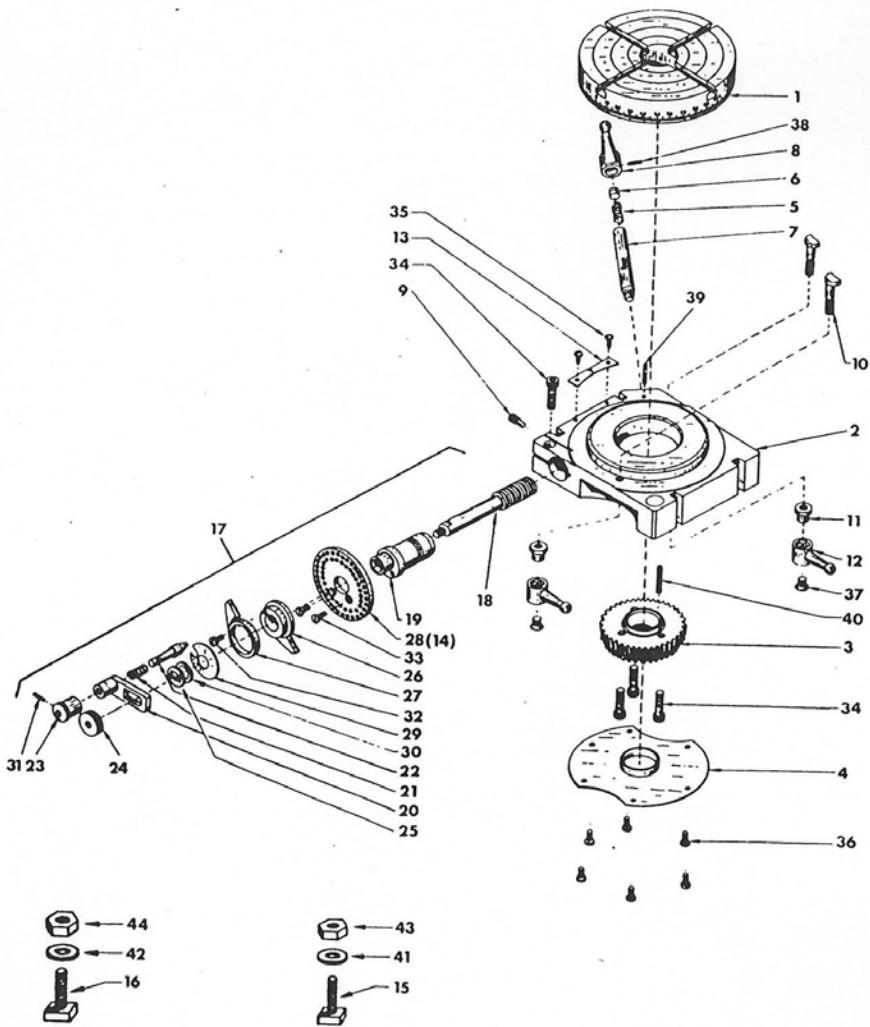
Pos.	Ref.No.	DIN	Type	Benennung	Description	Designation
1-42				Blechaufbau	Sheet metal assembly	Assemblage en tôle
1-17	F1L 290 000			G. Tür	Door compl.	Ens. Porte
1	F1A 000 240			Tür	Door	Porte
2	F1L 000 450			Türblech	Door sheet	Tôle de porte
3	F1L 000 460			Frontblech	Front sheet metal	Capot en tôle
4	F1A 000 490			Führungs schiene	Safeguard	Glissière
5	F1A 000 490			Führungs leiste	Guide bead	Barre conductrice
6	F1A 000 510			Griff	Handle	Poignée
7	F1L 000 570			Pfeil	Arrow	Réche
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 lenticulaire
10	ZSR 120 855	M8x55 DIN 912-6.8		Zylinderschraube	Socket head screw	Vis 6 pans creux
11	ZSR 120 520	M6x20 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 8 pans creux
12	ZMU 340 500	M6 DIN 834-5		Sechskantmutter	Hexagonal nut	Ecrou hexagonal
13	ZSB 250 530	B5,3 DIN 125-ST		Scheibe	Washer	Rondelle
14	ZSB 980 530	A5,3 DIN 8798		Fächerscheibe	Serrated lock washer	Rondelle éventail
15	ZSR 790 512	M6x12 DIN 7991-8.8		Senkschraube	Countersunk screw	Vis tête fraise
16	ZOR 008 030	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	Couvre arrière
20	F1L 000 870			Deckblech	Cover plate	Coffre
21	F1L 000 230			Rückwand	Back cover	Paroi arrière
22	F1A 000 500			Distanzring	Spacer ring	Bague d'écartement
23	ZSR 120 520	M5x20 DIN 912-8.8		Zylinderschraube	Socket head screw	Vis 8 pans creux
24	F1A 000 282			Durchführungsblech	Sheet	Tôle de traverse
25	F1L 140 000			Verkleidungsblech 2	Side guard 2	Tôle d'habillage
26	F1L 000 550			Firmenschild	Adhesive label	Etiquette
27	F1L 130 000			Verkleidungsblech 1	Side guard 1	Tôle d'habillage
28	ZGU 770 623	KS 6/20-00		Kantenprofil	Edge protection	Bordure de protection
29	ZSR 880 516	M5x18-10.9		Linsenschraube	Filister head screw	Vis à tête lenticulaire
30	ZSB 210 530	A5,3 DIN 9021-ST		Scheibe	Washer	Rondelle
31	ZSR 880 510	M6x10-9.9		Linsenschraubo	Filister head screw	Vis à tête lenticulaire
32	Y1A 010 100			Kontrastfläche	Plate	Plaquette
33	F1L 340 000			Seitenwand 1	Side wall 1	Paroi latérale 1
34	F1L 360 000			Seitenwand 2	Side wall 2	Paroi latérale 2
35	F1L 360 000			Abdeckhaube	Cover	Couvercle
36	ZXM 012 240			Schnappdurchführung	Ring	Traversée
37	ZSR G14 295	B4,2x9,5 DIN 7981		Blechschiere	Sheet metal screw	Vis à tôle
38	ZSR 880 810	M6x10-10.9		Linsenschraube	Filister head screw	Vis à tête lenticulaire
39	ZSR 880 406	M4x6-10.9		Linsenschraube	Filister head screw	Vis à tête lenticulaire
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



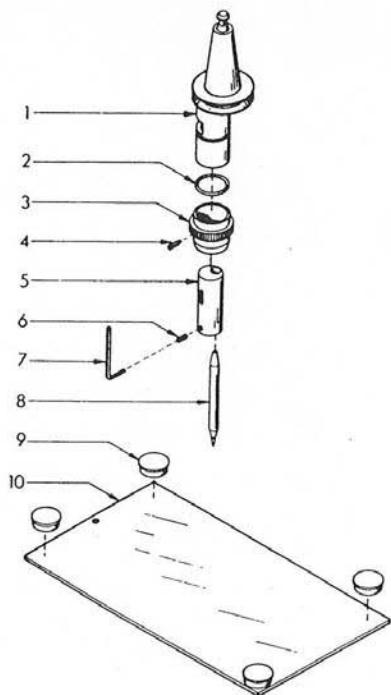
Pos.	Ref.No.	DIN		Benennung	Description	Designation
1	A6L 301 000			Blecheufbeu E-Kasten	Assembly switch cabinet	Assemblage du montant de boîte électrique
2	A6L 306 000			Gehäuse	Housing	Caisse
3	A6L 311 010			Montageplatte	Mounting plate	Plaque de montage
4	A6L 311 020			Abdeckung	Cover	Couvercle
5	A6L 311 030			Klemmblech	Clamping sheet metal	Tôle de serrage
6	A6L 311 040			Ventilatorblech	Fan sheet metal	Tôle de ventilateur
7	A6L 311 050			Träger	Carrier	Support
8	A6L 311 060			Steckerblech	Connector sheet metal	Tôle de connecteur
9	ZGU 783 011			Aufkleber 0-1	Transfer picture 0-1	Image à décalquer 0-1
				Neopren	Neoprene	Néoprène



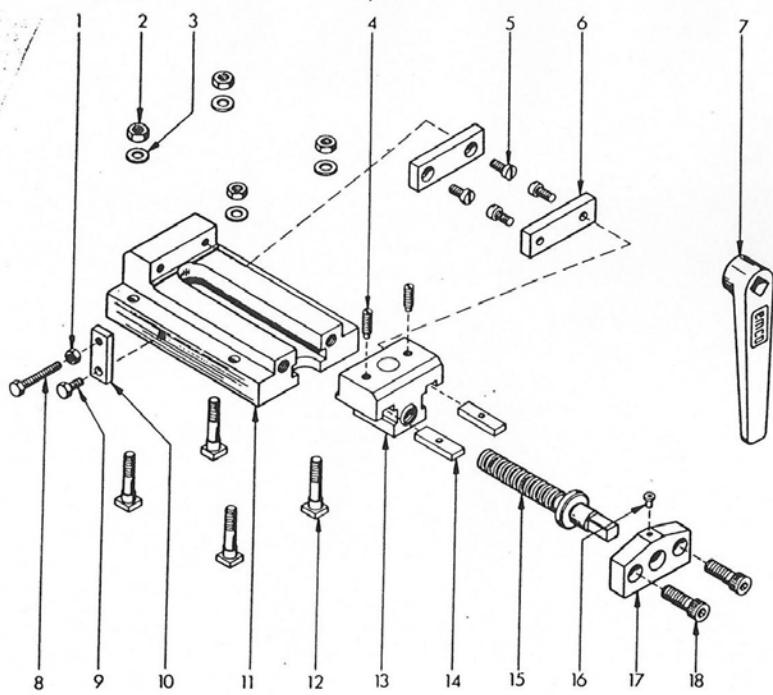
Pos.	Ref. No.	DIN	Benennung	Description
	346 510		G.Supportflansch	Cross slide adaptor compl.
1			Supportflansch	Cross slide adaptor
2	C3Z 030 040		Nutenschraube M8	T-Bolt M8
3	B4Z 170 020		Nutenschraube M6	T-Bolt M6
4	ZSB 25 0640	B 6,4 DIN 125	Scheibe	Washer
5	ZSB 25 0840	B 8,4 DIN 125	Scheibe	Washer
6	ZMU 34 0600	M6 DIN 934-6	Sechskantmutter	Hexagon nut
7	ZMU 34 0800	M8 DIN 934-6	Sechskantmutter	Hexagon nut



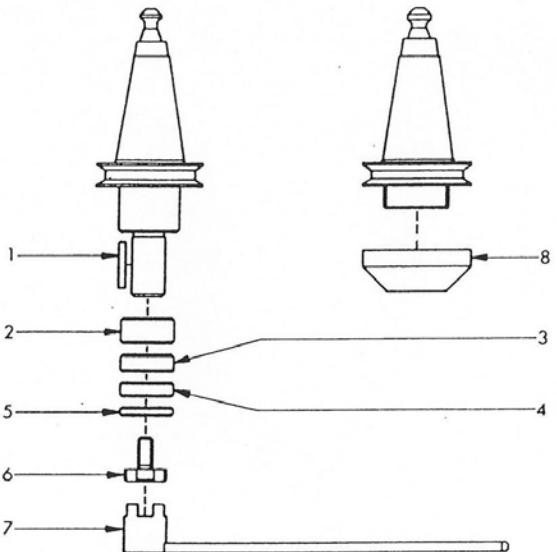
	745 000			G. Teilapparat	Dividing head
Pos.	Ref.No.	DIN		BENENNUNG	DESCRIPTION
1	BZZ 320 010			Rundtisch	Table
2	BZZ 320 020			Gehäuse	Housing
3	BZZ 320 030			Teilrad	Table flange
4	BZZ 320 040			Deckblech	Cover mount
5	BZZ 320 050			Druckfeder	Compression spring
6	BZZ 320 060			Druckbolzen	Bolt
7	BZZ 320 070			Index	Locking pin
8	BZZ 320 080			Knebelgriff	Lever
9	BZZ 320 090			Anschlagschraube	Bushing
10	BZZ 320 100			Klemmschraube	Locking bolt
11	BZZ 320 110			Mutter	Nut
12	BZZ 320 120			Knebelgriff	Lever
13	BZZ 320 130			Zeiger	Guide
14	BZZ 320 140			Lochscheibe 33-36-39	Indexing plate
	BZZ 320 150			Lochscheibe 38-40	Indexing plate
15	BZZ 320 160	M 6		Nutenschraube	T-Nut
16	BZZ 320 170	M 8		Nutenschraube	T-Nut
17	BZZ 321 000			Gr. Schnecke	Worm shaft
18	BZZ 321 010			Schnecke	Worm shaft
19	BZZ 321 020			Exzenter	Assembly arbor
20	BZZ 321 030			Kurbel	Crank
21	BZZ 321 040			Druckfeder	Compression spring
22	BZZ 321 060			Absteckbolzen	Bolt
23	BZZ 321 060			Hülse	Sleeve
24	BZZ 321 070			Rändelmutter	Knurled nut
25	BZZ 321 080			Scheibe	Plate
26	BZZ 321 090			Schere rechts	Section arm r. h.
27	BZZ 321 100			Schere links	Section arm l. h.
28	BZZ 321 120			Lochscheibe 27-36-42	Indexing plate
29	BZZ 321 130			Tellerfeder	Spring washer
30	BZZ 321 140			Scheibe 1,8	Plate 1,8
	BZZ 321 150			Scheibe 2,0	Plate 2,0
	BZZ 321 160			Scheibe 2,2	Plate 2,2
31	ZHL 81 0212	2x12 DIN 1481		Spannhülse	Pin
32	ZSR 86 0406	AM4x6 DIN 86		Zylinderschraube	Flat head screw
33	ZSR 63 0410	M4x10 DIN 963		Senkschraube	Flat head screw
34	ZSR 12 0625	M6x26 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	6x30 DIN 1481		Spannhülse	Pin
41	ZSB 25 0640	B6,4 DIN 125		Scheibe	Washer
42	ZSB 25 0840	B8,4 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
	<u>770 300</u>			<u>Plotter</u>	<u>Plotter</u>
1	F1Z 300 010			Aufnahmedorn	Arbor
2	ZOR 02 3324	OR 23,3 - 2,4		O-Ring	O-Ring
3	F1Z 300 030			Einstellring	Adjusting ring
4	ZST 15 0412	M4x12 DIN 915-4SH		Gewindestift	Set screw
5	F1Z 300 020			Exzenterhülse	Eccentric sleeve
6	ZST 13 0408	M4x8 DIN 913-4SH		Gewindestift	Set screw
7	ZWZ 11 0200	SW2 DIN 911		6-Kant Schraubendreher	Hexagonal key
8	ZST 99 1000			Faserstift	Plotter pen
9	ZXM 00 2008	Ø 20x8		Haltemagnet	Magnetic disc
10	F1Z 301 000			Aufspannplatte	Clamping plate



Pos.	Ref. No.	DIN		Benennung	Description
	<u>770 310</u>			Maschinenschraubstock	<u>Machine vice</u>
1	ZMU 34 0600	M6 DIN 934-6		Sechskantmutter	Hexagonal nut
2	ZMU 34 0800	M8 DIN 934-6		Sechskantmutter	Hexagonal nut
3	ZSB 25 0840	8,4 DIN 125		Scheibe	Washer
4	ZST 17 0515	M5x15 DIN 417-5.8		Gewindestift	Set screw
5	ZSR 84 0512	M5x12 DIN 84-4.8		Zylinderschraube	Flat head screw
6	BZZ 310 050			Aufsatzbacke	Jaw
7	BZZ 310 080	SW10		Schlüssel	Key
8	ZSR 33 0640	M6x40 DIN 933-5.6		Sechskantschraube	Hexagon head bolt
9	ZSR 33 0612	M6x12 DIN 933-5.6		Sechskantschraube	Hexagon head screw
10	F1Z 310 030			Anschlagplatte	Stop plate
11	F1Z 310 010			Körper	Body
12	F1Z 310 020			Nutenschraube	T-bolt
13	BZZ 310 020			Backe	Moving jaw
14	BZZ 310 060			Einstelleiste	Adjusting gib
15	BZZ 310 040			Spindel	Operating screw
16	ZNP 01 1000			Schmiernippel	Grease nipple
17	BZZ 310 030			Spindelträger	Screw mount
18	ZSR 12 0825	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 1600	16 DIN 6368		Schlüssel	Key
8	A5Z o4o o2o			Spannmutter	Nut

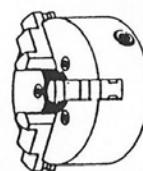
4-BACKEN-FUTTER, SELBSTZENTRIEREND 4-JAW-CHUCK, SELF-CENTERING MANDRIN À 4 MORS, SERRAGE CONCENTRIQUE



	A	B	C	D	E	F	
	Futter- durchmesser Dia of chuck Dia du mandrin	Satz von 4 nach außen abgestuften Backen. Set of 4 outside jaws Jeu de 4 mors Intérieurs	Satz von 4 nach innen abgestuften Backen. Set of 4 inside jaws Jeu de 4 mors extérieurs	Zahkränz- Scroll Couronne	Triebiling Pinion Pignon	Schlüssel Key(Wrench) CLE	Ref. No.
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	Ref. No.
VIC 328	φ 110 mm	42	ZME 30 1144	42	ZME 30 1154		

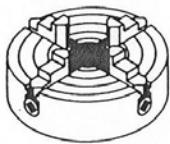
- Am Außenring des Zahkränzes ist eine Ziffer (0,1,2,3,...) eingraviert.
Bei Bestellung zusätzlich zur Bestellnummer diese Ziffer angeben.
- On the outside ring of the scroll a number (0,1,2 or 3) is engraved.
Please state this number also when ordering a scroll.
- Sur l'anneau extérieur de la couronne dentée est gravé un chiffre (0,1,2 ou 3).
Prénez l'indiquer en plus ce chiffre ensemble avec le numéro de référence.

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



	A	B	C	D	E	F	
	Futter- durchmesser Dia of chuck Dia du mandrin	Satz von 3 nach außen abgestuften Backen Set of 3 inside jaws Jeu de 3 mors Intérieurs	Satz von 3 nach innen abgestuften Backen. Set of 3 outside jaws Jeu de 3 mors extérieurs	Zahkränz- Scroll Couronne	Triebiling Pinion Pignon	Schlüssel Key(Wrench) CLE	Ref. No.
	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	Ref. No.
VIC 326	φ 110 mm	42	ZME 30 1143	42	ZME 30 1153		

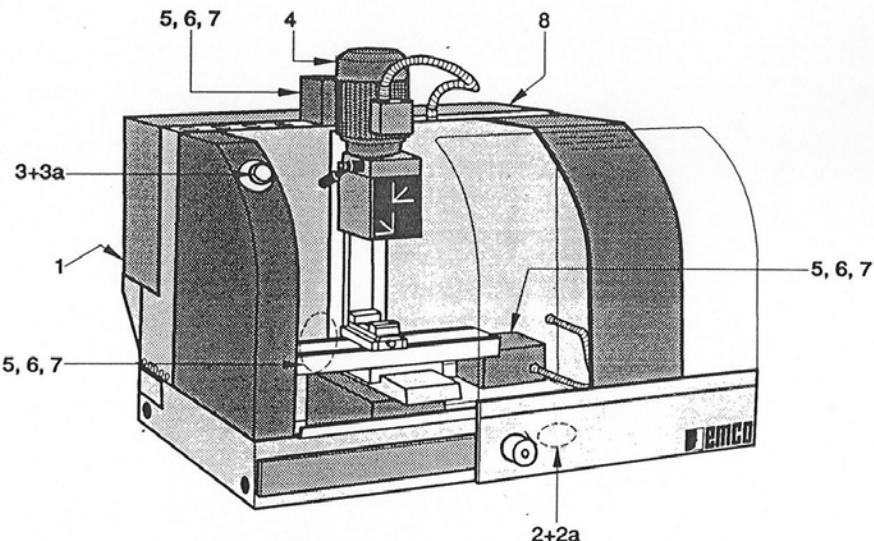
- Am Außenring des Zahkränzes ist eine Ziffer (0,1,2,3,...) eingraviert.
Bei Bestellung zusätzlich zur Bestellnummer diese Ziffer angeben.
- On the outside ring of the scroll a number (0,1,2 or 3) is engraved.
Please state this number also when ordering a scroll.
- Sur l'anneau extérieur de la couronne dentée est gravé un chiffre (0,1,2 ou 3).
Prénez l'indiquer en plus ce chiffre ensemble avec le numéro de référence.



P3E 324

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

Setz von 4 Umkehr-backen Set of 4 reversible jaws Jeu mors revers. A (mm) Ref. No.	Spindel Spindle Broche B (mm) Ref. No.	Gabelbolzen Bolt Axe à couple fourche C (mm) Ref. No.	Schlüssel Key (Wrench) CLE D (mm) Ref. No.
Φ 152 mm # 6"	51 P1E 004	48 PDE 000 030	18 P1E 000 150
		90	PDE 001 000



Pos.	Ref.No.	DIN		Benennung	Description	Designation
1	ZMO 789 220			Elektrische Teile	Electrical parts	Pièces électriques
2	ZEL 212 030	ZS 236-11Z		Axialventilator	Fan	Ventilateur
2a	ZEE 470 231			Endschalter	Limit switch	Commutateur de fin de course
3	ZEL 401 020	ZA2 BS 54		Rollenhebel	Roller lever	Levier à galet
3a	ZEL 490 020	ZA2 BZ 105		Not-Aus Taste	Emergency off button	Touche arrêt d'urgence
4	ZMO 473 380	0,37 kW-1370		Kontaktblock	Contact unit	Unité de contact
5	ZMO 780 030			Hauptmotor	Motor	Moteur
6	ZEL 212 022			Schrittmotor X, Y, Z	Step motor X, Y, Z	Moteur pas à pas X, Y, Z
7	ZEL 239 002	MILTAC		Ind. Näherungsschalter	Proximity switch	Commutateur capacitif
8	ZEL 440 022	ZB2		Schnappeschalter	Quick base switch	Interrupteur instantané
				Schlüsseltaster	Key switch	Commutateur à clé

Ersatzteile für elektrischen und elektronischen Teil

Service parts for electrical and electronical parts

Pièces de service pour électriques et électroniques pièces

EMCO PC MILL 50

Ausgabe 94-3 V2

Edition 94-3 V2

Edition 94-3 V2



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

Anlage	Ort	BMK	Pfad	SachNr.	Technische Beschreibung
install	loc	equ.	path	parts no	technical description
					Bestellnummer/order number Hersteller/manufact
					Funktionstext/description
*1FA0.C1	+1FL1	-A2	1.3	ZEG212210	BRÜCKENGLIECHRICHTER 100V 10A bridge-rectifier 100V 10A FA.ELBATEX
*1FA0.C1	+1FL1	-C1	1.4	ZK0032479	ALUMINIUM-ELEKTROLYTKONDENSATOR 15000MF/40V DXL-40X55 MIT STECKANSCHLÜSSEN UND GEWINDEBOLZEN M8 aluminium electrolytic capacitor 15000MF/40V DXL-40X55 with plug connections and screw bolt M8' CHIP&BYTE
*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
				ZEL491103	KONTAKTELEMENT ZB2 BZ103 2 Schließer contact element ZB2 BZ103 two NO contacts TELEMECANIQUE
				ZEL491103	KONTAKTELEMENT ZB2 BZ103 2 Schließer contact element ZB2 BZ103 two NO contacts TELEMECANIQUE
				ZEL491101	KONTAKTBLOCK 1 SCHLIESSEN contactbloc 1 nc TELEMECANIQUE
*1FA0.C1	+1FL1	-T1	1.2	ZET000383	TRANSFORMATOR PRIM.SPARWICKLUNG: +5%,0,-5% 110V 5.5A 230V 2 SEKUNDÄR: 18V 7A transformer prim.autotransformer: +5%,0,-5% 110V 5,5A 230V sec.: 18V 7A KATRONIK
*1FA0.E1	+1FL1	-M1	1.3	ZMO789220	AXIALVENTILATOR 220V TYPE 4580N axial ventilator 220V type 4580N PAPST
*1FA0.E1	+1FL1	-M2	1.4	ZMO789220	AXIALVENTILATOR 220V TYPE 4580N axial ventilator 220V type 4580N PAPST

Anlage	Ort	BMK	Pfad	SachNr.	Technische Beschreibung	
install	loc	equ.	path	parts no	technical description	
					Bestellnummer/order number	Hersteller/manufact
					Funktionsbeschreibung	
-1FA0.M1	+1DP1	-R6	2.2	ZEWI30331	MRS25 330E/TK50/0,6W/+/-1%/0207/ AMMOPACK 2322 156 23301 MRS25 330E/TK50/0,6W/+/-1%/0207/ ammopack 2322 156 23301	PHILIPS
-1FA0.M1	+1FL1	-A2	1.3	Y4A012000	G.AXISCONTROLLER 485 g.axiscontroller 485	EMCO
-1FA0.M1	+1FL1	-A3	1.6	Y4A011000	G.SPS 2000 g.sps 2000	EMCO
				Y4A016000	G.STECKERPL. SPS 2000 g.plug-board sps 2000	EMCO
-1FA0.M1	+1FL1	-A3	2.6	Y4A016000	G.STECKERPL. SPS 2000 g.plug-board sps 2000	EMCO
				Y4A011000	G.SPS 2000 g.sps 2000	EMCO
-1FA0.M1	+1FL1	-A5	1.4	Y4A014000	G.NETZTEIL 485 g.power pack 485	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 4303.0091	SCHURTER
				ZES158010	SICHERUNGSSCHUBLADE FÜR KEC 1-POLIG SICHERUNGSTYP:5X20;FÜR SPANNUNGEN:100/120/220/240 fuse drawer for KEC single-pole fuse type:5x20;voltages:100/120/220/240V 4303.2114.01	SCHURTER
-1FA0.M1	+1FL1	-F1	1.6	ZEE750084	GLASROHRSICHERUNG 2,5A TR 6,3X32 (CSA) CSA GENEHMIGT glass-tube fuse 2,5A time-delay 6,3X32 CSA-approved	WICKMANN

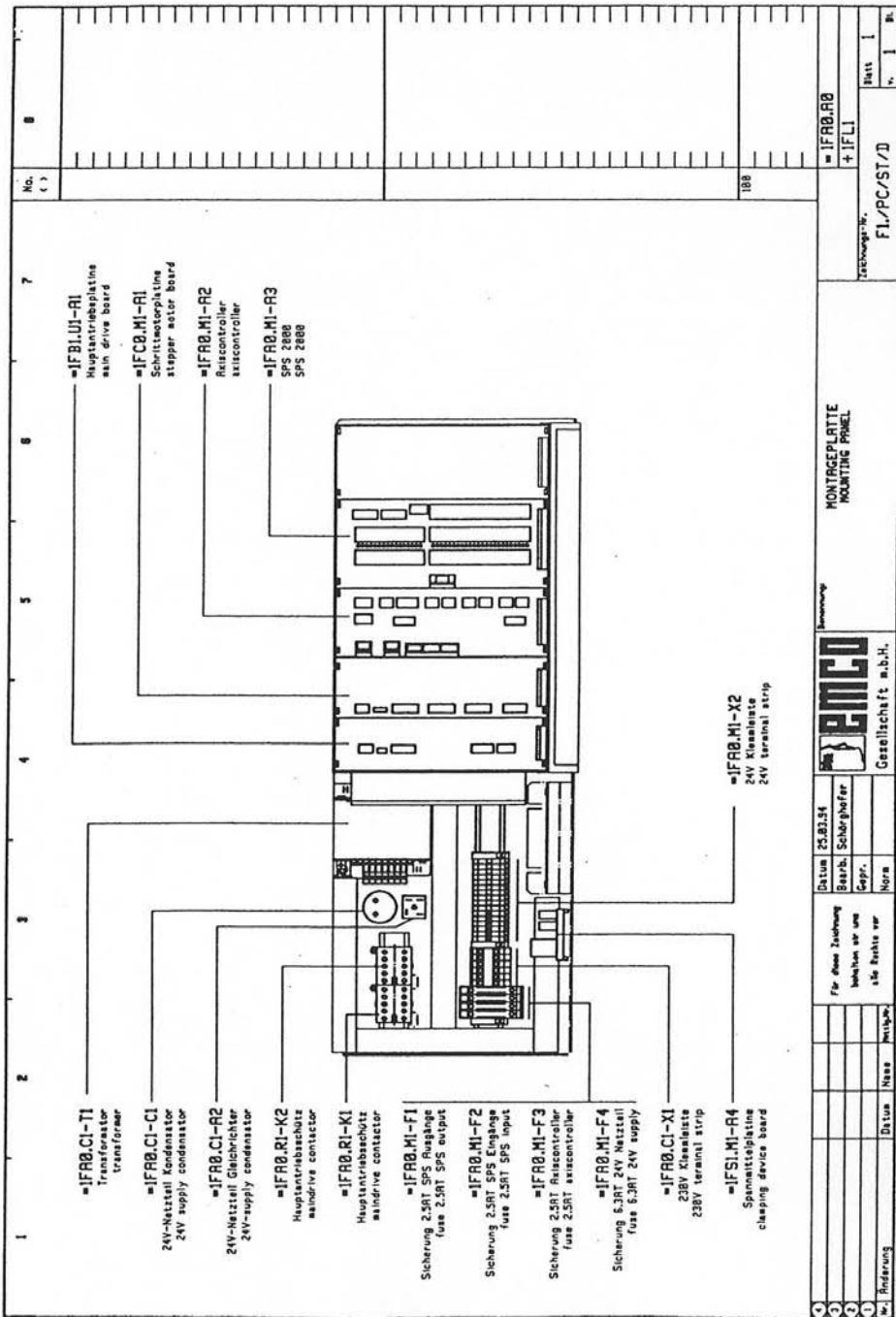
Anlage	Ort	BMK	Pfad	SachNr.	Technische Beschreibung	
install	loc	equ.	path	parts no	technical description	
					Bestellnummer/order number	Hersteller/manufact
					Funktions-text/description	
				ZEK222002	SICHERUNGSKLEMME UK 6,3 HESI fuse clip UK 6,3 HESI	PHÖNIX
-1FA0.M1	+1FL1	-F2	1.6	ZEE750084	GLASROHRSICHERUNG 2,5A TR 6,3X32 (CSA) CSA GENEHMIGT glass-tube fuse 2,5A time-delay 6,3X32 CSA-approved	WICKMANN
				ZEK222002	SICHERUNGSKLEMME UK 6,3 HESI fuse clip UK 6,3 HESI	PHÖNIX
-1FA0.M1	+1FL1	-F3	1.3	ZEE750084	GLASROHRSICHERUNG 2,5A TR 6,3X32 (CSA) CSA GENEHMIGT glass-tube fuse 2,5A time-delay 6,3X32 CSA-approved	WICKMANN
				ZEK222002	SICHERUNGSKLEMME UK 6,3 HESI fuse clip UK 6,3 HESI	PHÖNIX
-1FA0.M1	+1FL1	-F4	1.4	ZEE750083	GLASROHRSICHERUNG 6,3A TR 6,3X32 (CSA) CSA-GENEHMIGT glass-tube fuse 6,3A time-delay 6,3X32 CSA-approved	WICKMANN
				ZEK222002	SICHERUNGSKLEMME UK 6,3 HESI fuse clip UK 6,3 HESI	PHÖNIX
-1FA0.M1	+1FL1	-R4	2.5	ZEW130331	MRS25 330E/TK50/0,6W/+-1%/0207/ AMMOPACK 2322 156 23301 MRS25 330E/TK50/0,6W/+-1%/0207/ ammopack 2322 156 23301	PHILIPS
-1FA0.M1	+1FL1	-R5	2.5	ZEW010121	MRS25ST 120E/TK50/0,6W/+-1%/0207/ AMMOPACK 2322 156 41201 MRS25ST 120E/TK50/0,6W/+-1%/0207/ ammopack 2322 156 41201	PHILIPS

Anlage	Ort	BMK	Pfad	SachNr.	Technische Beschreibung Bestellnummer/order number Funktionstext/description	Hersteller/manufact
install	loc	equ.	path	parts no	technical description	
=1FA0.M1	+1FL1	-R6	2.5	ZEW130331 MRS25 330E/TK50/0,6W/+-1%/0207/ AMMOPACK 2322 156 23301 MRS25 330E/TK50/0,6W/+-1%/0207/ ammopack 2322 156 23301	PHILIPS	
=1FA0.M1	+1FL1	-X20/F1	1.3	ZEE750013 GLASROHRSICHERUNG 6,3A TR 5x20 glas tube fuse 6,3A time-delay 5x20	WICKMANN	
=1FA0.M1	+1FP1	-A1	2.1	Y4A013000 G.PC-EINSCHUB 485 g.PC insert-card 485	EMCO	
=1FA0.M1	+1FP1	-R4	2.2	ZEW130331 MRS25 330E/TK50/0,6W/+-1%/0207/ AMMOPACK 2322 156 23301 MRS25 330E/TK50/0,6W/+-1%/0207/ ammopack 2322 156 23301	PHILIPS	
=1FA0.M1	+1FP1	-R5	2.2	ZEW010121 MRS25ST 120E/TK50/0,6W/+-1%/0207/ AMMOPACK 2322 156 41201 MRS25ST 120E/TK50/0,6W/+-1%/0207/ ammopack 2322 156 41201	PHILIPS	
=1FA0.R1	+1FL1	-K1	1.2	ZEL531020 WECHSELSTROMSCHÜTZ BC6-30-01 1ÖFFNER +24V GLEICHSTROMBETÄTIGT AC contactor BC6-30-01 lopening contact +24V DC-powered GJL1213001R0011	ABB	
=1FA0.R1	+1FL1	-K2	1.3	ZEL531020 WECHSELSTROMSCHÜTZ BC6-30-01 1ÖFFNER +24V GLEICHSTROMBETÄTIGT AC contactor BC6-30-01 lopening contact +24V DC-powered GJL1213001R0011	ABB	
=1FA0.R1	+1FL1	-S3	1.2	ZEE470231 ROLLENHEBEL roll-lever ZR231-11Y	SCHMERSAL	
=1FA0.R1	+1FL1	-V1	1.2	ZED120913 DIODE IN4007 RM10.16 diode IN4007 RM10.16		
=1FA0.R1	+1FL1	-V2	1.3	ZED120913 DIODE IN4007 RM10.16 diode IN4007 RM10.16		

Anlage	Ort	BMK	Pfad	SachNr.	Technische Beschreibung	
install	loc	equ.	path	parts no	technical description	
				.	Bestellnummer/order number	Hersteller/manufact
					Funktions-text/description	
-1FA0.R1	+1FU1	-S1	1.2	ZEL401020	NOT-AUS-TASTE emergency-off-button ZA2 BS 54	TELEMECHANIQUE
				ZEL490020	KONTAKTBLOCK contact block ZA2-BZ105	TELEMECHANIQUE
-1FB1.D1	+1FL1	-F1	1.4	ZEE750015	GLASROHRSICHERUNG 0,1A TR 5x20 glas tube fuse 0,1A time-delay 5x20	WICKMANN
-1FB1.D1	+1FL1	-F2	1.4	ZEE750013	GLASROHRSICHERUNG 6,3A TR 5x20 glas tube fuse 6,3A time-delay 5x20	WICKMANN
-1FB1.D1	+1FU1	-M1	1.4	ZMO473380	DREHSTROMMOTOR 0.37KW 1370U/MIN 220/380V BAUGRÖSSE 71, BAUFORM B14 KL.FLANSCH BEST.NR.: LKM607N04J3B SCHUTZART IP54 three-phase-motor 0,37KW 1370upm 220/380V size 71, design B14 small flange order-nr.: LM607N04J3B IP54	ELIN
-1FB1.U1	+1FL1	-A1	1.2	Y4A400000	G.FREQUENZUMRICHTER FRC105 g.frequency converter	EMCO
-1FC0.M1	+1FL1	-A1	1.2	Y4A018000	G.SCHRITTMOTORPLATINE	EMCO
-1FC1.G1	+1FU1	-M1	1.4	ZMO780030	SCHRITTMOTOR VRDM 564/50LN MIT KLEMKENKASTEN NENNSTROM 0,95A SCHRITTZAHL(HS/VS) 1000/500 BEST.NR.: 12670015000	BERGERLAHR
-1FC1.M1	+1FU1	-B1	1.6	ZEL212022	INDUKTIVER NÄHERUNGSSCHALTER Z-720 MIT 5M PU-KABEL UND 4K7 WIDERSTAND PULL-UP AM AUSGANG Ersatz: 922AA1YA4N050 inductance proximity switch z-720 with 5m PU-cable and 4K7 resistor pull-up spare part: 922AA1YA4N050 BES 516-343-EOX	BALLUFF
-1FC1.M1	+1FU1	-S1	1.5	ZEL239002	BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18 microswitch V-10FL2-1C2 V3L-E9001M-D18	OMRON

Anlage install	Ort loc	BMK equ.	Pfad path	SachNr. parts no	Technische Beschreibung Bestellnummer/order number Funktionsbeschreibung/description	Hersteller/manufact
-1FC2.G1	+1FU1	-M1	1.4	ZM0780030 SCHRITTMOTOR VRDM 564/50LN MIT KLEMMENKASTEN NENNSTROM 0,95A SCHRITTZAHL(HS/VS) 1000/500 BEST.NR.:12670015000	BERGERLAHR	
-1FC2.M1	+1FU1	-B1	1.6	ZEL212022 INDUKTIVER NÄHERUNGSSCHALTER Z-720 MIT 5M PU-KABEL UND 4K7 WIDERSTAND PULL-UP AM AUSGANG Ersatz:922AA1Y44N050 inductance proximity switch z-720 with 5m PU-cable and 4K7 resistor pull-up spare part: 922AA1Y44N050 BES 516-343-EOX	BALLUFF	
-1FC2.M1	+1FU1	-S1	1.5	ZEL239002 BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18 microswitch V-10FL2-1C2 V3L-E9001M-D18 OMRON		
-1FC3.G1	+1FU1	-M1	1.4	ZM0780030 SCHRITTMOTOR VRDM 564/50LN MIT KLEMMENKASTEN NENNSTROM 0,95A SCHRITTZAHL(HS/VS) 1000/500 BEST.NR.:12670015000	BERGERLAHR	
-1FC3.M1	+1FU1	-B1	1.6	ZEL212022 INDUKTIVER NÄHERUNGSSCHALTER Z-720 MIT 5M PU-KABEL UND 4K7 WIDERSTAND PULL-UP AM AUSGANG Ersatz:922AA1Y44N050 inductance proximity switch z-720 with 5m PU-cable and 4K7 resistor pull-up spare part: 922AA1Y44N050 BES 516-343-EOX	BALLUFF	
-1FC3.M1	+1FU1	-S1	1.5	ZEL239002 BASISSCHALTER V-10FL2-1C2 V3L-E9001M-D18 microswitch V-10FL2-1C2 V3L-E9001M-D18 OMRON		
-1FP1.M1	+1FU1	-S1	1.5	ZEL212030 ENDSCHALTER limit-switch ZS 236-11Z	SCHMERSAL	
				ZEE470231 ROLLENHEBEL roll-lever ZR231-11Y	SCHMERSAL	
-1FS1.M1	+1FL1	-A4	1.2	Y4A035000 G.SPANNMITTELPLATINE g.clamping device board	EMCO	

Anlage install	Ort loc	BMK equ.	Pfad path	SachNr. parts no	Technische Beschreibung technical description Bestellnummer/order number Funktionstext/description	Hersteller/manufact
-1FS1.M1	+1FL1	-M1	1.2	ZM0780122	DC-MOTOR 2332.909-13.151-050 MIT GETRIEBE 2938.804-0100.0-000 100:1 DC-motor 2332.909-13.151-050 with transmission 2938.804-0100.0-000 100:1 MAXON	
-1FS1.M1	+1FU1	-B2	1.5	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER PNP-Schließer M8x1 inductance proximity switch PNP-closer M8x1 BES 516-324-EOX	BALLUF
-1FS1.M1	+1FU1	-B3	1.6	ZEL212023	INDUKTIVER NÄHERUNGSSCHALTER PNP-Schließer M8x1 inductance proximity switch PNP-closer M8x1 BES 516-324-EOX	BALLUF



EMCO Service

Österreich	06245/891-*	Für Notfälle: Service Hotline	06245/87005-*
EMCO MAIER Gesellschaft m.b.H. Friedmann-Maier-Straße 9 Postfach 131 A-5400 Hallein/Austria	Serviceabteilung Leitung Hr. Seiwald *278	Betreuung Maschinen Hr. Kronthaler *330 Hr. Holzer *259	
Fax 06245/86965 Fax Serviceabteilung 06245/891-402 Telex 631052 emco a	Sekretariat Fr. Rainer *279 Ersatzteilbestellungen Fr. Marchl *401	Reparaturwerkstätte Auftragsannahme Hr. Unterrainer *392, *317, *395, *432	

Deutschland	08662/666-*	Schweiz	01/7614711
EMCO MAIER G.m.b.H. & Co. KG Sudetenstraße 10 Postfach 1165 D-83313 Siegsdorf Fax 08662/12168 Service: Leitung Hr. Nott *16 Hr. Lehenaue *18, Hr. Hirscher *19		ARGONAG AG Obfelderstraße 36 CH-8910 Affoltern am Albis Fax 01/7614744 Service: Hr. Schneiter	

France	896233-16
K'MX TECHNOLOGIE 10, Rue de Soultz B.P. 2139 F-68060 MULHOUSE Fax 89534484 Directeur service: M. Debski	

USA	614/771-5991	Great Britain	01923/249582
EMCO MAIER CORPORATION 2757 Scioto Parkway Columbus OH 43221-2134 Fax 614/771-5990 Service Manager: Mr. Edwards		EMCO MAIER Limited 9 Woodshots Meadow, Croxley Business Park Watford WD1 8YU Fax 01923/243908 Service Manager: Mr. Steve Webb	

Generalvertretungen weltweit in nahezu 100 Ländern.

General agencies world-wide in nearly 100 countries.