Any service performed by EMCO or its authorized representative during the warranty period will be rendered free of charge. Any service performed by EMCO or its authorized representative after the warranty period will be charged at charge. 

6. There is no claim of warranty for defects which occurred after the period of warranty. 

7. The warranty period is 12 months from the date of initial shipment of the machine. 

8. The warranty period is extended to 18 months for machines exported.

9. In case of malfunction or its inability to perform its functions, the user shall notify the factory. 

10. All regulations concerning the operation of safety instructions for work with machine tools have to be observed. 

11. The machine may only be operated by persons familiar with operation, maintenance, and repair and instructions indicated by the manufacturer.

12. Consultation with the manufacturer before application of tools and adaptations is required. 

Adquate Use
Safety Recommendations - Lathe

The workplace should fit tightly.

- Do not clamp too short.
- By means of collet plate or revolving center punch.

- Support larger workpieces (clamping center x2) should not exceed the maximum speed of the clamping device.

- Clamp only short workpieces in clamped tools.

- Observe speed limits.
- Ensure the operation check the chuck key has been removed.
- Prior to each operation check it is workpiece and tool safe.

- EWEHENGY-OF Key to stop machine.
- In case of hazards, immediately switch it off.

- Prior to each operation check if the machine is powered.
- No modifications on machine.
- Fear brakes have been removed.
- Wear safety glasses and hearing protectors.

- Tool change handles are light around the wrists and hips.
- Never move the machine while the machine is running.
- Do not wear loose clothing.

- Do not wear loose clothing.

- Prevent your feet from slipping.

- Machine lubrication must be done regularly.

- Wear body protection.

- Collar on measurement work only during standard.

- Machine and tool change handles only during standard.

- Better protection device along the machine is equipped.

- The machine should be covered by a 10mm plate.

- During measurement of not masked parts protecting.

- The machine may be operated by authorized personnel.

- Be careful on your feet.

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

- Read the documentation completely before you start.
Never exceed the clamping range of the chuck.

Avoid small clamping diameters (d) with the workpiece must be well tightened. Other winding diameter (g) would get too small. The workpiece will be clamped out of the cutting force of the small diameter. A tool too short (a) will be clamped out of the chuck.

The tool height must be exactly at the boring center.

A tool which is clamped too short will bend.

Clamp the tool as short as possible.

The clamping feed will be mounted at the tool end. The clamping feed will be mounted on the tool end.

The clamping feed must be supported by the tool.

The tool is too long and supporting by the tool end is too long and supporting by the tool end.

If the clamping length of the tool is too long and supporting by the tool end is too long and supporting by the tool end.

The cutting pressure and start emerging.

The emerging of the workpiece will be bounded by the center of the steady.

The clamping feed is bounded with the chuck with the workpiece must be supported with the Shock tool. In the cutting element the workpiece must be supported with the Shock tool. If the emerging workpiece length is longer than the Shock tool, it can be supported with the Shock tool.

Conforms with the steady.

Clamp only short workpieces in the clamping.
Addition to Technical Data

EMCO COMPACT 5
Regulations is effective:  
Furthermore the conformity of the subject product with the above-mentioned standard bases and modifications dated June 20th, 1991 (91/396/EEC), June 14th, 1993 (93/44/EEC) and July 2nd, 1993 (93/44/EEC) and is the agreement of the legal obligations of the member states for machines (93/68/EEC) and the conformity with the currently valid stipulations of the directive of the Council dated June 14th, 1989 for Electric documentation as applicable.

Particular notes:  

Test certificates:  

Regulations:  
EN 60204-1 (6/93)
A-5400 Helkama  
Friedmann-Merz-St.  
Address of manufacturer: Emsco Meter Ges. m.B.H.

Fault: Compact  
EMCO  
Type:  
Model:  
Machine data:  
Product:

Declaration of conformity
3. Changed reference numbers in service parts list (page 6)

A too rough adjustment causes unnecessary wear off the cross slide.
It should be possible to move cross slide without play smoothly.

Checking:

2. Compressing play of cross screw in cross nut.

The lead screw nut

unt will play is eliminated.

(a) Adjusting the nut: Read hexagon head screw (39) in lead screw.
(b) Adjusting the nut: Adjust hexagon head screw (39) in lead screw.

Note: When removing the handwheel, is turned a certain angle.

1. Compressing play of lead screw in the lead screw nut (annex)

To chapter "Adjustments", page 32

be added to instruction book and spare parts list.

Starting with machine recall, No. 56 of 001 we shall supply

<table>
<thead>
<tr>
<th></th>
<th>42</th>
</tr>
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<tbody>
<tr>
<td>ZT 81 0214</td>
<td></td>
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<tr>
<td>457 0050</td>
<td>41</td>
</tr>
<tr>
<td>165 0060</td>
<td></td>
</tr>
<tr>
<td>457 0050</td>
<td>40</td>
</tr>
<tr>
<td>2SR 12 0516</td>
<td>39</td>
</tr>
<tr>
<td>457 0212</td>
<td>19</td>
</tr>
<tr>
<td>457 0212</td>
<td>14</td>
</tr>
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<td>457 0212</td>
<td>9</td>
</tr>
<tr>
<td>457 0212</td>
<td>3</td>
</tr>
</tbody>
</table>

Ref. No.
Pos.
commanded speeds.
and o'0.4 mm so that you can read out re-
0.000" and o'0.000" equals approx. o'0.7
The chart shows speeds for 50 cycles

0.75/0.8/1.0/1.25/1.5/1.75
Metrical threads: 0.25/0.3/0.45/0.5/0.6/
20/22/24/26/28/30/32/34/36/40 44/48
Inch threads: 10/12/13/14/15/16

Thread pitches with change gear set (on
16/20,4/2.2 rpi)
Thread pitches with accessory automatic
feed mechanism (on inch type machine)

0.004" per revolution
Per revolution:
0.003" per revolution
60 cycles 250-2800 rpm
Range of speeds: 50 cycles 200-2400 rpm
Pitch of cross slide spindle: 20 rpl
Pitch of threadscrew: 16 rpl

Technical Data:

Differences concerning the Inch Version

For parts which differ,
you find the metric and inch numbers
on the charts. In the spare parts lists
there are different readings
pitches as well as different readings
for feeds and thread
have their pitches. This causes another
pitch of threadscrew, cross slide spindle
pitch of threadscrew, cross slide spindle

In the Instruction manual, the metric
Version is described. The Inch Version

Inch Version of Compact 5 (60 cycles)
If you have a 60 cycle machine:

360 - 450
720 - 600
1200 - 1500

Take threaded of 1600 - 1900

Converting speed chart:

Page 44/45

1200 rpm.

Speeds for 60 cycle machine: 450-600.

Page 38

The chart (punched version)

Thread sizes and gear combinations shown

Page 30

The calculator. It shows o.1 with a full

the scale and the chart w.r.t to

The slide moves o.05".

Turning the handwheel a full revolution,

20 fit.

The cross slide spindle has a pitch of

Example

gear combinations are the same for this

The feed sizes on the punch machine data

Page 29/30

One revolution is o.009".

With one revolution the slide moves o.049","n

Top slide:

The calculator will be reduced o.029",

Turning the handwheel one revolution.

"...I" o.095. When you make a full revolution of the

The handwheel moves o.0625".

As the spindle has a pitch of 16 fit,

Handwheel for longitudinal slide

Page 14/15/16

15 or 60 rpm on a 60 cycle machine.

The corresponding speed of 60 (550 rpm)

The machine.

Illustrations and examples show 50 cy-

Page 13
suit.

tion later, only proper operation can guarantee the desired re-
ction a few minutes now can save valuable time and frustra-
read the instruction manual carefully before starting the ma-
per or careless working methods can lead to injuries.
current safety regulations in industry and schools, but imple-
the construction of the compact 5 and the accessories meets al-
always follow the rules for accident prevention.
found in the service parts list.
How in the mounting instructions, these dimensions can be
the sizes of screws, nuts, bolts, etc., are not always infor-
The working types are indicated with the mosaic screen pattern.

the necessary basic information to the already
recess convey the necessary basic information to the applying
these charts, "basics about running, adjusting and maint" and
the accessories, working types and rules for accident prevention.
machine and its operating elements: mounting instructions for
this instruction manual contains a general description of the
Index – Turning
Accident Prevention: Milling – Drilling

- Use original spare parts!
- Work
- Machine maintenance or measuring
- Turn off motor before unloading and
- Never reach over running (rotating)
- Replace machine if repairs required
- Remove plug from socket.
- Chucks:
- Never reach over running (rotating)
- Be careful of extending chucks!
- Page 11 and 14.
- Changing spindles are indicated on
- Do not surpass the clamping capacity
- With the hand.
- Never try to stop workplace or chuck
- NEVER TOUCH RUNNING MACHINE PARTS!
- USE CHIP HOOD for removing chips!
- or similar:
- Attach to the machine with clamps.
- The chuck keys should never be
- even when machine is not being used.
- REMOVE ADJUSTING KEYS AND WRENCHES.
- Keep work area clean! Cluttered+
- Piece
- could get caught in chuck or work-
- Wear proper apparel! Loose sleeves+
- ALWAYS WEAR SAFETY GOGGLES! Be also+
- Start it
- With the use of the machine cannot
- children and visitors not accredited
- machine should be stored so that
- KEEP CHILDREN AND VISITORS AWAY THE
- guard.
- close belt guard
- between centerless, mount lathe dog
- DO NOT ALIVE GUARD! When turning+
- may also be carried out process-
- the play (it is not already mounted)
- raceway must be available, mounting of
- ELEC T RICAL CONNECTION: The socket
- Read instruction manual before work
- Follow all accident prevention rules
Never use force.

Use the correct tool for the job. Avoid damaging the tool.

Clean the machine regularly and keep it tidy.

Clean and dust all machine surfaces.

Prevent dust and dirt from the leadscrews and machine tool for cleaning use a brush or a cloth.

Rout-out any wear of the leadscrews.

Chips and dirt on the leadscrews cause a quick wear of the leadscrews.

Care about it and you will do it all.

Care about precision in the operation of the machine and how they have a look to the precision tools.

The compact is a precision machine.

Machine parts - See "Basic Machine".

Check the machine for possible transport damage and for completeness of the de-

Unlocking, cleaning the machine.

Unpacked, cleaning the machine.

SERVICE TOOLS

1. Safety driving plate
2. Lathes dog
3. MT 1 center
4. MT 2 center
5. Tool spacers

BASIC EQUIPMENT

Tools, spatula, tool, instruction with sheets and deathly, tocolator, and cleaning the machine, lathe bed, headstock, tailstock, tools.
### Accessories Lathe

<table>
<thead>
<tr>
<th>Order No. 200 110 010</th>
<th>Order No. 200 110 030</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 threading tools</td>
<td>Internal and external tools</td>
</tr>
<tr>
<td>5 turning tools</td>
<td>6 turning tools</td>
</tr>
</tbody>
</table>

### Tools Lathe

<table>
<thead>
<tr>
<th>Order No. 200 200 420</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tapered steady 40 mm dia.</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Double tool holder</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 101</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-jaw independent chuck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 340</th>
</tr>
</thead>
<tbody>
<tr>
<td>90 mm dia. with reversible jaws</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 410</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 jaw fixture (key)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 102</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-jaw chuck (2400 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick-change tool holder</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 040</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-jaw independent chuck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 152 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morse taper arbor MT1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 420</th>
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</thead>
<tbody>
<tr>
<td>Face-tool shank (140 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 400</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face-tool shank (140 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 350</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-marring compound</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 410</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 jaw fixture (2400 mm)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 500</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-jaw independent chuck</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Order No. 200 200 250</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quick-change tool holder</td>
</tr>
</tbody>
</table>
Facing

The tool is moved at a right angle to the axis of rotation.

Illustration shows a left turning tool.

Taper Turning

The size of feed (s) is the path of the point of the tool.

If the feed is carried out from left to right, then a lightening cut must be made.

The tool is moved parallel to the axis of rotation.

Some Basic Terms About Turning
Cutting Speed Chart

The cutting tool, once it is at the feed rate to overheat and damage of the carbide tool as not to overheat and damage the tool, must be at a speed as not to overheat and damage the tool. As the workpiece diameter is assumed as existing, the feed rate can be calculated.

Example:

- Feed: 0.07 mm/rev
- Diameter of workpiece: 20 mm
- Tool: Carbon tool steel

The values are valid for carbon tool steel, staying below the temperature of the tool will be:

- 500°C
- 600°C

Compare - high speed tool steel (HSS) tool

1. The larger the feed (a)'
2. The larger the depth of cut (c)
3. The larger the workpiece'
4. The higher the spindle speed (with equal dia.
5. The higher the spindle speed (with equal dia.
6. The higher the spindle speed (with equal dia.

The chart shows the recommended speeds.

Different Spindle Speeds

Spindle speeds can be set:

- 200/300/500/500/750/750 revolutions per min.

- 200/300/500/500 revolutions per min.

On the compact 5 spindle speeds can be set.
Thread-Cutting Tools

Suspension: Speed, vibration and chatter. Cuts may not be too tight. The depth of cut (a) may not be too long. The tool angle 60° external and internal thread-cutting.

Side Tools: They are used for longitudinal, transverse turning, and for turning the external and internal parts of the tools.

Pantograph Tool: It is used for grooving and shaping.

Boring Tool: The tool is used for boring a hole of exact size and shape.

The Turning Tools: Note the different clamping angles of the tool. Cross feed and longitudinal feed are possible feed directions.

The turning tools (see illustration)

Set of 6 Turning Tools
Care of Tools

- The tools must be stored so that the cutting edges are not damaged.
- Note that your turning tools lose their cutting ability when the cutting speed is too high. - See cutting speed chart.

Grinding Tools

- Sharpen only the backdread surfaces of the tools. In no case the tip end ones.
- Sharpen with offset.
- Note that the angles of the surfaces are not changed.

Sharpening Tools

- After longer use of the turning tool, the cutting edge of the workpiece surface and uneven workpiece surface cause rough and uneven surfaces. Turning tools cause rough and uneven surfaces.

- Clamp the turning tool with as little overhang as possible! A tool with too much overhang causes bending and causes increasing deflection. For this purpose, spacers of the same cutting edge length exactly at center.

- The turning tools must be clamped so that they are not altered.

- Note that the angles of the surfaces must be ground. Grinding requires some practice and retesting.

- Correct Mounting of Tools
for connecting to the machine.

A grounding receptacle must be available.

Mounting the Plug

Electrical Connection

Setting-up the Machine.

Exact Play. Turn freely and does not have too much movement. Adjust with Allen screw and Ty-Rap.

Mounting the Handle on the Longitudinal Slide Handwheel and Cross Slide Handwheel

For tightening the screws: Recommended size of screws: 6-8 mm. da. Screw the carrier plate with the hexagonal nut securely.

The Sketch indicates the distance bet.

Would encourage a negative turning re-

If the machine is not fastened with screws, vibrations could occur, which may result in the wood being unstable or the machine being destroyed.

Mount the machine on an appropriate surface, wooden board is best, plywood board is also fine. An even surface should be suitable, or it can be extended with screws or fastened with adhesives. Groove, workbench, etc.
Tip

The illustration below shows belt post-

belt and tighten the hexagon screw.
The motor downward – this tightens the
motor pulley. Place the belt on
loosen the hexagon screw (1) and lift

Setting the required spindle speed:

<table>
<thead>
<tr>
<th>B</th>
<th>C</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>A</th>
</tr>
</thead>
<tbody>
<tr>
<td>200</td>
<td>330</td>
<td>450</td>
<td>550</td>
<td>650</td>
<td>1500</td>
</tr>
</tbody>
</table>

The Main Spindle Drive

The lathe bed is made of high-quality

Design, Controls, Operating Elements
Tool Holder

The Cross Slide

Cross Slide

The Longitudinal Slide

The Cross Slide can be clamped with the set screw (5). The cross slide is set according to the scale divisions adjacent to the diameter of the workpiece.

This means when the cross slide is adjusted by 0.05 mm, the scale divisions change according to the diameter, and are instated at 0.05 mm. The cross slide can only be adjusted by hand (without any adjustment of the cross slide). (This applies also to the Cross Slide.)

The cross slide 4 (Run Spindle) is supported by 2 ball bearings in the sturdy headstock house. The main spindle is supported by 2 ball bearings and inserted into the spindle bushing for the main spindle. The bearings are pre-tightened and inserted into the spindle bushing for the main spindle. The spindle bushing is accurately fitted into the spindle sleeve with a special spring so that the spindle is accurately supported.

The spindle is driven by a special drive motor, and the main spindle is driven by a special motor. The horizontal (with end screws) and vertical (with end screws) sliding movement of the headstock is driven by the spindle motor. The spindle motor is driven by a special motor.
The thistle can be seen on the scale on the depth can be set with the handwheel. The depth is set by adjusting the handwheel. The thistle can be set to a required angle with the Allen screw (6). The rear centering bore (7) and clamp in the front on the required working post depending on the required working post.

Mounting the top slide:

The top slide runs smoothly in a dovetail guide groove and can be clamped in any position. The cross-section can be cambered to the same cross-section with a maximum size of 12×12 mm, with the cambering done with the cambering tool. The graduated scale enables exact adjustments. The required angle is set with the clamping screw. The handwheel is placed on the back and fixed. The holding long for holding long.

15
Mounting:

1. Assemble the chip tray and splashguard.

2. Set up machine, bolt splashguard with guard washers (diameters see spare parts list).

3. Tighten machine bed onto chip tray.

Calculation work:

- This saves the position of the slide. This saves time to zero position without changing the scale. You can set the scale by adjusting the scale rings on the handwheels.
Mounting the Workpiece

Working Tip:

- Piece between centers.
- Clamp lathe dog on workpiece. Mount work.
- Nose with the 3-jaw lathe center to the spindle.
- Mount lathe dog guard onto the spindle.

Turning a Rotor

Spindle speed 950 rpm.

Correct: The center fits completely into the 60° center bore.

Wrong: The center bore is not deep enough.

Correcting:
The center would only touch the shaft.

Making a Center Bore

- In order to clamp the workpiece, a center punch is used.

- Piece between centers.
- Clamp lathe dog on workpiece, Mount work.
- Nose with the 3-jaw lathe center to the spindle.
- Mount lathe dog guard onto the spindle.

Correct: The center fits completely into the 60° center bore.

Wrong: The center bore is not deep enough.
The clamping shoes.

3-mm chuck, 50 mm diameter.

4-mm independent chuck, 60 mm diameter.

Round, hexagon or reverse-slotted workpieces.
The 3-jaw chuck serves for concentrically clamping workpieces.

3-mm chuck, 60 mm diameter.

Round, hexagon or reverse-slotted workpieces can be clamped concentrically and eccentrically. Each jaw can be individually adjusted and reversed.

With the 4-mm independent chuck, workpieces can be clamped independently.

For workpieces (summarized)

Turning: Clamping Devices
Mounting

3. Insert Jaw no. 1 into groove 3.
2. Insert Jaw no. 2 into groove 2, turn clockwise until齐
1. Insert Jaw no. 3 into groove 1 and align.

Inserting jaw:
- For the jaws, clean the jaws before inserting. Note the correct mounting order: Jaw mounted stepped outside or Jaw mounted stepped inside.
- The jaws can be reversed: Jaw mounted.

Reversing the Jaws

3-Jaw Chuck, \( \varnothing 80 \) mm

Clamping Devices – Working Examples

Threaded holes for
- z Jaw chuck and the dog guard.

Do not use shorter screws - the screws could break or tear out.

Please note:
- The产生的 correct contact with the screws (M5 x 0.8, DIN 912) are the flathead nose with the flat threaded nose and chuck nose must be fit together with the 3-Jaw chuck once.

Applied torque with the 3-Jaw chuck:
- The torque applied on the chuck is no longer present, therefore the danger of breaking the chuck is guaranteed.

Clamping Capacities:

For concentricity clamping of round, hexagonal and square workpieces, square workpieces can be clamped concentrically.
When turning off small diameters, the tool tip is especially important, and it is recommended to use the revolving center.

**Supporting Long Workpieces**

Long workpieces must be supported to avoid bending. The tool must be long enough to reach the center of the workpiece.

**Working with the Revolving Center**

When working on thin workpieces, use a tool angle of 90°. When working on thick workpieces, the angle should be smaller than 45°. The most advantageous angle depends on the material and the tool angle of the tool. Use a tool angle of 75° for the turning tool.

An even surface is achieved with the automatic feed mechanism.

**Working with 3-Jaw Chuck**

The center bore was made with a hand drill. It is recommended to use a drill bit with a diameter of 0.5 mm (see chart), 0.1 mm/rev, turning tool: side tool, feed: 0.1 mm/rev, spindle speed: 200 rpm, feed: 1.5 mm/rev, workpiece is of steel, 65 mm diameter.
Boring

- Clamp longitudinally.
- Use low spindle speed.
- Angle to the turning axes.
- Maintain constant height and at a slight incline.
- The parting-off tool must be clamped.
- Clamp workpiece with as much as possible, so that it is not bent by the pressure of the tool.

Drilling

- Leave for instance with aluminum.
- Ensure that the drill is as sharp and as new as possible, so that it is not damaged in the drilling process.
- Clamp workpiece with a suitable clamping device.
- The speed must always match with the material.
The Clamping Plate 90 mm Diameter

The clamping plate is clamped securely. The steps must be turned so deep that the steps are:

1. Carefully tight the nuts.
2. Clamp a round workpiece and turn the step.

Procedure:

1. Soft jaws for the chuck
The Independent Chuck, Ø 90 mm

Example:

A camphor concentrate in a 3-jaw chuck.

Square material (workpiece) cannot be

Example:

Workpieces. For center or eccentric camphor

Chuck provides a means of orientation.

The rings turned into the independent

workpieces can be camphor concentrate.

Each jaw can be adjusted individually.

and uneven shaped workpieces.

For camphor round, square, rectangular

Clamping Capabilities

Independent chuck.

Threaded holes for

Mounting

M3 x 25, DIN 912.

Spherical nose with the 4 allen screws

Mount the independent chuck to the

mounting base.
The ESX 25 Collars

Care & Service

The precision, the clamping taper and cone and influence after use - chips and dirt could damage check and oil all collar holder before and after cleaning.

Changing the Collar

When the clamping nut is removed, the collar is automatically ejected from the holder. The collar is then removed, the collar holder loosened, clamping nut (3), insert collar, loosen clamping nut (3), insert collar, loosen clamping nut (3).

Mounting the Workpiece

Insert the hexagon screws (2) into the screw holes in the collar holder (1) onto the spindle. Mount collar holder (1) onto the spindle. Use the hexagon screws (2) to hold the collar holder in place. The collar holder can then be secured with the collar holder locking screw.

Mounting the Workpiece

The workpiece, the collar, and the clamping members on the lathe. The collar is then clamped to the workpiece. The collar is clamped to the workpiece using the collar holder.
The Quick-Change Toolholder

Mounting:
+ Set basic element (1) onto the top side.

Max. tool section: 8 x 8 mm

Should several tools be necessary for turning at certain workplaces, continual changing of tools would be very time-consuming.

With the quick-change toolholder, the tool can be clamped beforehand and adjusted to exact center height.

Clamp the tool in the toolholder (2) and mount onto the basic element from the top.

Adjust center height with the knurled screw (3). Tighten knurled screw (3) with the toolholder is clamped.

Clamp the basic element in the required angle with the hexagon screw.

The two-way toolholder can only be mounted onto the top slide. In order to reach the exact center height, spacers must be used.

Working tips:

The two-way toolholder can be turned.

This enables easy mounting of the clearance angle "W". The clearance angle "W" influences the type of chips and the surface quality. Try it and see!
and heating up. 0.11 contact points to decrease friction.

Working tips:

1. Center is not possible.

2. A smooth pipe is turned internally and

3.Centrally supported, but not clamped.

4. Slide plate so that the workpiece is

5. With the clamping plate, clamp the

6. Mount the steady rest on the lathe bed.

Mounting:

The workpiece from bending.

The center, the steady rest prevents

Workpiece, which are supported with

Also when turning very narrow (thin)

The center cannot be used.

For supporting the workpiece, since

Etc., the steady rest is necessary

And, turning spans, taper turning,

With some work, such as boring, drill-

Largest workpiece diameter: 40 mm

Small workpiece diameter: 2 mm

Specifications:

The Steady Rest

The Traveling Steady

1. Fix the workpiece.

2. Counterclockwise at the contact points.

3. When adjusting the pins (2), do not

4. Work out from depression the threads.

5. Tighten the traveling steady with the

6. Remove the 2 set screws on the tangent-

Mounting:

Tool tool and prevent bending.

Support spindle near the

The supporting plan of the traveling

The supporting plate of the traveling

Narrow workpiece, bend under the press-

And, from 4 - 25 mm.

For long round workpieces with clamp—
Working – is it securely clamped?
Always check the workpiece before.

and the independent chuck!
Capacitv of the lathe chuck
Never surpass the clamping

then no sight!
Forethought is better
Always wear safety goggles.

Rule:
Follow all accident prevention

Station (of the workpiece).
Possible movement (pressing out of pro-
currntly the steady rest prevents a
at the end of the shaft, a taper is
Mount gear wheels (note the direction.)

- Socket head screws (12).
- Head screw short and fasten the words spindle stock to center the gear wheels straight to left to-
- Move longitudinally slide to left to-
- The control knob.

- Lightly tighten set screw (2). The groove in the control knob must be engaged with the control housing. The pin on the insert control knob (3) into the lower control housing (4). Remove set screw (2) and pull out.
- Remove washer (3) and gear wheel.
- Control knob.

Mounting

1. Mount control housing onto the comp. 2. Line up the 2 Allen head screws and tighten the Allen head screws. 3. Remove control housing (11) and stack it onto the comp.

- threaded-cutting:
  - The surface of the workpiece is even.
  - You use drawing and longitudinal tooling
    - feed:

- Turning with automatic longitudinal tooling:
  - 2 spacers
  - 3 shear pins
  - Quadrant with 6 gear wheels
  - Control with control knob

Delivered Units

The Automatic Feed Mechanism
Mounting the Gears

Steps for Mounting the Gears

1. Loosen the allen head screw (1) and swivel the gear wheel (6) counterclockwise (2) downward.
2. Mount gear wheel (7) onto axis (g).
3. Place bearing ring (g) onto axis (22).
4. Place bearing ring (b) onto axis (22).
5. Mount gear wheel (20) onto axis (22).
6. Mount gear wheel (60) onto axis (b).

In order to fix gear axes:
- Mount gear wheel (20) onto axis (22).
- Mount gear wheel (60) onto axis (b).
- Mount gear wheel (60) onto axis (22).
- Place bearing ring (b) onto axis (22).
- Place bearing ring (g) onto axis (22).

Correct Play of the Engaged Gear Wheels

- The accuracy of the threaded pitch must be present.
- The pitch error in no way influences the accuracy of the gears.
- Avoid excessive wear, which would weaken the gears.

Recommended method:

Go on next.

- Ring washer and the hexagonal washer and spacer with the gear wheel and screw (4). Fix gear wheel (6) and swivel the gear wheel (6) counterclockwise (2) downward.

Example of mounting:

and for the threaded pitches are indicated.

Correct Play of the Engaged Gear Wheels

- The accuracy of the threaded pitch must be present.
- Avoid excessive wear, which would weaken the gears.
- The pitch error in no way influences the accuracy of the gears.

Mounting the Gears

- Mount gear wheel (20) onto axis (22).
- Mount gear wheel (60) onto axis (b).
- Mount gear wheel (60) onto axis (22).
- Place bearing ring (b) onto axis (22).
- Place bearing ring (g) onto axis (22).

Correct Play of the Engaged Gear Wheels

- The accuracy of the threaded pitch must be present.
- Avoid excessive wear, which would weaken the gears.
- The pitch error in no way influences the accuracy of the gears.

Mounting the Gears

- Mount gear wheel (20) onto axis (22).
- Mount gear wheel (60) onto axis (b).
- Mount gear wheel (60) onto axis (22).
- Place bearing ring (b) onto axis (22).
- Place bearing ring (g) onto axis (22).

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- The accuracy of the threaded pitch must be present.
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- Mount gear wheel (20) onto axis (22).
- Mount gear wheel (60) onto axis (b).
- Mount gear wheel (60) onto axis (22).
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- Mount gear wheel (60) onto axis (22).
- Place bearing ring (b) onto axis (22).
- Place bearing ring (g) onto axis (22).

Correct Play of the Engaged Gear Wheels

- The accuracy of the threaded pitch must be present.
- Avoid excessive wear, which would weaken the gears.
- The pitch error in no way influences the accuracy of the gears.
Warning: Always wear protective eyewear when working with machinery.

Procedure

1. **Thread Cutting**:
   - Set up the tool according to the diagram.
   - Adjust the tool to the cutting depth.
   - Bring the tool to the start position.
   - Turn the wheel to the correct pitch.
   - Cut the thread, ensuring the cutting depth is correct.

2. **Important Note**:
   - It is recommended to use all tools in a set.
   - Use the correct tool for the task.
   - Ensure the tool is clamped at the exact position.

**Metric Threads**

- The pitch size is given in millimeters.
- Choose metric set, 1" or 1.75.

**Procedure**

- Select the correct pitch and thread size.
- Ensure the tool is set for the correct pitch.
- Cut the thread to the desired size.

**Working Tips – Thread Cutting**

- Use the correct tool for each thread.
- Ensure the nut is tightened to the correct torque.
- Check the pitch size on the chart.
USE ONLY ORIGIAL SHEAR PIN!

mounted, push, otherwise, the shears cannot be
reset, shear pin may not overhang the
through the larger bore of the bush.
be reset. Press shear pin -Remount bush and turn it, so that

- Procedure:

of punch: 2.5 mm.

pin with a punch (maximum diameter
remove broken shear
Remount shears from the headgear.

Adjustment of the Handwheel Clamping on

Longitudinal, Cross, Top Slide and Tablelock

Adjustment:

Remove end position and re-tighten
Turn handwheel towards hold in the

(1) Hold handwheel and loosen cap nut

Adjustment of the Handwheel Clamping on

for best performance, adjust set screws.

Hold set screws in the adjusted post-
until the stells run without play.

Loosen hexagon nuts, adjust set screws

Adjustment:

Chamfering the Shear Pin

If the shears break, due to

be inserted, a new or оригинал shear pin must
be matched on the automatic feed to

machine. If the automatic feed is

overloaded or incorrect handling of the

Follow the manufacturer's instructions for best performance.

Adjustment of the Cross Slide and Top

Set screws in the adjusted position.

gon nuts (2) serve for securing the

slide guidance is adjusted. The hexa-

which press on the gib, the play-free

The dovetail guidance are fitted

Slides Guidance

Playfree-Re-Adjustment of Cross Slide and Top

Adjustments
1. Dismount gears, unscrew set screw.
2. Move longitudinal slide towards rear knob (2).
3. Unscrew the 2 Allen head screws (3).
4. Remove coupling (4) from the head.
5. Re-mounting:
   a. Grease.
   b. Reassemble positioning and lubricate with grease.
   c. Place coupling (4) onto read cue.

Interval approx. 200 Working Hours

Lubrication
<table>
<thead>
<tr>
<th>Problems – Possible Causes – Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Chattering</strong></td>
</tr>
<tr>
<td>Spindle speed is too high or too low</td>
</tr>
<tr>
<td>Machine not bolted down</td>
</tr>
<tr>
<td>Too much tool overhang</td>
</tr>
<tr>
<td>Long or narrow workpiece not supported either by tailstock center or by fixed steady. Workpiece bends through the power generated by the cutting operation.</td>
</tr>
<tr>
<td>Cutting tool dull, or cutter angles not correct</td>
</tr>
<tr>
<td>Main cutting edge not on center height</td>
</tr>
<tr>
<td>Play in the slide guideways</td>
</tr>
<tr>
<td>Increased cutting depth “a”</td>
</tr>
<tr>
<td><strong>Rough surface</strong></td>
</tr>
<tr>
<td>Dull tool</td>
</tr>
<tr>
<td>Tool is too pointed</td>
</tr>
<tr>
<td>Play in the slide guideways</td>
</tr>
<tr>
<td><strong>Machine stopped or speed is reduced strongly</strong></td>
</tr>
<tr>
<td>Dull tool</td>
</tr>
<tr>
<td>Spindle speed to high, or cutting depth too large</td>
</tr>
<tr>
<td><strong>Workpiece not round</strong></td>
</tr>
<tr>
<td>Tailstock center does not fit to center bore</td>
</tr>
<tr>
<td>Long or narrow workpiece not supported by tailstock center or fixed steady</td>
</tr>
<tr>
<td><strong>Shear pin breaks</strong></td>
</tr>
<tr>
<td>Drive overloaded, longitudinal slide clamped</td>
</tr>
</tbody>
</table>
Drilling - Milling

Index Drilling – Milling

required angle position. Any milling not only vertical milling, but in any vertical milling and horizontal milling, since the milling spindle can be used for both units. It is not described, but is included in the name "vertical milling and drill.-"

Note:

milling machine into a drilling machine and a universal unit, the compact S can be connected with the vertical milling and drill.-
### Tools for Vertical Milling and Drilling Attachment

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>152 110</td>
<td>Set of 6 gear mills. 0.5 mm (No. 1-6)</td>
</tr>
<tr>
<td>764 200</td>
<td>Heavy-duty end mill</td>
</tr>
</tbody>
</table>

### Accessories for Milling and Drilling Attachment

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>225 000</td>
<td>1 ( \frac{1}{2} ) in. wooden case, gripping capacity from 1.5 to 13 mm</td>
</tr>
<tr>
<td>200 320</td>
<td>14 individual collars EXS-25</td>
</tr>
<tr>
<td>200 400</td>
<td>150 100 - Vertical fine feed attachment</td>
</tr>
<tr>
<td>200 310</td>
<td>90 mm dial, with 2 clamps</td>
</tr>
<tr>
<td>200 360</td>
<td>3/4 in. milling table</td>
</tr>
<tr>
<td>150 350</td>
<td>0.5 mm, with 1.4 flutes, metric thread</td>
</tr>
</tbody>
</table>
Accident Prevention: Milling – Drilling

Order No. 792 120

1. Set chuck Ø 1.6 x 4 mm
2. Cutter tool blade for metal Ø 60 mm
3. Cutting tool ground at 45°
4. Turning tool round, assorted
5. Turning tool round, assorted
6. Cnc milling tool round, assorted
7. Milling tool round, assorted
8. Milling tool round, assorted
9. Milling tool round, assorted
10. Milling tool round, assorted
11. Milling tool round, assorted
12. Milling tool round, assorted
13. Milling tool round, assorted
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91. Milling tool round, assorted
92. Milling tool round, assorted
93. Milling tool round, assorted
94. Milling tool round, assorted
95. Milling tool round, assorted
96. Milling tool round, assorted
97. Milling tool round, assorted
98. Milling tool round, assorted
99. Milling tool round, assorted
100. Milling tool round, assorted

Service Parts Set

Order No. 199 900

Order No. 119 000

Order No. 124 000

Order No. 123 380

Order No. 784 010

Order No. 784 008

Order No. 784 006

Order No. 784 004

Order No. 784 002

Order No. 784 001

For metal, 60 mm dia.

Circulator saw blade
Electrical Connection

Mounting the plug:
- Mounting of plug must be carried out according to the instructions on the plug.
- The plug must be plugged into outlets which match the vertical milling and drilling unit.

Technical Data

Motor: [Details as per diagram]
- Voltage and Frequency: See label.
- Output Power (P2): 100 W, 230–400 V
- Input Power (P1): 200 W, 50–60 Hz
- Non-standard single-phase motor, dust-resistant.
Mounting the Vertical Unit - Operating Elements

- Any required angle can be set at the quill. The quill can be set at any required angle.
- The graduated scale enables accurate setting of the quill holder to the required angle.

**Vertical Adjustment**

1. Tighten the 2 pinion head screws (1).
2. Fixing the vertical column.
3. The cross slide is tightened to the vertical column.

**Height Adjustment**

1. Loosen the 4 socket head screws and washers.
2. Attach to the base of the lathe bed.
3. Clean contact surfaces thoroughly before mounting.

**Fixing the Vertical Column**

1. Tighten the 2 pinion head screws (1).
2. Fixing the vertical column.
3. The cross slide is tightened to the vertical column.

**Height Adjustment**

1. Loosen the 4 socket head screws and washers.
2. Attach to the base of the lathe bed.
3. Clean contact surfaces thoroughly before mounting.

**Vertical Adjustment**

1. Tighten the 2 pinion head screws (1).
2. Fixing the vertical column.
3. The cross slide is tightened to the vertical column.

**Height Adjustment**

1. Loosen the 4 socket head screws and washers.
2. Attach to the base of the lathe bed.
3. Clean contact surfaces thoroughly before mounting.
The Vertcal Fine Feed Attachment

1. Loosen the socket head screw and swivel.
2. Insert pinion into the quill holder.
3. Place centering bolt (5) of the feed.
4. Insert the quill into the worm.
5. Work the quill to engage with the worm.
6. The socket head screw, so that the quill unit into the hole and clamp with.

Moving

The vertical fine feed serves for accuracy and depth adjustment for milling and
vertical machining.

Always clamp quill when milling,
never force the quill.

Never force the quill.

The quill is fixed with the socket head.

Clamping screw for the quill (3).
<table>
<thead>
<tr>
<th>Aluminum/Brass</th>
<th>Cast Iron</th>
<th>Steel</th>
<th>Spindle Speed</th>
<th>Diameter of Drill (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>75</td>
<td>300</td>
<td>15-20</td>
<td>5-10</td>
</tr>
<tr>
<td>700</td>
<td>75</td>
<td>300</td>
<td>15-20</td>
<td>5-10</td>
</tr>
<tr>
<td>1000</td>
<td>75</td>
<td>300</td>
<td>15-20</td>
<td>5-10</td>
</tr>
</tbody>
</table>

Never work with belt cover open!

Adjusting the Spindle Speed

**Note:**
- Tighten belt and fix socket head screw onto the required pulley compartments.
- The belt is loosened and can be shifted towards motor.
- Open cover (1), loosen socket head screw (2).
Working Tips – Drilling

Drill feed is achieved via the quill.

Drill feed:

Let the eccentricity of the workpiece.
Let and the material of the workpiece.

The spindle speed of the drill depends on the material of the drill.

Spindle speed:

The appropriate chucking device.

Chuck the workpiece.

or in the collar chuck.

Drill is clamped in the drill chuck.

Drillling in General

- By 1.25 mm.
- 2.5 mm after one complete revolution.
- Cross the handwheel continuously during turning. The scale on the table of the workpiece refers to the diameter of the workpiece.
- The scale on the cross slide refers with all of the scale rings on the coordinate drilling.

Dinners can be carried out.

Measures, drilling in accordance with longitudinal and cross slide hand-...

Feed (very carefully), feed must be carried out with little pressure. Drill it to that a little break, drill it finer the better.
Millling in General

Types of Movements

- Milling

Conventional Milling (downcut milling)

Climb Milling (up-milling process)

Tips
- Be aware of the danger of breaking the tool on the compact 5 corner.
- Use conventional milling method for compact 5 corner.
- Opposite direction for the workpiece and cutter.

Feed direction of the workpiece and cutter are the same.

Example:
- The feed movement is performed by the cutter.
- Measurement of the cross slide is made by the cutter.
- Main movement is made by the workpiece.

Additional remarks:
- Move material.
- The tool feeds the main motion movement.
- The main (compound) motion moves against the material.
Example 1

Example 2

Example 3
<table>
<thead>
<tr>
<th>DIA (mm)</th>
<th>Cast Iron</th>
<th>Steel</th>
<th>Aluminum/Brass</th>
<th>Spindle Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-40</td>
<td>380</td>
<td>380</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>15-20</td>
<td>380</td>
<td>380</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>10-15</td>
<td>380</td>
<td>380</td>
<td>380</td>
<td></td>
</tr>
<tr>
<td>5-10</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td>10-5</td>
<td>700</td>
<td>700</td>
<td>700</td>
<td></td>
</tr>
<tr>
<td>5-5</td>
<td>1600</td>
<td>1600</td>
<td>1600</td>
<td></td>
</tr>
</tbody>
</table>

**Selecting the Spindle Speeds**

- In general:
  - The harder the material of the work, the slower the spindle speed.
  - The larger the diameter of the miller, the slower the spindle speed.
  - The selection of the spindle speed depends on the size of the workpiece and not on the size of the drill. Drill the required diameter of the miller and add 1000 (in general).
  - The spindle speeds must be carried out completely deep grooves in several workpieces.

**For this reason:**

- Tacks. Feed is larger than with softer material.
- When hard materials are used, the breaking and overloading the machine.
- If the milling depth and the milling feed are too large, the miller will bend — this means danger of breaking the machine.

- Milling depth — milling feed
Clamping Devices for Drills and Millers

(Summary)
Clamping Devices for Workpieces (Summary)

Machine vice
Milling table
3-jaw chuck
4-jaw independent chuck
Collet attachment
Clamping plate 90 mm dia.
Support flange
Cross slide
Two collet attachments being used.

Arbor

By means of the plate which are fitted -

collet attachment is accomplished.

This reason, the collet attachment is.

NITRES must be clamped securely and

NITRES are the same.

For the lathe, the collets for the vice-

is disconnected with the

unit has an M4 x 1 mounting thread and

the collet attachment for the vertical.

Clamping capacity using the collets 6x

Collet Attachment

Clamping Devices for Drills and Millsers

3-Jaw Drill Chuck

directly onto the spindles.

that used with the lathe. It is mounted.

The 3-jaw drill chuck is detached with

clamping capacity: 1 - 8 mm
Mounting on milling table

1. Remove set screw (1)

Mounting on cross slide

2. Mount machine vice on cross slide and tighten with the two shorter screws.

Technical data

Technical data

The Machine Vice

Clamping Devices for Workpieces
Adjust the hexagon screw so that the clamping shoe is vertical.

If you want to adjust the clamping table, pin the collector and attach the table to the table bed, feed a round collet of the milling table exactly parallel.

Mounting on the cross slide:
- Mount the support head on top of the lathe table.
- Screw the support head with the socket head screws.

Dimensions:
- Max. clamping height with long screws: max. 15 mm
- Max. clamping height with short screws: max. 35 mm
- Length x width: 120 x 80 mm
7. Any service performed by EMCO or its authorized representative's regular rate.

8. Warranty will be charged at EMCO's or its authorized representative's regular rate.

9. There is no claim of warranty for defects which occurred by:

   a. All defects which are not caused by EMCO or its authorized representative.
   b. The warranty extends to the elimination of all defects in material or workmanship.
   c. EMCO machines is, without limitation of operating conditions for new EMCO machines.

Warranty Conditions for...
The Dividing Attachment

Examples:

attachment must be retained; a dividing attachment is required.

Workpiece is mounted on dividing attachment which is mounted horizontally. Feed is carried out with the longitudinal slide. and

Note: When the vertical unit is turned and

wrench, etc., every where where exact dt—

gear milling, etc., hexagon milling gear.

on the gear wheel is superimposed onto the gear

cross slide. All other change gears (cross

slide, quill, base, sleeves, dividing attach-

wrenches are lightened.

hole, groove, or via the longitudinal
turned. The broken key are milled. —

The groove for a hooked key are milled. —
Cross slide

Dividing attachment

Clamping plate 90 mm dia.
Collect attachment
4-jaw independent chuck
3-jaw chuck

Clamping Devices for the Dividing Attachment (Summary)
I.e., distance in every fourth hole.
60:15 = 4
15 diameters are required. These are the diameters that indicate the drill.

Example:

- Drilling centers for the respective holes:
- Mount the dividing attachment on the drill.
- Cross slide, with the two hexagon screws.
- Vertical mounting:
- Horizontal mounting:

Mounting the dividing attachment.
1. Insert index bolt (1) into bore for the second has "6", etc.,
circle of divisions has 60 holes.
Required division. The outermost

2. Pull the index bolt and turn divided.

Workshop Tip:

3. Tighten clamping screw (2) before

Example: 15 divisions are required.
For better orientation, mark the graduation with a felt marker.

360° : 15 = 24°, Mark 24°, 48°, etc.