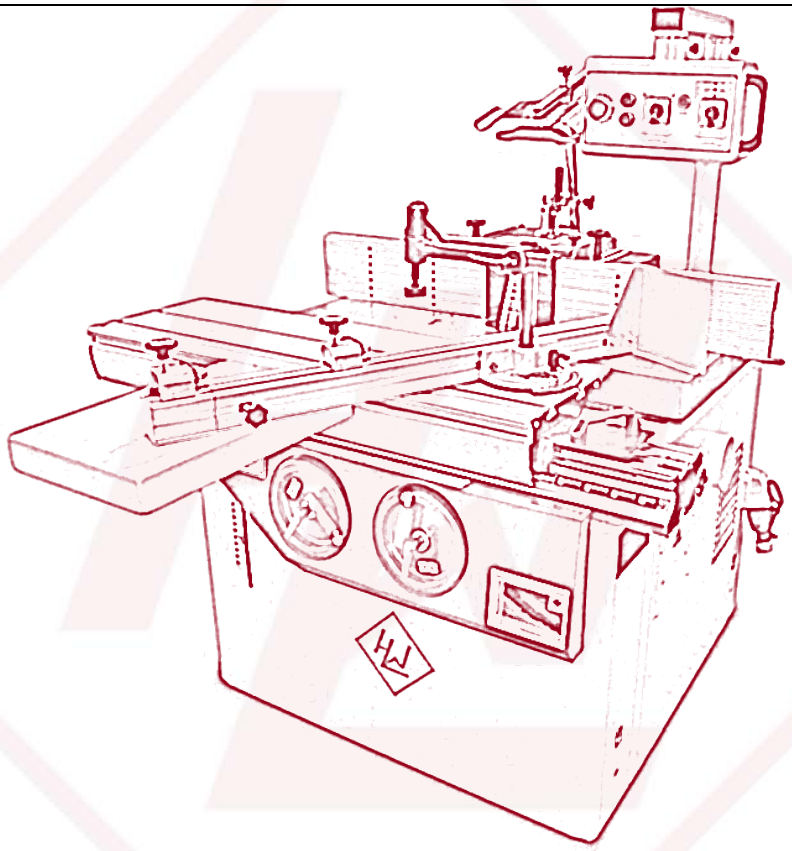
OPERATION MANUAL

WINTER MILLING MACHINE

SF 45 FST



WARNING!

The operator must thoroughly read this manual before operation.
Keep this manual for future reference.

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TO OUR CUSTOMERS

This manual contains all the instructions required for the faultless operation of the machine and its respective maintenance, as well.

Thus, during the warranty period, you will receive for free all components that have presented eventual defects.

The producer is always at your disposal for resolving of problems that machine operators may encounter during operation, and for delivery of spare parts, too.

Your recommendations related to this manual are valuable contribution to the improvement of the products offered by Winter Holztechnik GmbH to its customers.

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SECTION A: GENERAL DATA

A.1. MANUFACTURER

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A.2. INTRODUCTION

The present manual is designed for those who will operate the machine. You will find in it the necessary data for assembly, commissioning, maintenance and safety operation of the machine. The experience of the company manufacturer and its experts in considered in the preparation of this manual.

We recommend you to consider with responsibility our recommendations concerning the safety of work. The operations requiring disassembly of machine and electrical components should be performed by authorized and qualified personnel only. Repairs and settings not described in the present manual should not be performed. This manual is prepared by the manufacturer and is an integral part of the machine's delivery. The information contained herein is intended for specialists and is compulsory.

The manual defines the machine's field of application and contains all the information necessary for its proper and safety operation.

The permanent and exact observation of the instructions contained in this manual ensure safety of personnel and machine, profitable work as well as long life of the machine itself.

For better clarity this manual is divided in separate parts in which are contained the more important subjects.

The contents will allow you to find fast the specific subjects.

The important text is printed in bold and is marked by the following symbols:

WARNING

This means that you should proceed very carefully in order to avoid situations that could be dangerous to human life or may cause serious injury to the personnel.

ATTENTION

Provides information about situations that may occur during the life of the product, the system or the equipment and that may cause injury to the personnel, damages on the machine, environmental pollution or financial loss.

CAUTION

Means that you should be more cautious in order to avoid material damage.

INFORMATION

Very important instructions.

Some figures and information in this manual may not coincide with those of the machine purchased by you.

The producer is constantly working on the improvement and renovation of the product and may introduce modifications without prior notification.

At preparation of this manual are considered all the operations belonging to "normal servicing". Repair works and other operations not mentioned in the manual should not be undertaken.

All operations requiring disassembly of machine parts should be carried out by technically qualified personnel.

The instructions of this manual should be observed for correct usage of the machine.

Use only original spares of ZMM "Stomana" JSC.

The manufacturer should not be held responsible for damages caused by the use of spares which are not original.

INFORMATION

The machine can be operated and serviced only by specially trained personnel, well acquainted with this manual.

A.3. CORRESPONDENCE

In case of technical problem please contact the Seller or Service department.

In the correspondence or telephone call with them concerning the purchased machine please supply the following information:

- Machine serial number
- Operating voltage and frequency
- Date of production
- Detailed description of the eventual failure
- Detailed description of the working process
- Total time of operation – working hours;

In case of enquiry concerning the electrical part is necessary to provide the data from the name plate.

A.4. NAME PLATE

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CE

TYPE	XXXXXX	PRODUCTION YEAR	20XX
SERIAL NR.	Xx12345	PHASE NR.	3
SUPPLY VOLTAGE (V)	400	MAX. POWER (kW)	XX,X
FREQUENCY (Hz)	50	WEIGHT (Kg)	XXXX

A.5. FIELD OF APPLICATION

This machine is designed for longitudinal for profiling, prickle cutting, folding, pattern milling (copying) of wood or other materials similar to wood (e.g. wooden-fibre plates, chipboards, plywood, laminated and non-laminated planes etc.)

You may not process on this machine materials, other than those as indicated above, or materials other than wood.

A.6. WORKING CONDITIONS AND REQUIREMENTS

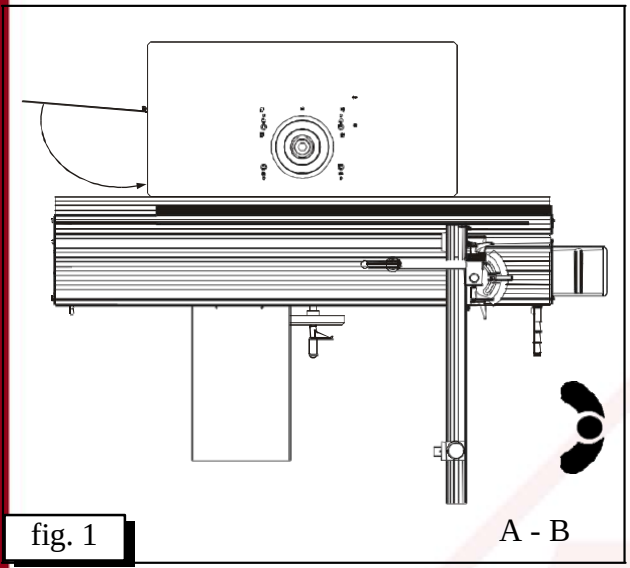


fig. 1 A - B

ATTENTION

The machine is designed for one operator only.

A – place of work during profiling, folding, pattern milling (copying).
B – place of work during work with moving table.

Tools that may be used:

May be installed and used on the machine tools com-

Working environment

The machine is designed for operation under the following environmental conditions:

Humidity	Max 90%
Temperature	Min +1°C Max +40°C
Altitude	Max 1000 м

The machine should not be open-air operated.
The machine should not be operated in environment presenting danger of explosions.

Defense to operate

- The operation of the machine under conditions differing from those above mentioned is prohibited.
- The operation of the machine without the protection devices provided, as well as the removal of any part of those devices, is prohibited.
- Materials differing from those described above may not be processed on the machine.
- Pieces, whose dimensions differ from those described above, may not be processed on the machine.
- Tools that do not comply with pr. EN847-1 and tools, whose dimensions do not comply with the cutting disk shaft diameter may not be used.
- Introduction of modifications in the machine is prohibited.

The sole and exclusive liability in case of injury of personnel and damages of the machine as a result of processing of unspecified materials shall be borne by the machine operator.

A.7. TECHNICAL CHARACTERISTICS

		T1002L	T1002S
Dimensions of the working board	mm.	1000x650	1000x650
Dimensions of the mobile board	mm.	1600x350	1150x350
Mobile board run - to the left - to the right	 mm mm	 1115 1115	 730 730
Working table's elevation above the floor	mm	850	850
Exchangeable cutter arbour (Morse taper)		MK4	MK4
Diameter of the cutter arbour	mm	ø30	ø30
Working length of the cutter arbour	mm	125	125

Vertical run of the spindle	mm	180	180
Spindle tilting (backwards)	(°)	0°-45°	0°-45°
Aperture diameter of the working board	mm	ø260	ø260
Maximal diameter of the tools:			
- during profile milling	mm	ø250	ø250
- during tongue milling	mm	ø300	ø300
Max. depth of tool run ø 250 bellow the table surface	mm	60	60
Turning frequency of the spindle (with a 3-phase motor)	min^{-1}	3000/4000/5000/ 6000/8000/10000	3000/4000/5000/ 6000/8000/10000
Two-speed motor, 3-phase, 400V, 50 Hz	kW (HP)	3.2/4.0 (4.3/5.5)	3.2/4.0 (4.3/5.5)
Diameter of the rings, covering the aperture of the working board	mm	ø206, ø156, ø110, ø70	ø206, ø156, ø110, ø70
Diameter of the aspiration hose -above the working board - under the working board	 mm mm	 ø120 ø120	 ø120 ø120
Tool protector for ø250mm with integral rulers	mm	2 x350	2 x350
Machine dimensions	mm	1350 x 1000 x 850	1800 x 1000 x 850
Machine weight, approximately	kg	446	430
Dimensions of the packing	mm	1750 x 1300 x 1100	1750 x 1300 x 1100

OPTIONS

Rotating ruler for milling without extension	mm	900	900
Rotating ruler for milling with extension	mm	900	900
Extension for the working board to the left, right	mm	500x320	500x320
Extension for the working board to the	mm	500x320	500x320
Console table	mm	500x320	500x320
Tool protector for ø250mm with integral rulers	mm	2 x500	2 x500
Changeable cutter arbours MK4	mm	ø1 ¼", ø32, ø40, ø50	ø1 ¼", ø32, ø40, ø50
Left / right spindle rotation			
Tenoning table and tenoning hood ø 320 mm			
Horizontal and vertical pressing device "MORI"			
Detachable control board			
Feeding mechanism MX38, MX48			
Two-speed motor, 3-phases	kW (HP)	4.5/5.5 (6.1/7.4)	4.5/5.5 (6.1/7.4)
One-speed motor	kW (HP)	5.5 (7.4)	5.5 (7.4)
One-speed motor	kW (HP)	7.5 (10.1)	7.5 (10.1)
Spindle rotation for the one-speed motor	min^{-1}	4000//6000/8000	4000//6000/8000

A.8. NOISE CHARACTERISTICS

ATTENTION

A continuous noise exposure over above 85 dB (A) may result in health injury. That is why we recommend to use in such cases noise protection devices like ear-plugs, earphones, etc.

Statement on the emitted noise:

1. /A/ weighed level of noise pressure at idle

L_{pfA} = 74 dB

Indefiniteness K = 2 dB

2. /A/ weighed level of noise power at material processing

- L_{wA} = 103 dB

Indefiniteness - K = 2 dB

At 95% probability

SECTION B: SAFETY OF WORK

B.1. SAFETY INSTRUCTIONS

Before commissioning, use, servicing, repair, cleaning or any other operations on the machine read very carefully this manual.

The manufacturer shall not be liable for any damages on the machine or any injury of personnel occurred as a result of failure to observe the operation, maintenance and safety instructions.

- Only persons who have normal brains, are well grounded in exploitation of machine and dangers can work on it.
- Observe operation manual.
- During activities for supporting preparation for work disconnect power cord from mains.
- Before putting into operation always check safety devices.
- Operating with gloves is forbidden.
- After closing work clean machine from dust and chips.
- Keep working space of the machine always clean.
- Never clean machine with water neither when on nor when off.
- Before starting operation remove from machine and working space all adjustment tools.
- Always observe that machine is switched off when any electrical connection is due.
- Use machine and tools for the correct application only.
- Do not operate machine in humid spaces or leave machine exposed to rain or low temperatures.
- Never leave machine operating without supervision when you are away.
- Do not operate with widely clothing, free hair and long shawls.
- Bracelets, watches, chains, etc. to be removed.
- Operate machine with headphones to avoid noise.
- Always use protective glasses, mask against dust or use other prescribed safety devices.
- Keep children away from machine and take that children have no access to it.
- Teenagers under 16 years may operate the machine under the supervision of experienced workers.
- When machine is operated for longer periods a connection to aspirators for dust and chips removal is recommended.
- Before starting work check up details for defects like knots, nails and other foreign ingredients.
- Use only perfectly sharpened tools.
- Do not use cracked, damaged and irregular sharpened tools.
- Observe always rotation of cutting tools used not to exceed maximum rotations prescribed by the respective tool manufacturer.
- Clean joinable surface of tool carefully and check up for swellings and injured places on them.
- Never clean tools with wire brush and water.
- With tools use protective gloves.
- Never open protective covers and doors when machine is operating.
- Never hand or other parts of your body to moving parts or materials.
- Operate only materials for which machine are intended.
- When installing machine observe oncoming light (500 Lx) not to blind operator and avoid stroboscope effects.
- Transporting, installing and assembly of machine must be done only by skilled staff.
- Only skilled staff can do all interventions in electrical equipment.
- Never change electrical equipment.
- Device for sucking out dust and chips must secure output least 1800 m^3/h at speed 25-30 m/s.
- Do not switch on machine at open covers of electrical equipment (electrical cupboard, desks, engines).
- Around machine must have enough place to be sure worker wile be always out of dangerous places.
- Regularly clean the table and the floor of dust and chips.

- When stopping machine to adjustment, repair, supporting, cleaning etc. put the main switch in position "zero", warn workers with plate and lock the main switch with padlock.
- The key from the padlock must be in you self.

Training of servicing staff

All persons servicing machine must be trained for using and adjustment it.
The training must consist in:
- basic principles for moving of machine rules for using, adjustment of fulcrum ruler etc..
- correct operating with details during the work.
- position of hands toward tool during the work and after working.

Servicing staff must be inform about dangers during curing using the machine and about safety work.
Servicing staff must be trained for doing periodic checking of safety equipment.
Servicing staff must be informed about safety equipment.

Additional dangers

Despite all operation and safety rules contained in this Operation and service manual, the following additional dangers may occur:
- Contact with the tool;
- contact with the rotating parts of the driving (pulleys, belts etc.)
- Back hit of the piece or parts thereof;
- Possible danger of dust when operating without aspiration device.

However, the safety depends mainly on yourself.
Bear in mind that you always undertake some risk when operating the machine.

B.2. DESIGN MEASURES FOR ENSURING SAFETY FOR WORK

The machine includes the following safety equipment and measures:
- Milling support with fulcrum rulers and protective box.
  Serve:
  1. As support for precisely leading of the detail.
  2. As protective box (safety lock) against touching unused during the work part of tool.
  3. As collector of chips with tip for inclusion toward equipment for sucking out dust and chips from working surface of the table.

  Cover of the protective box can open upward and gives possibility for change of the tool without dismanting of the box.
  The equipment for vertical and horizontal pressing of details toward the table can be assembled on the protective box.
- Set of hoops on the milling mandrel cover the whole height.
- Insurance hoop on the milling mandrel prevents allocation of the tool during the stopping of turning.
- Bolt for make fast the tool on milling mandrel.
- Hoops cover the outlet in working table.
  Give possibility for optimum covering of the outlet in the table.
- Adjusting milling mandrel along height and slope from 90 to 45 with possibility of fixing in adjusted position by blockade rods.
- Blockading of milling mandrel against turning.
  It secures immobility of mandrel at allocation and making fast of the bolt during the changing of tool.
- Moving table with telescopic fulcrum ruler which can turn in borderlines -45 to +45 and device for making fast the detail on the moving table.
  Moving table secures safety work of details with big sizes.
- Bracket table.
- Irreproachably tools.

Blunted and damaged tools create danger from opposite hit, overload the machine and create vibrations and bad surface of detail.

- Helping equipment.

We recommend using helping equipment during the special operating:

1. Wood piece for pushing the detail at the end of operation.
2. Protective box for covering the tool during the prickle cutting.
3. Additional table with protective shields for prickle cutting, assembled on the moving table (carriage).
4. Cross supports for notch cutting.
5. Prolongations of the table for operating of long details.
6. Device for arched milling.
7. Feed gear etc..

Helping equipment must be always in good working order near the machine.

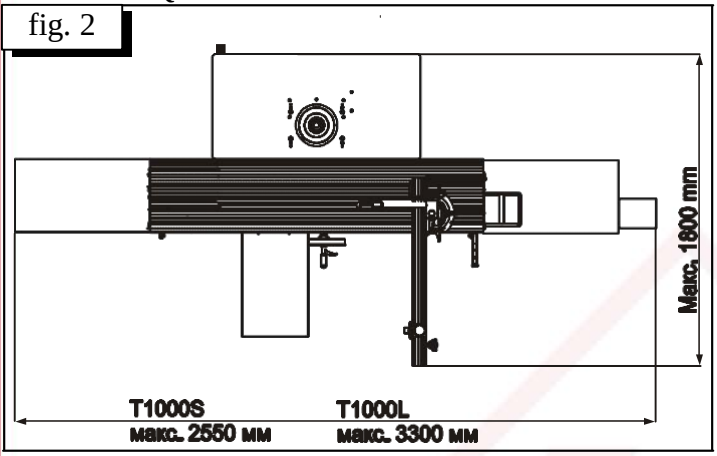
ELECTROEQUIPMENT

- Electronic brake for electrodynamics stopping of engine.
  It secures stopping of turning of mandrel for time less that 10 seconds after turning off the engine.
- Minimum voltage protection.
  After stopping of voltage the machine stops working, but at restoration of voltage it stays at rest.
- Breakdown stop on main desk.
  Turn off switch for control and interlock of milling mandrel during changing of tool. It prevents starting of machine during the changing of tool.
- Circuit breaker for choosing speed of rotation of mandrel.
- Protective earthling.
- Protection of engine against overloading (by built in thermocontacts).
- Stage of protection of electrical apparatuses IP 54.
- Turn off switch of back door.
  It prevents starting of the machine at open door.
- Light indication for shat revolution.

SECTION C: ASSEMBLY OF MACHINE

C.1. REQUIREMENTS TO THE WORKING AREA

fig. 2



- Choose suitable place for machine accordingly moving of movable table.
- Observe described in section 3 prescriptions.
- Chosen in advance place for fixing the machine must secure convenient joining toward electrical mains and device for sucking out dust and chips.
- Secure suitable lighting (500 Lx), which does not blind eyes and avoids stroboscope effects.
- Check up bearing ability of floor. Machine must be leveled on four points of rest simultaneously.
- Besides it is necessary to secure distance least of 0.8 m / 31 ½ in. around the machine.

At input and output of the machine must be secured necessary space for handing and taking down of long details.

C.2. UNLOADING OF MACHINE

The hoisting and shifting of the machine must be carried out by suitable personnel especially trained for that kind of work and disposing of the required equipment.

WARNING

During loading and unloading operations the machine must be handled with extreme precaution and hits and pushes must be avoided in order to prevent injury of personnel and damage of the goods.

During hoisting and shifting there must be not people near to the load hung or within the operation scope of the crane

The shifting of the machine and its parts must be carried out only by transportation means that correspond to the weight of the machine, e.g.

- fork-lift truck;
- wheelbarrow;
- crane;

ATTENTION

For hoisting of the machine you will need a fork-lift truck with fork long at least 1200 mm.
- Ensure a fork-lift truck A with the required loading capacity corresponding to machine's weight.
- The fork B should be brought under the machine in a way as presented in fig. 3.

In case you dispose of crane or other similar means, act as follows:
- prepare 2 ropes or belts C with the required loading capacity and length.

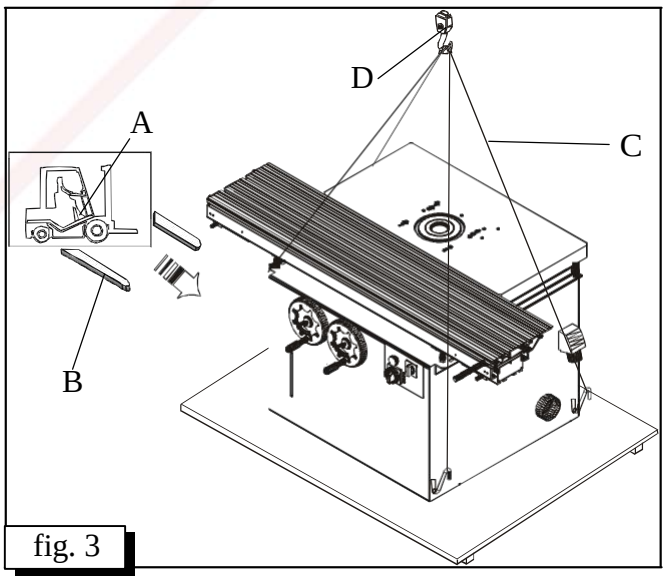


fig. 3

- The ropes should be hung on the hook of crane D with loading capacity corresponding to that of machine's weight.
- The ropes are hoisted by the crane and are hung on the four hooks provided for the hoisting of the machine.

WARNING

Check the secure fixing of the hoisting hooks to machine's body.

- Adjust the ropes well and, if required, the crane should move slightly apart in order to ensure the stable vertical hoisting without inclination of the machine.
- The machine must be hoisted slowly and with extreme precaution in order to avoid pushes and swinging of the load.
- After the machine is hoisted at 1 m height, stop the hoisting and mount the four leveling supports to machine's body.
- Place the machine on the chosen location by means of the crane.
- Level the machine by means of the four leveling supports in order to effect a stable state.

C.3. DESLUSHING OF MACHINE

Remove the anti-corrosion grease from all unpainted machine parts using kerosene, turpentine or ordinary cleaning products commercially available.

Do not use nitro- thinners or similar diluents and by no means use water.

C.4. FOUNDATIONS LAYOUT

The stable construction of the machine, ensuring precise leveling and vibration-free operation does not require any foundations.

C.5. ASSEMBLY OF THE DISASSEMBLED UNITS

With view to the transportation and packaging, some parts of the machine are delivered in unassembled condition

You will find hereafter instructions concerning the assembly of those parts.

C.5.1. Assembly of bracket table for support of details

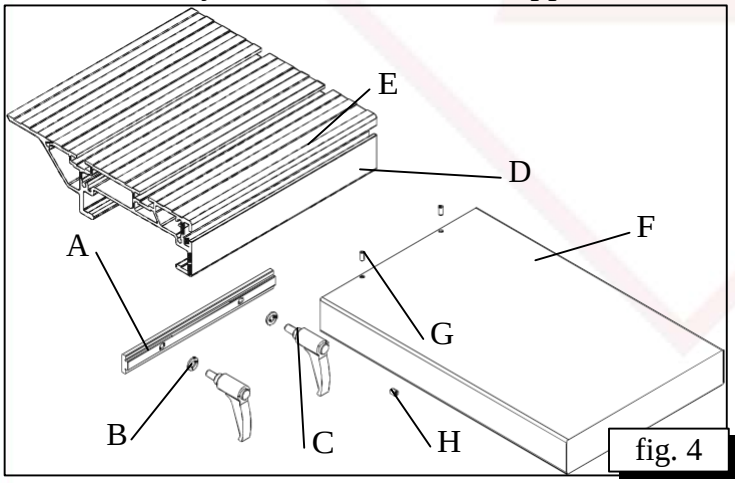


fig. 4

Assembly guiding wedge A (fig. 4) (together with washers B and handles C) in "T- channel" D on the moving table E.

Widen bind fast handles C so that to hand up bracket table F on the pins with thread of the handles C.

After that bind fast handles C so that level the bracket table with moving table by tuning screw G.

Bind fast handles C finally to fix bracket table F.

C.5.2. Assembly of the handle for moving of the mould table its cover, support of details

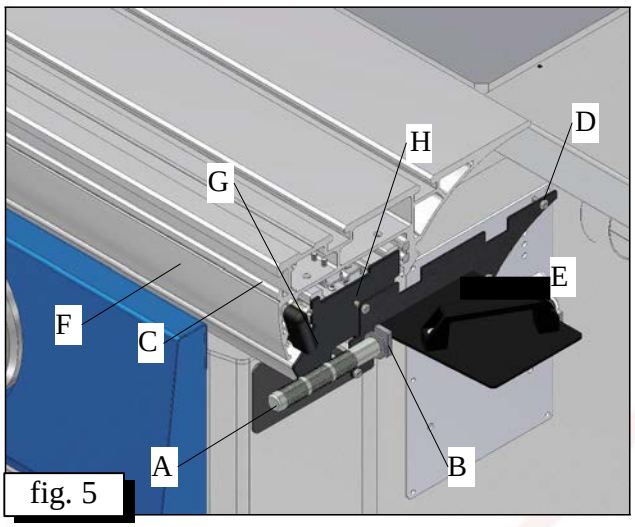


fig. 5

Assembly of the handle for the moving of the movable table

- Remove the packing tape from lever N and screw O.
- Dismantle the transport screw and nut O
- Unscrew handle A (fig. 5) from feather B so it is necessary to enter feather B in "T- channel" C.
- After tuning in definite position in channel C bind fast handle A again.

Assembly of cover with the handle

- Unscrew 4 number screw D /fig. 5/;
- Assemble cover with handle E toward mould table F.
- Screw and bind fast screws D again.

Assembly the support for circumcision

- Widen handle G /fig. 5/;
- Assemble feather H in one of channels J or I on the mould table F.
- After tuning of the support in definite position on the table, bind fast the handle G again.

C.5.3. Assembly of the fulcrum ruler with bind fast mechanism

- Fix feather A (fig.6) toward pad C centering along spring pins;
- Screw column D and handle C in feather A;
- Put assembled ruler on the mould table E so that feather A to move in one of the two channels B;
- After defining position of ruler toward mould table E bind fast column D with help of bracket F.

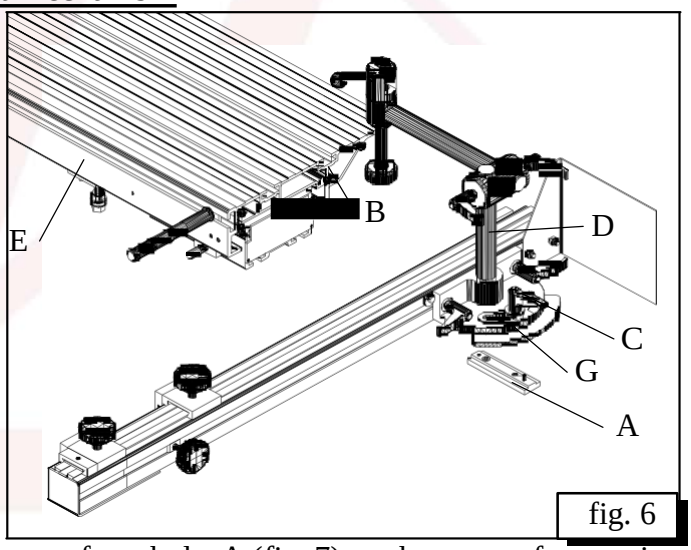


fig. 6

C.5.4. Assembly of the horizontal and vertical pressing mechanism on the protective box (option)

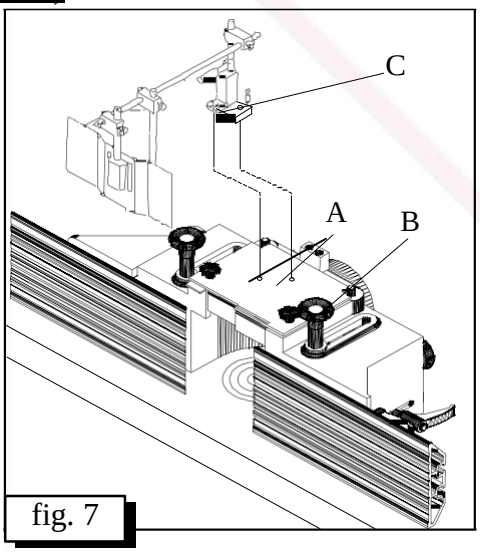


fig. 7

- Unscrew fully nuts from bolts A (fig. 7) on the cover of protective box B.
- Assemble pressing mechanism C on the cover of protective box B and bind fast well by bolts A and nuts .

C.5.5. Assembly of the protective box with pressing mechanism on the work table

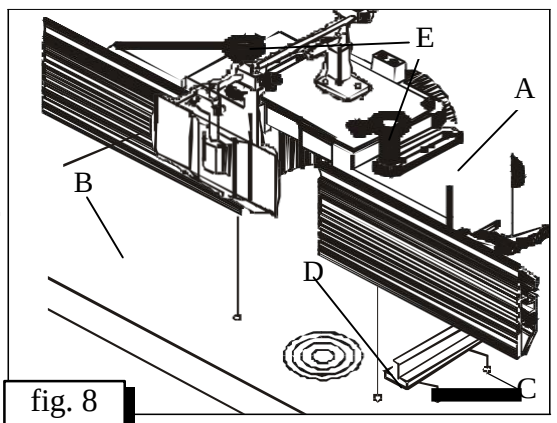


fig. 8

- Put centering plank D (fig. 8) so that pins enter in outlets C on working table B.
- Put the protective box A on the working table B so that its channel to enter in centering plank D.
- bind fast protective box A toward working table B by handles E.

C.5.6. Assembly of the protective box during the cutting of prickle (option)

During cutting of prickles it is necessary to use special protective box.

- Dismantle the protective box for work with fulcrum rulers from the table.
- Put protective box A (fig.9) for work cutting of prickle on the working table B and center it toward thread outlets C.
- Bind fast protective box A toward working table B by handles D.

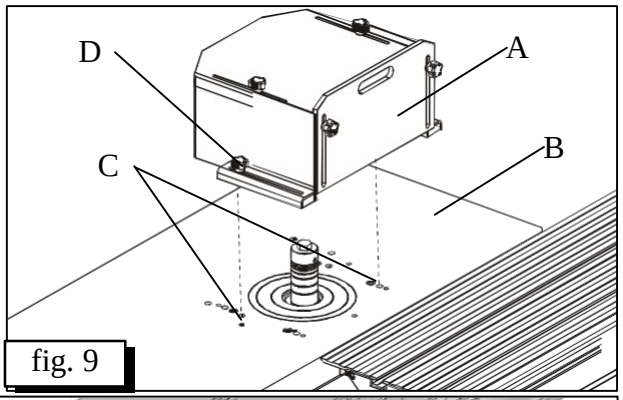


fig. 9

C.5.7. Assembly of the cutting board on the format board (option)

- insert nut A in the lateral T-shaped groove B of the format board C (fig. 10).
- Install the guide D to the format board C by means of the tightening lever E and nut A.
- insert key F along with the screw G inside the groove H of the format board C.
- install the cutting board I on the format board C in a way to make the groove J coincide with the threaded aperture K of the key F, and the guide D to enter in the groove L of board I.
- screw up the axle-guide M in the threaded aperture K of the key F without completely fastening it.

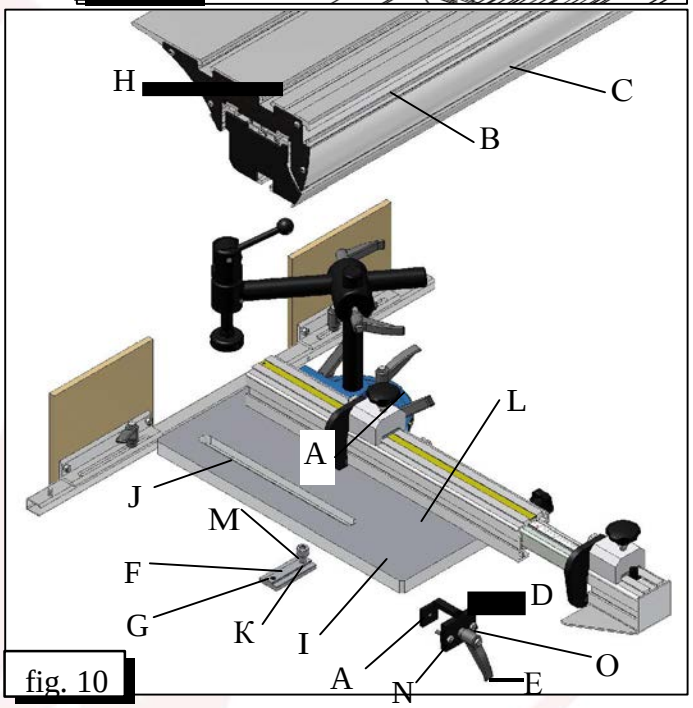


fig. 10

- now you can move the cutting board along the length of the format board in the required location.
- by means of screw G fix the key F in the groove H.
- check the motion of the cutting board in transversal direction compared to the format board. Provided the motion is not perpendicular to the format board length
- release counter-nuts N.

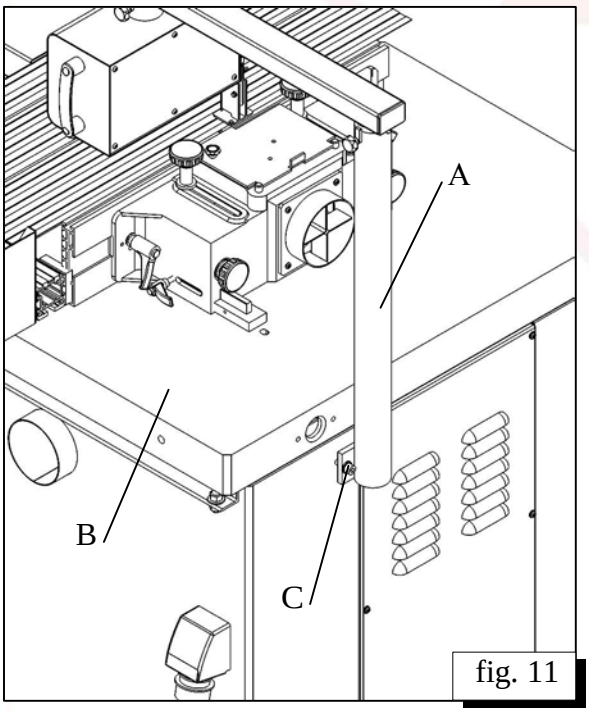


fig. 11

- you can adjust, by means of screws O, the cutting board I towards the format board C or towards the parallel rulers of the milling cutter's rest.
- Tighten again the counter-nuts N.

C.5.8. Mounting of the detachable control board (option)

Fix the carrying pipe A (fig. 11) to the machine's board B through the screws and the washers C.

C.5.9. Mounting of the extension table (option)

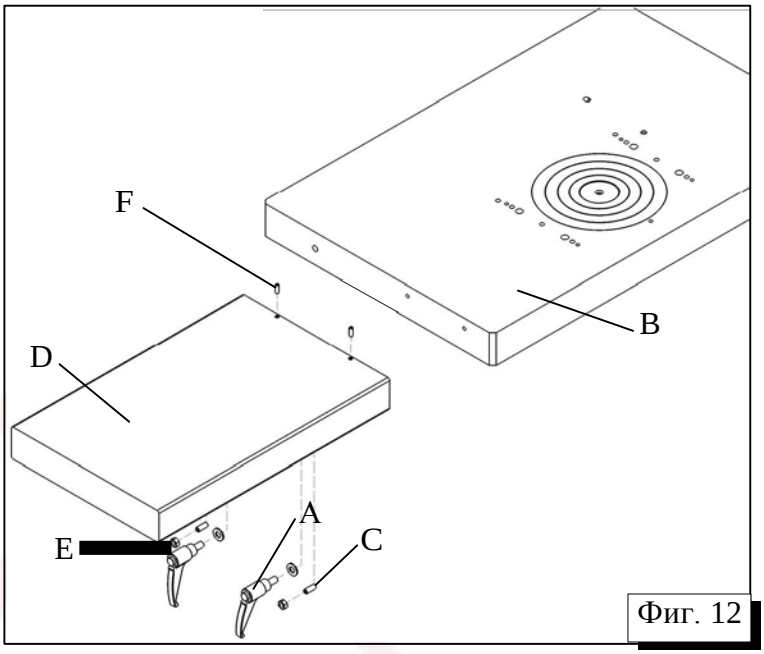
Two persons are required for this operation.

Mount the extension table D to the fixed table B through the levers A and the washers.

Tighten slightly the levers A.

You can level, if necessary, the front rim of the extension table to the fixed table through the screws F and C ; fix it in this position with the nuts E.

Tighten finally through the levers A.



Фиг. 12

C.6. CONNECTION TO THE MAINS

ATTENTION

The connection of the machine to the electric mains, as well as all subsequent checks, must be carried out by electrical technician only.

- Check by suitable apparatus the good condition of the nullifying and earthing device.
- Check whether the supply voltage and frequency of the current correspond to the data stated on machine's plate.

The deviation of the supply voltage must not exceed ± 5 %. (for instance: a machine operating under supply voltage of 400V can work within 370 to 420 V).

- In order to define the required section of the supply cable, refer to the data of the amperage, stated on machine's plate, as well as to the table below:

Electric current (A)	*Section of the cable*	*Fuse*
Up to 10	2.5 mm^2	12A AM
from 10 to 14	4.0 mm^2	16A AM
from 14 to 18	6.0 mm^2	20A AM
from 18 to 22	6.0 mm^2	25A AM
from 22 to 28	10.0 mm^2	32A AM
from 28 to 36	10.0 mm^2	40A AM
From 36 to 46	16.0 mm^2	50A AM

- We do recommend to use a rubber insulated supply cable type H07RN (WDE0282) and to take the necessary measures for its protection from mechanical damages.
- Connect the supply cable to the respective terminals in the incoming electric board (L1,L2,L3,N,PE) (fig. 13).
- Provided there is CEE socket available (380V, 16A), the connection to the mains is carried out by means of respective CEE plug (L1,L2,L3,N,PE).

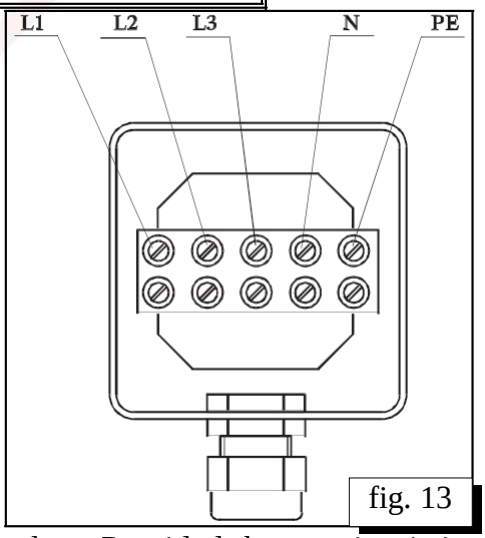


fig. 13

ATTENTION

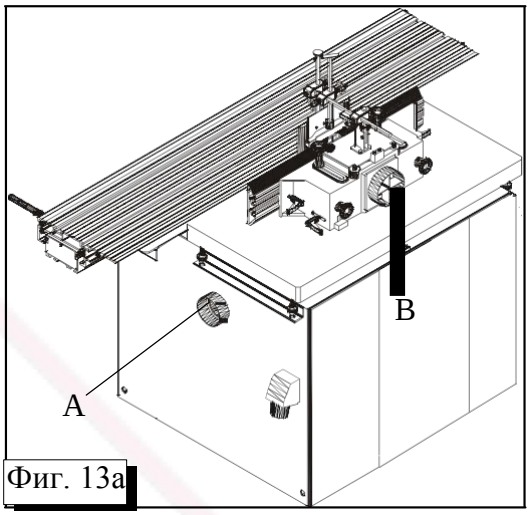
During initial commissioning and after each modification of the connection to the three-phase mains, check whether the direction of rotation of the shaft corresponds to that indicated on the plate. Provided the rotation is in the opposite direction, change the connection points of the three-phase cables L1 and L2.

C.7. CONNECTION TO THE ASPIRATION DEVICE

The chip and dust aspiration device must ensure a minimal rate of air delivery of 1800 m^3/h at a speed of 25-30 m/sec.

ATTENTION

The dust and chips aspiration device must be switched on simultaneously with the motor of the machine.



Фиг. 13a

The machine is supplied with two tips for sucking out dust and chips. The first tip A, with diameter ø100 mm, is sucking out dust and chips under working surface of the machine table /fig.12/.

The other tip B, with diameter ø120 mm, is sucking out dust and chips from protective box over the working surface of the machine table /fig.13a/.

Connect rubber materials toward tips A and B and bind fast them with clamps.

The device for sucking out dust and chips must have two tips or to use special fork-joint.

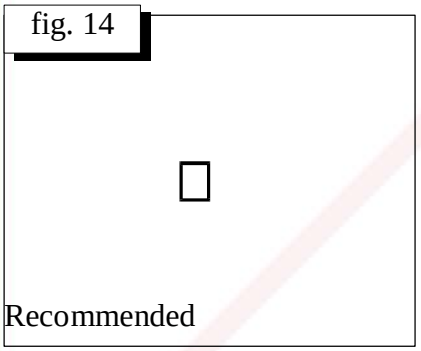
SECTION D: FITTING AND OPERATING OF MACHINE

D.1. OPERATING OF MACHINE

D.1.1.General instructions during the milling operation

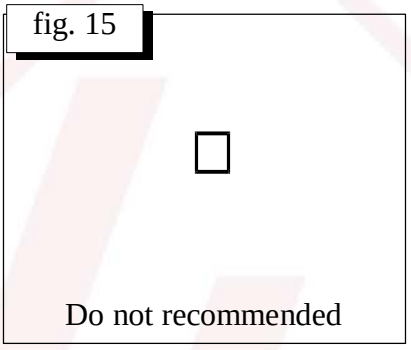
- Before starting the work with the milling mandrel be sure that the tool is assembled correctly toward to turning direction and it is binded fast hardly.
- Be sure that milling mandrel is turning freely by hand.
- Putting at the position of the mandrel at height must be done always from down to up to avoid the influence of eventual windages.
- Milling must always starts and finishes along the wood fiber direction.
- The feed of detail must do uniformly without pushing's.
- Tool must be covered as it is possible /by hoops in the machine table and by safety equipment/.

fig. 14



Recommended

fig. 15



Do not recommended

- Tool must be binded fast lower on the mandrel to avoid vibrations /fig. 14 and fig. 15/.

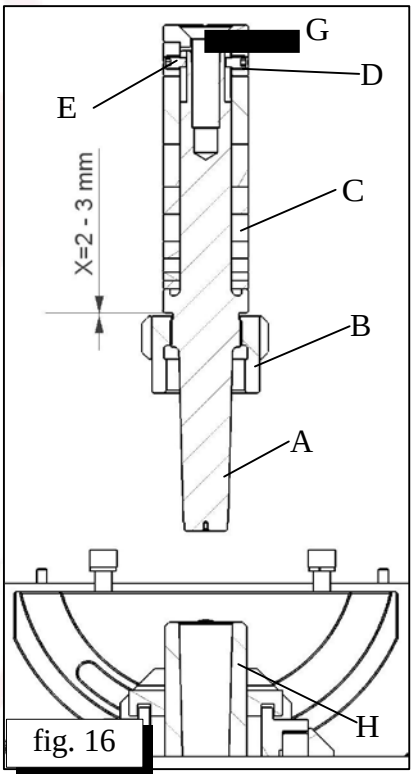


fig. 16

ATTENTION

- Use only suitable for the machine tools. Observe data of the producer (diameter – revolutions).
- Observe correct fixing of the tool accordingly the turning direction of the mandrel.
- Use only well – sharpened tools. Blunted tools increase the danger from opposite hit.
- If there is vibration check up the balance of the tool.

- Use alwaysy intended safety equipment and support them in good working order. Observe operating manual..

D.1.2. Fixation and adjustment of the tools

Before proceeding to fixation and adjustment operation disconnect the machine from the power supply.

The machine has an exchangeable cutter arbour A, which is to be fixed to the spindle H through the Morse taper and a differential nut B. (fig. 16)

On the cutter arbour there is a set of distance rings C, which cover the whole operation length of the cutter arbour. Above the set of rings there is a pressing ring D with two spring pin E. The ring D prevents self-loosening of the tool during rotation start and stop.

The tightening of the tool is done by means of the ring D and the screw G.

Mounting and exchange of the tools can be done in the following way.

D.1.2.1. Assembly and adjustment of the tool

Before starting any assembly and adjusting of the tool make sure that the machine is switched off the electric mains.

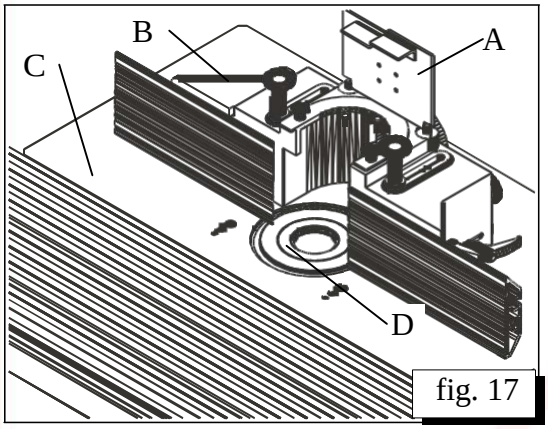


fig. 17

- Lift the cover A of the protection box B (fig. 17).
- If necessary, shift the protection box B backward or completely remove it in order to work more conveniently
- Remove from the board C the rings D that cover the hole.
- Release the fixing lever E (fig. 18) and position, by means of hand wheel F, the cutting spindle G in 90° towards the operation board.

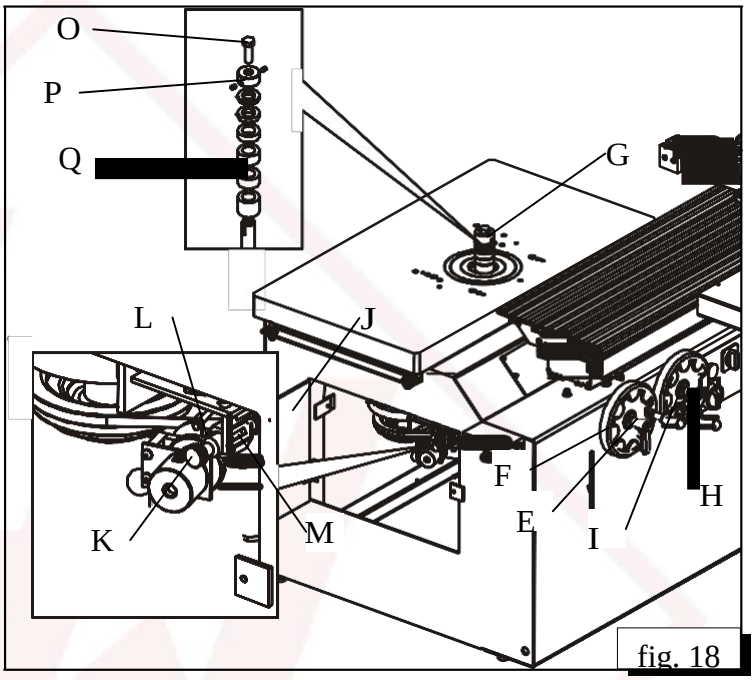


fig. 18

- Release the fixing handle H and position, by means of hand wheel I, the cutting spindle G in the upper position.
- Open door J in order to provide for access to handle K, blocking the cutting spindle against rotation.
- Pull handle K and rotate it until the pin L enters in the deeper groove M.
- Turn the spindle G by hand until the handle K blocks its rotation.
- Unscrew the screw O and remove the securing ring P and the spacer rings Q.
- Clean thoroughly the connection surfaces of all aforesaid parts of the machine and the cutting spindle.
- Choose the suitable tool, clean it thoroughly and make sure that the surface is clean of dints, fissures, cracks and other defects.
- Chose the most suitable spacer rings and install the needed tool on the spindle, observing the direction of rotation as indicated on machine plate.

D.1.2.2. By dismounting of the exchangeable cutter arbour

Move the milling spindle (fig. 19) as described above in section D.1.2.1. For better access you can tilt the spindle to 20º - 30º.

Clean thoroughly the cone surface of the milling spindle and the surface of the changeable cutter arbour; check for dents, swellings, cracks or other defects. Clean the threads of the spindle and the cutter arbour by means of a soft brush.

Mount carefully the exchangeable cutter arbour with the attached tool to the milling spindle; tighten the differential nut by means of a suitable hook spanner.

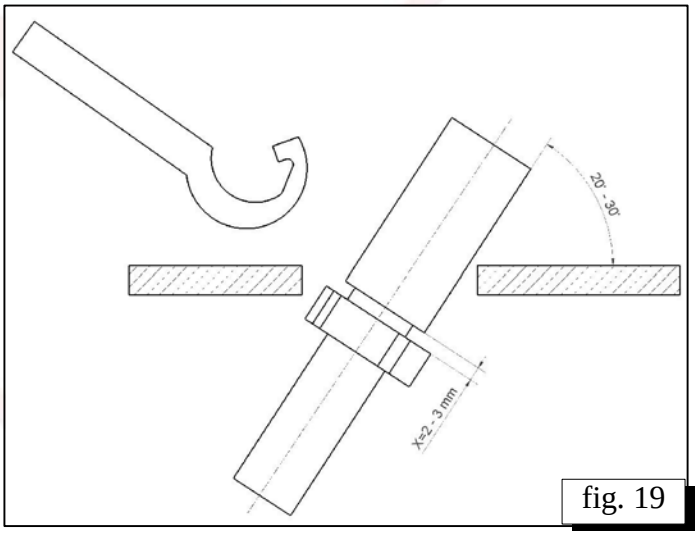


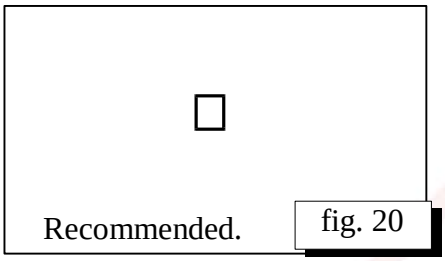
fig. 19

INFORMATION

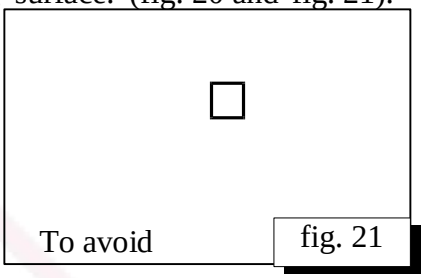
Follow the rule that between the exchangeable cutter arbour and the differential nut there should be a distance of X= 2 - 3 mm.

WARNING

For correct use of the machine the tool must be installed as lower as possible on the spindle in order to reduce vibrations and get better processing surface. (fig. 20 and fig. 21).



Recommended. fig. 20



To avoid fig. 21

- Never forget to install the securing ring P, which prevents the self-release during the stop.
- Tighten again screw O.
- Pull again the handle K and turn it again at 90° until the pin L enters the more shallow groove for un-blocking of spindle rotation.
- Actuate the spindle by hand to make sure that it turns freely and that the tool does not touch any part of the protection box or the machine.
- Place in board's hole rings with most suitable inner diameter so that the distance between the tool and the ring is as short as possible.
- By means of hand wheels F and I position the spindle to the desired inclination and height and block it in this position through handles E and H.

INFORMATION

In order to avoid eventual clearance the adjustment of the spindle in height should always be carried out down up.

- Assemble or adjust again the protection box with the support rules towards the tool;
- Actuate again the spindle by hand to make sure that it turns freely and that the tool does not touch any part of the protection box and the support rulers or the machine.

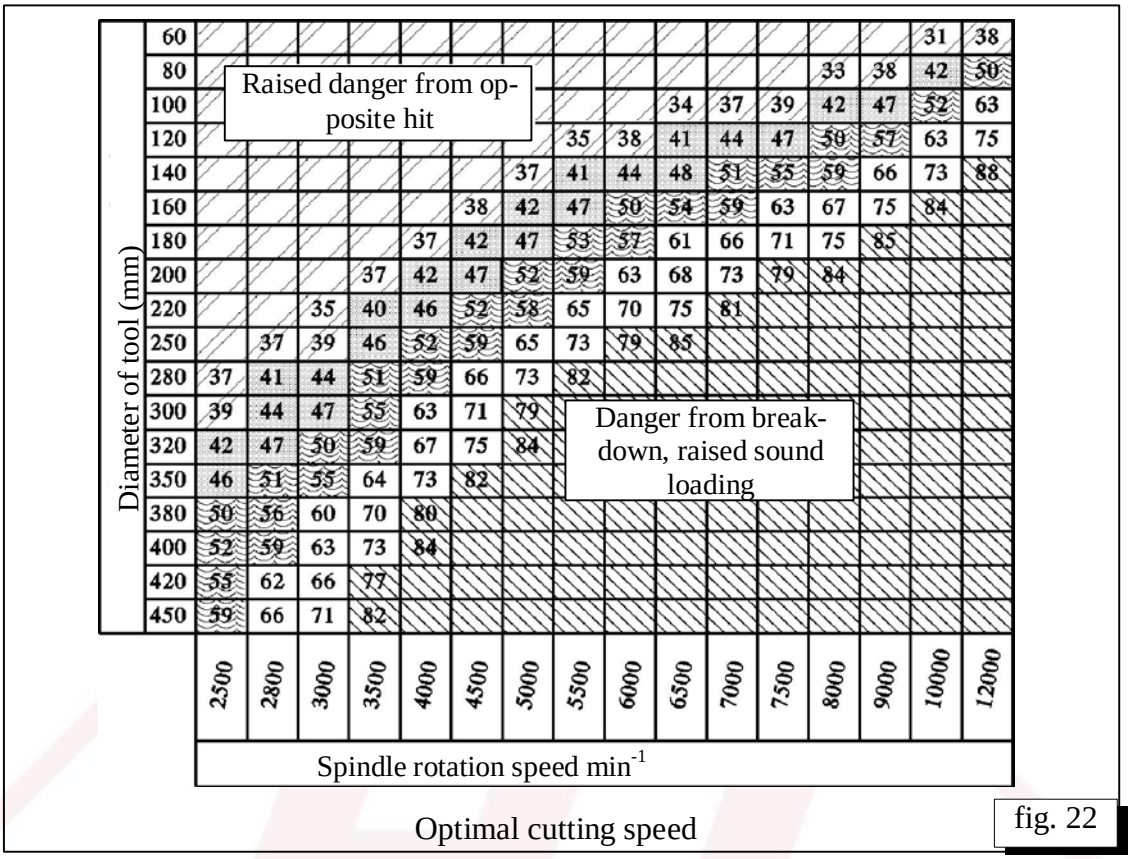
D.1.3. Choice of rotations of the spindle

- The speed of rotation of the spindle depends on the tool, the type of the wood and the processing.
- The lower recommended speed is 40 m/sec, and the highest is 70 m/sec.

In the table below you will find approximate values of the cutting speed according to the kind of the material processed and the material of the tool

Material of tool / Processed material	HSS m/s	HM m/s
Soft wood	50 to 80	60 to 80
Hard wood	40 to 60	50 to 80
Pressed plates		60 to 80
Fibre plates		35 to 50

Fig. 22 shows the dependence between the speed of cutting, the diameter of the tool and the rotation of the spindle.



Diameter of tool (mm)	2500	2800	3000	3500	4000	4500	5000	5500	6000	6500	7000	7500	8000	9000	10000	12000
60															31	38
80													33	38	42	50
100										34	37	39	42	47	52	63
120							35	38	41	44	47	50	57	63	75	
140							37	41	44	48	51	55	59	66	73	88
160						38	42	47	50	54	59	63	67	75	84	
180					37	42	47	53	57	61	66	71	75	85		
200				37	42	47	52	59	63	68	73	79	84			
220			35	40	46	52	58	65	70	75	81					
250		37	39	46	52	59	65	73	79	85						
280	37	41	44	51	59	66	73	82								
300	39	44	47	55	63	71	79									
320	42	47	50	59	67	75	84									
350	46	51	55	64	73	82										
380	50	56	60	70	80											
400	52	59	63	73	84											
420	55	62	66	77												
450	59	66	71	82												

Optimal cutting speed

fig. 22

- hard material tool, cutting speed 60-70 m/s
- monolithic tool of steel and chromium allow, cutting speed 50-60 m/s
- tool with mechanical fixing of the knives made out of steel, cutting speed 40-50 m/s

ß The maximum permissible number of rotations of the spindle depends on (fig. 23)

- diameter of the spindle d_1;
- the maximum used length of the spindle l_1;
- cutting width b;
- diameter of the circle of cutting of the instrument d_2;

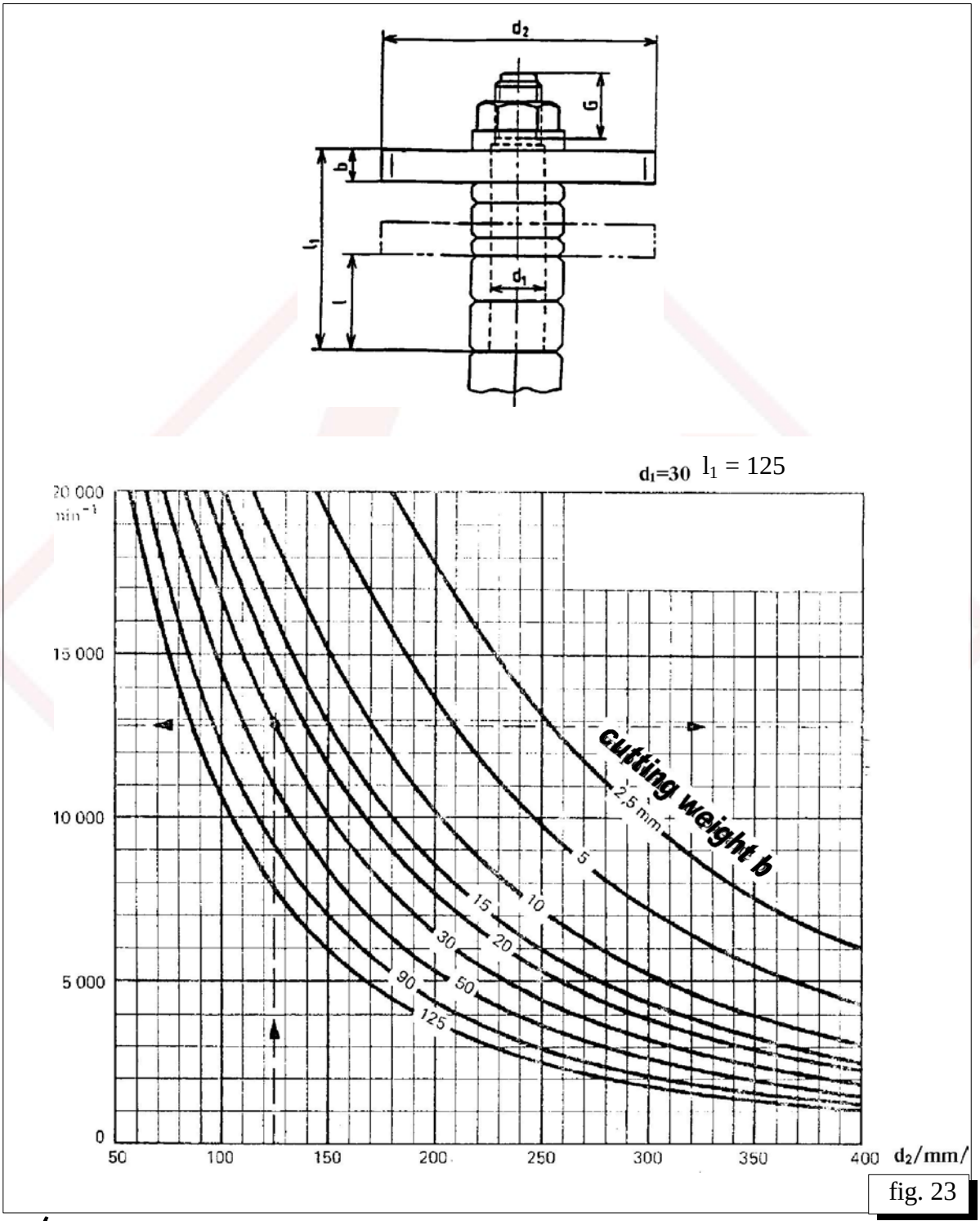


fig. 23

ATTENTION

The operating rotations of the spindle must not exceed the maximum permissible ones as recommended be the producer.

In order to adjust the required rotations you have to make the following:

ATTENTION

Disconnect the machine from the electric mains (pull out the plug), turn the switch in position "0" and lock it.

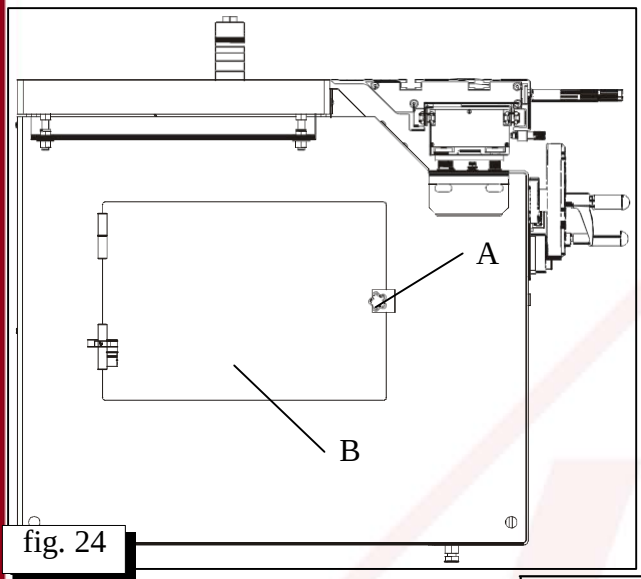


fig. 24

- Release handle A and open door B in order to provide for convenient access to the rotations adjustment device of the spindle (fig. 24)
- Move the spindle in the upper position towards the operation board.
- Release handle C (fig. 25) in order to loose the belt D. Move the belt on the pulleys as per the instructions on the information plate E for the rotations of the spindle, situated at the internal side of the door.
- position the handle F so that to correspond to the number of rotations chosen.

ßDraw the belt and tighten the motor by means of handle C.

ßActuate the pulleys by hand to make sure that the belt does not enter into contact with the handle F.

ßClose the door B and screw again handle A.

ßConnect the machine to the electric mains.

ßTurn the main switch in position "1" (ON).

ßCheck, through the light indication on the el. Board whether you have adjusted the rotations of the spindle in the proper way.

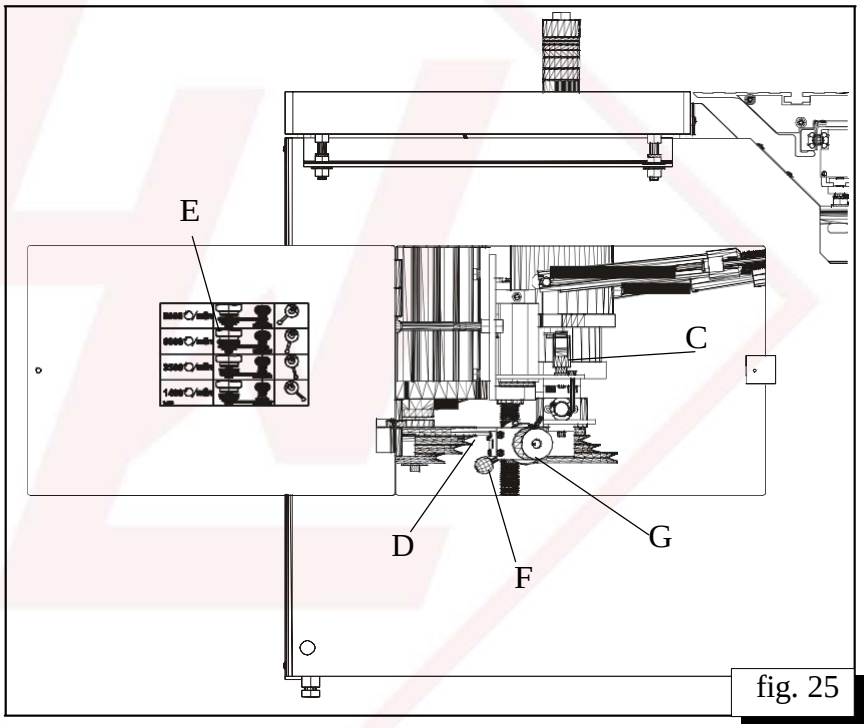


fig. 25

D.1.4. Adjustment of the protection box and support rulers

In order to enable you to adjust the protection box and supporting rulers A and B (fig. 26), you must:

ß Release the handles C and D.

ß Adjust roughly by hand the box in the desired position and screw again the handle D. The fine adjustment is made by turning of handle E and afterwards by tightening of handles C.

ß Release the fixing levers F and adjust the rulers A and B according to the diameter of the tool. The distance between both rulers should be as short as possible.

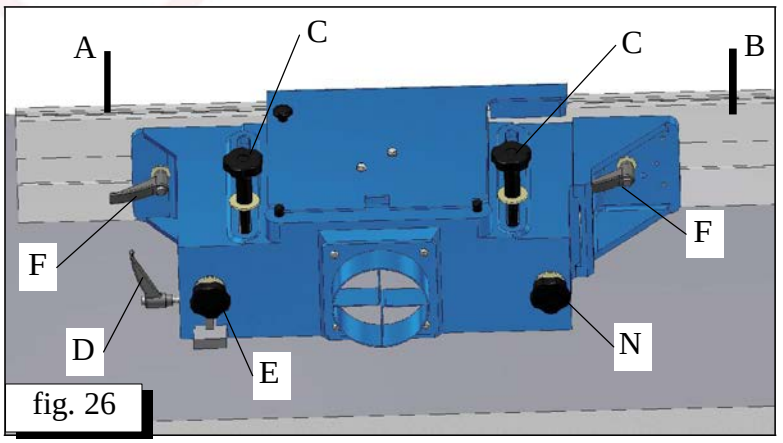


fig. 26

ß Tighten again the levers F.
ß You can adjust the ruler B towards the tool and the ruler A by means of the handle N.

CAUTION

Both rulers should be adjusted in a way to guarantee the secure support of the piece at the inlet and outlet section of the machine.

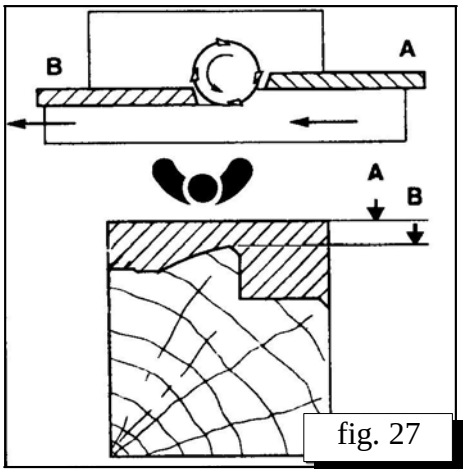


fig. 27

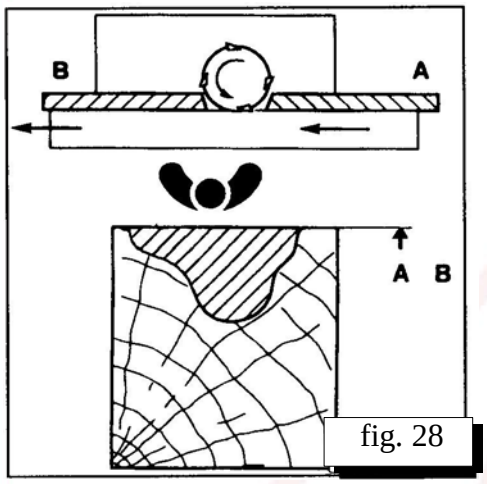


fig. 28

For profiling of the whole length of the piece the ruler B should be adjusted leveled to the tool (fig. 27).

If the profiling is not done along the whole length of the piece, both supporting rulers will level. (fig. 28)

D.1.5. Adjustment of the ruler

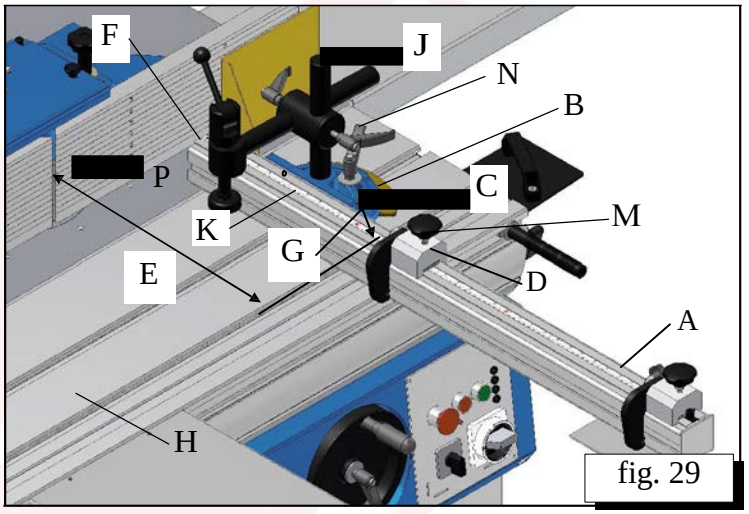


fig. 29

It is possible during the assembly or during the work to unscrew handle C /fig. 29/ and this to change the position of ruler A toward base B. You must tune the ruler in following way:
- Assemble the ruler so that by turning around column J does not touch the ruler of safety device P;
- Bind fast handles C, turn the ruler thus that to stay perpendicularly on moving of mould table and bind fast handle N;
- Bind fast movable support D by handle M;
- Under review value at level G must fit of distance E. If it is not performed unscrew the screw F and remove ruler K to necessary direction;
- Bind fast screw F.

D.1.6. Operating of the milling machine

At the milling machine can be done following working operations:
1. Cutting of prickle.
2. Folding.
3. Pattern milling (copying);
4. Profiling.

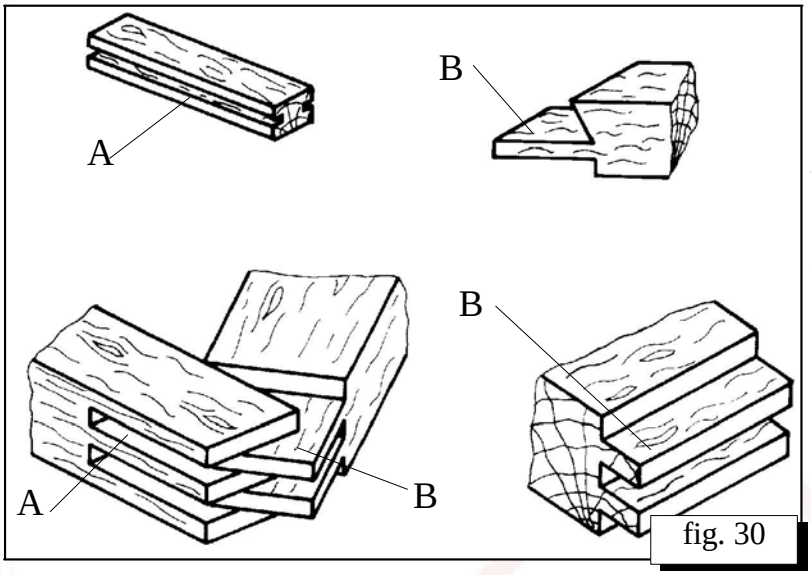


fig. 30

Cutting of prickle

By this operation details are operated for joining by groove “A” and gibe ”B” /fig. 30/.

To do this operating it is necessary to use following safety equipment:

- Moving table;
- Additional table for bind fast of the detail;
- Protective box without fulcrum rulers /ø 250 mm / 9 7/8” max. /;
- Device for bind fast of the detail;
- Adjustment protective screens;
- Across support ruler;

ATTENTION

- Use only suitable for the machine tools.
- Observe data from producer of the tools (revolutions, diameter).
- For maximum admissible number of revolutions see section 5.2

Folding

For outside profiling “A” use this operation (for example window-frame) /fig. 31/.
To do this operation it is necessary to use following safety equipment:
- Protective box with fulcrum rulers /ø 250 mm / 9 7/8” max. /;
- Moving table;
- Device for bind fast of the detail;
- Fulcrum telescopic ruler;

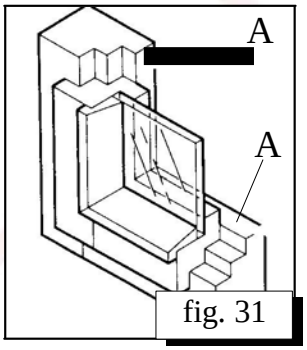


fig. 31

- If the details are long they must be put on the moving table.
- Fulcrum rulers must be parallel with the moving of the movable table and fulcrum telescopic ruler on the table must be turned at 90 .
- It is recommended to start with one across lath and after that the frame is turned at 90 to remove the fevers from the previous operation.
- Work is done along direction of wood fibers /fig.32/

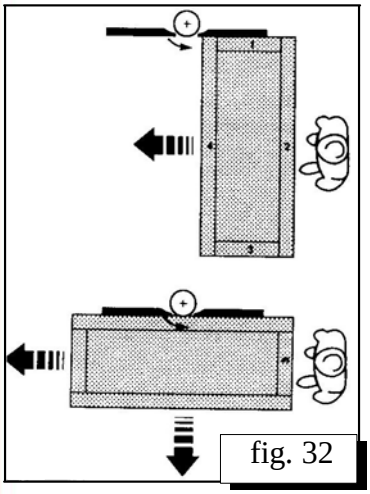


fig. 32

Pattern milling (copying)

By this operation is done milling at curved line with help of pattern.
To do this operation it is necessary to use following safety equipment:
- Protective box with fulcrum rulers;
- Horizontal and vertical pressing device;
- Pushing rod or pushing wood block;
- Milling tool and copying hoop are put on the milling mandrel.
- Milling support with fulcrum rulers must be fully dragged back to details and the pattern can move frely /fig. 33/.

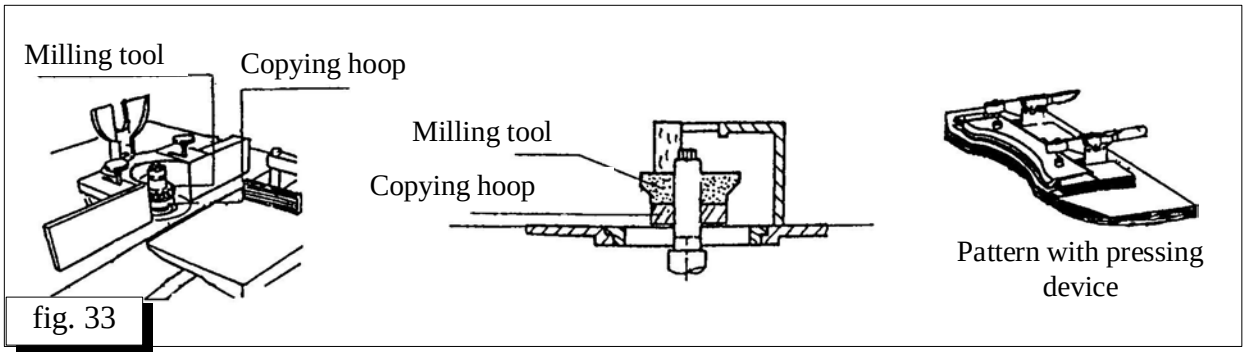


fig. 33

ATTENTION

- Pattern must be mode from hard material (e.g. – slab from many layers).
- Pattern must not be made from metal.
- Pattern must have pressing device to bind fast detail steadily.

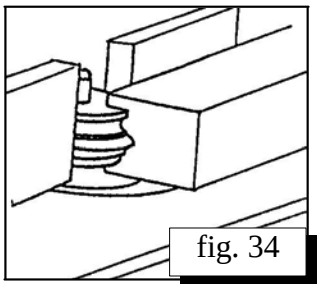


fig. 34

Profiling

It serves as milling profilers on long and straight details along wood fibers direction /fig. 34/.

- The detail is lie with one side on the table and with other side (perpendicularly) of the first one) is lie on the fulcrum rulers of the milling support.
- The operation starts from the one side of the detail and finishes to the other one.
- During the feed the whole length of the detail must contact to fulcrum rulers.
- Fulcrum rulers must be turned thus so that to guarantee steady lieing of the detail.

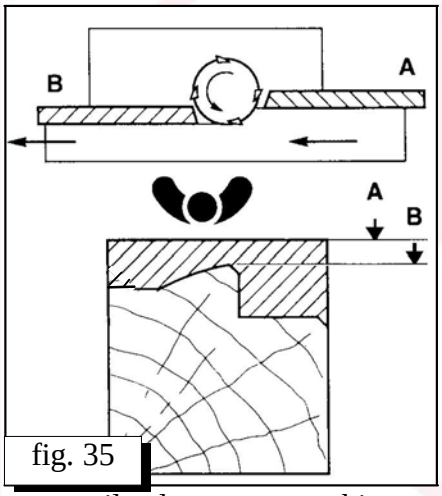


fig. 35

- At profiling of the whole side of the detail fulcrum ruler "B" is tuned at the one level with the tool /fig. 35/.
- If the profiling will not done at the whole side of the detail the two fulcrum rulers are at the equal level /fig. 36/.
- The adjustment of the rulers is checked up by pattern, which controls the milling profile in the detail.
- If there is not such a pattern must start milling with little chip but then must check the height and the depth of the profile and if it necessary tune the ruler additionally.

ATTENTION

- At operating of short details always use pushing rod.
- Do the milling with constant speed of feed without pushes.
- Always when it is possible use feed gear.
- Use only suitable milling tools sharpened well.

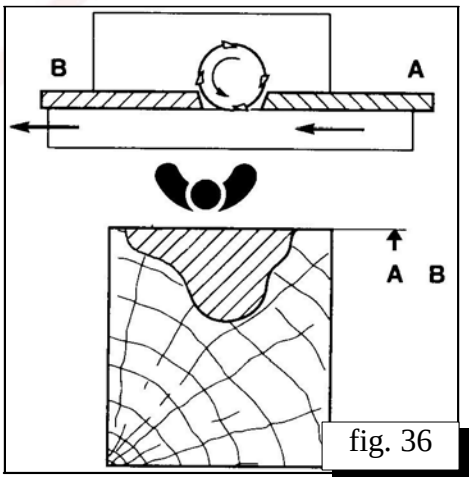


fig. 36

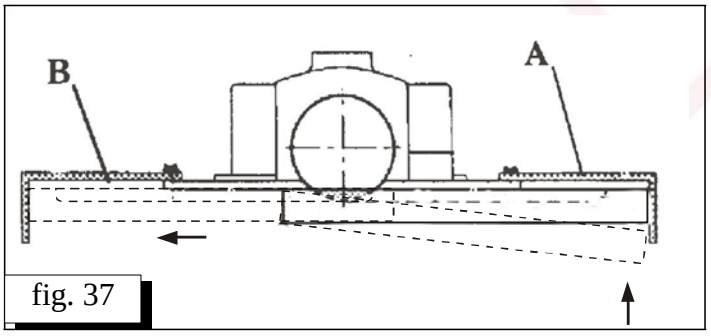


fig. 37

- During the blind milling on the short details must use reflect protective supports fixed on the milling support /fig. 37/.

At operation follow this way:
- Preparing the machine for work
- Turn on the milling machine
- The wood detail rests in support “A” and presses toward the tool
- After that detail is pushed toward support “B”

Profiling with bending mandrel

The machine has a bending mandrel which can bend without stage in borderlines 90 45 . This permits to make different profiles with good surface (e.g. arch-shaped profiles of the doors).

Operating can be done by tool A fixed on the vertical turned milling mandrel toward the working table /fig. 38/

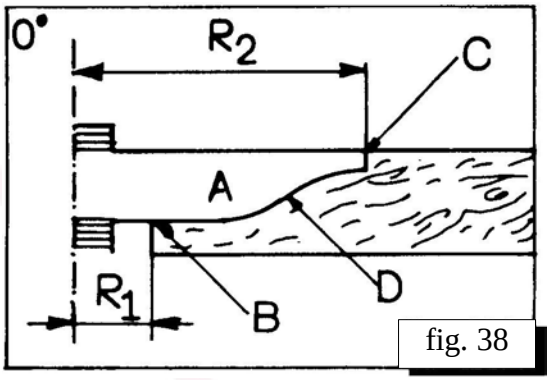


fig. 38

At figure 34 can see that the cutting speed in point C is bigger than cutting speed in point B, because $R_2 >> R_1$.

<u>This leads to difference in property of working surface D and can lead overheating of tool.</u>

This defect can be decreased by bending of milling mandrel at 45 and using of suitable tools. /fig. 39/

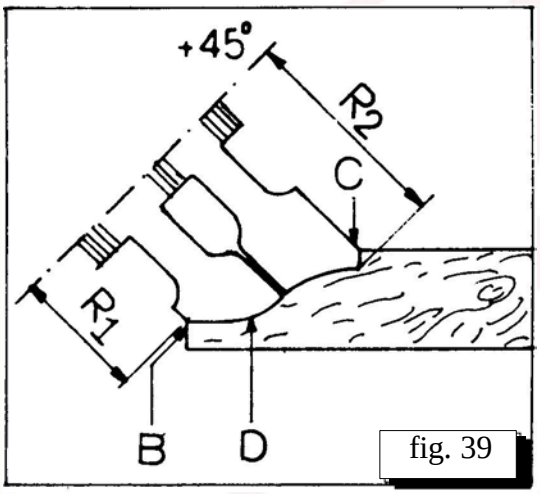


fig. 39

At fig. 39 can see that cutting speed in points B and C are approximately equal because R_1 R_2, and properly of working surface D is equal along the whole profile.

To do profiling with bending mandrel safety it is necessary:

- To assemble protective box A with fulcrum rulers on the working table B /see fig. 27/.
- Assemble the tool on the milling mandrel /see fig. 18 and 19/.
- If it is necessary bring out the hoops from the table when cannot bend the mandrel.
- Drop bind fast roods E and H /fig. 19/ to tune milling mandrel at height ant slope by hand wheels F and I.
- Blockade this mandrel position by rods E and H.
- Tune out the cutting depth by adjustment of the protective box and fulcrum rulers toward the tool.
- Start the machine and make a test detail.
- Check up the profile by test pattern and if is necessary tune the position of the mandrel and tool additionally.

D.2. CONTROL PANEL

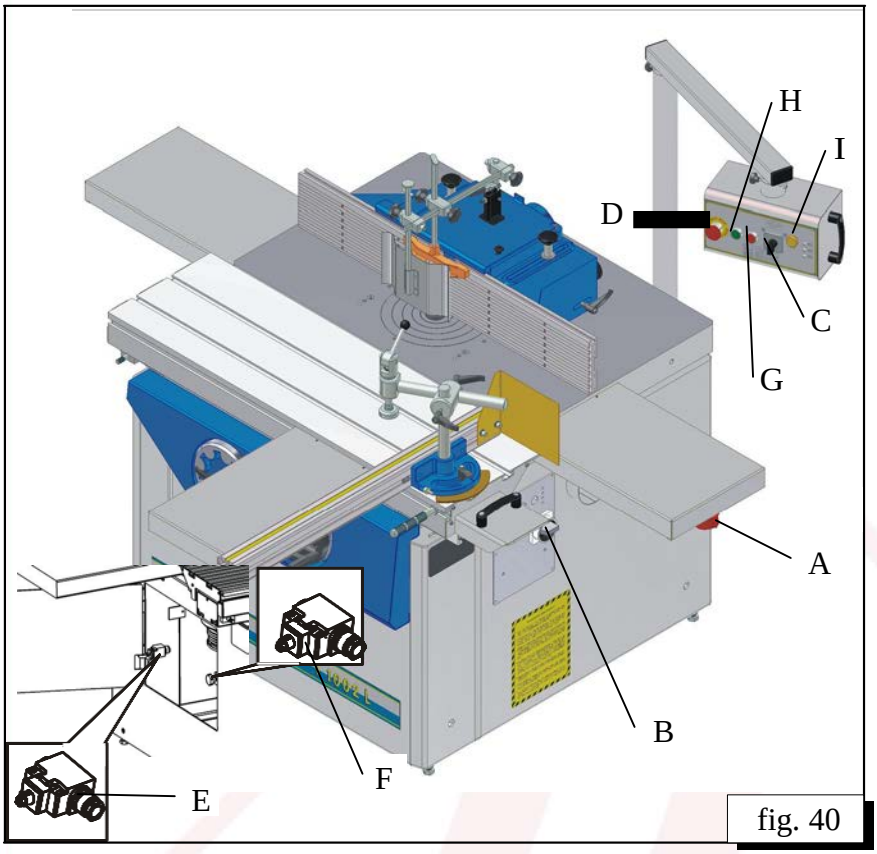


fig. 40

Operation functions

A - CEE-socket/3P+N+E; 400V; 16A/- for connection to and disconnection from the electric mains through CEE plug.

B - Main switch – serves as switch on and off of the electrical supply of the machine. There is possibility to lock it in position “0” to avoid undesired switch on of the machine.. Operated by turning. Position “1” – ON. Position “0” – OFF.

C– Switch – it serves for choosing the direction of the spindle turning. It works through turning right to - rotating clockwise or through turning left to to the other side. At passing from position “1” to position “2” the switch get through position “0”, at which the machinine turning off.

D - Emergency stop knob – operates by pressing the button holds back itself in pressing position. It can free by turning in right and dragging. If the button is not free the machine can not turn on.

E– Switch at the door- for approach to milling knot-serves as locking starting of the machine. It stops at opening the door.

F – Switch which locking starting of milling machine at locking milling shaft.

G- Red knob – to normally stop the machine. Operated by pressing.

H- Green knob – to start the machine. Operated by pressing.

I – Signal lamp for choosing the direction of the spindle rotation. It light at position “2” when the spindle turns clockwise.

J - Speed selector. (only for two-speed motors).

D.3. STARTING

ATTENTION

Always check the protection devices before commissioning. Follow the safety instructions according to the service manual.

The commissioning is made, as follows:

1. Put the mains switch B into position ”1”.
2. The switch C is turned before into the required position.
3. If the machine is equipped with a two-speed motor, then the direction of rotation is to be chosen by the speed selector J.
4. Push the green button START H.

D.4. STOPPING

Normal stop

The stop of the machine is effected by pressing the red knob G, thus actuating the electrodynamics brake of the motors.

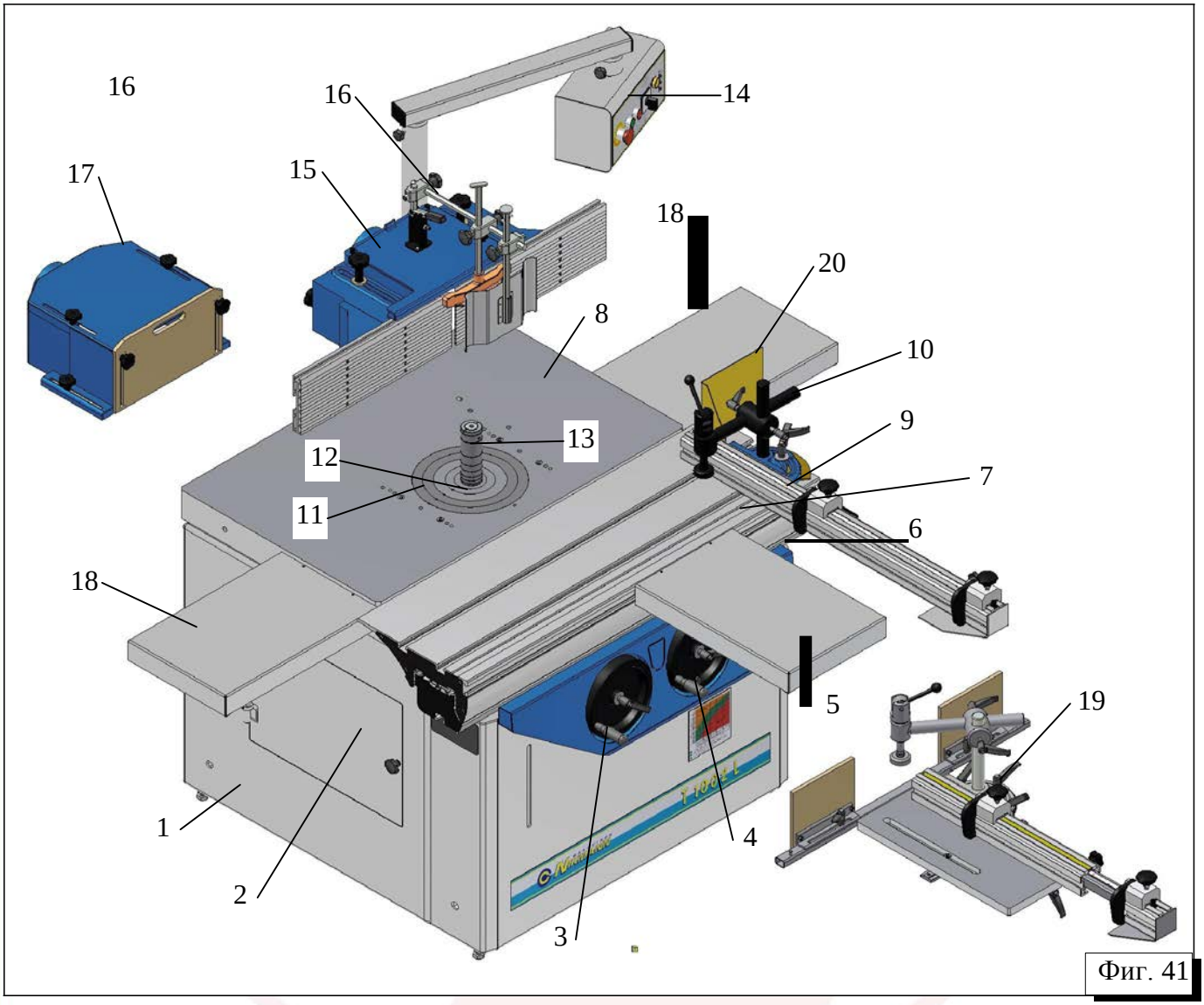
Emergency stop

The emergency stop is effected by pressing the emergency knob D, thus actuating the electrodynamics brake of the motors.

Do not stop the machine by means of the mains switch B , by means of the direction selector C or the speed selector, because in this case the electrodynamic braking of the motor is not active.

SECTION E: DESCRIPTION OF MACHINE

E.1. TECHNOLOGICAL PART



Фиг. 41

Main components

1. Body
2. Blocking device for the milling spindle during tool exchange
3. Device for inclination adjustment of the milling spindle
4. Device for height adjustment of the milling spindle
5. Console table *
6. Controls
7. Formatting table
8. Working board
9. Support ruler *
10. Device for tightening of the workpiece *
11. Protection rings
12. Milling spindle
13. Exchangeable cutter arbour
14. Detachable control board *
15. Protection box for milling with support rulers
16. Vertical and horizontal clamp device *
17. Protection box for tongue milling *
18. Extension tables *
19. Table for tongue milling *
20. Hand guard *

*1) - Upon special request

The milling machine has a welded steel body with stable working board made of cast iron and polished surface mounted above.

The mechanisms for setting of the milling spindle in vertical direction and for tilting, as well as the drives are placed inside the body of the machine; they are protected against accidental touch by the operator.

The machine has a mobile board, which is running on cylinder guides.

The mobile board is equipped with a support ruler and with a clamp device for fixation of the workpiece.

On the working board, there is a milling stop with support rulers and a protection box, which covers the free operation part of the tool.

The protection box has a hose for chip and dust collection above the working board.

The machine has a hose for chip and dust collection bellow the working board.

The milling spindle is adjustable in vertical direction and at angle between 0° and 45°; the position is fixed by means of tightening levers.

The milling spindle can be locked against turning during tool exchange.

The milling spindle can descend beneath the level of the working board and the aperture is covered with rings.

The processed material is placed on the working board; the feeding is done manually but it is possible to use feeding device.

The larger workpieces can be placed on the mobile board; the mobile board is being operated manually during processing.

E.2. ELECTRICAL PART

The machine is equipped with:

- light indication of spindle rotation speed;
- electronic brake for electrodynamic braking of the motor rotation;
- door switch for interrupting of the startup circuit;
- lock switch for interrupting of the startup when the milling shaft is blocked;
- thermal protection of the electric motor;
- CEE - socket for the power supply;
- IP54 protection against dust and moisture;
- reverse switch;
- speed selector with two-speed motor;

SECTION F: MAINTENANCE

F.1. CLEANING OF MACHINE

Every evening clean thoroughly the machine and its internal space from chips and dust by means of the aspiration system ; all remaining contamination are to be removed with a jet of compressed air.

Remove the side covers in order to get access to the internal space for cleaning at least once per six months or after 500 working hours.

INFORMATION

Before starting any cleaning operations on the machine or its components you must turn the mains switch to position ZERO.

F.2. LUBRICATION OF MACHINE

Clean all belts after every 500 hours of operation by means of a soft brush in order to remove the dust and chips.

Clean thoroughly the machine with compressed air and apply a thin film of oil to all moving parts and connections.

Protect the belts and pulleys from oil and grease.

The milling spindle A (fig. 42) rotates on two precise high-speed ball bearings B and C; they are lubricated through the nipples D and E. After every 1000 hours of operation the bearings need additional lubrication.

For lubrication make use of grease Arcanol (produced by FAG): ARCA, GREASE.SPEED 2.6 (new label), L75 (old label) or grease produced by SKF with labels: LGLC 2 or LGLT 2.

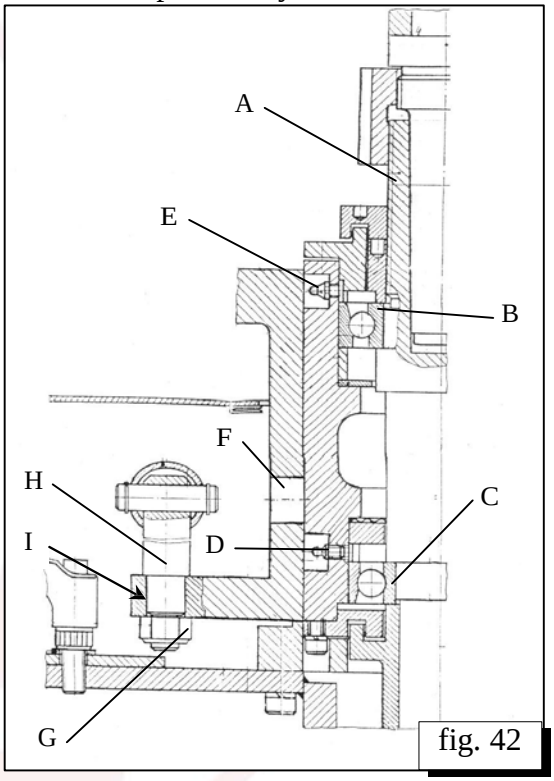


fig. 42

Needed amount: approximately 8 – 9 g of grease for each bearing.

In order to lubricate the bearings proceed as follows:

- Disconnect the machine from the mains.
- Turn off the mains switch (position 0) and lock it by means of a padlock.
- Put a warning plate “REPAIR!” on the machine.
- Move the milling spindle to the most bottom position in order to get better access to the greasing nipples D and E.
- Open the side door of the machine.
- Clean all accessible parts by means of compressed air and a soft brush; proceed with special attention to the apertures where the nipples D and E are placed.
- Remove the protection cap of the aperture F in order to get access to the nipple E. It may be reasonable to unscrew the nut G and to lift the pivot H.
- Grease the bearings by means of suitable device.
- Clean again the nipples access area.
- Put on the protection cap into the aperture F.
- Tighten the nut G in a way that the pivot H can turn in the aperture I.
- Use the opportunity to apply a thin layer of grease to all remaining moving parts of the machine and to check the tightening of the belts; clean the belts by means of soft brush or cloth.

ATTENTION

Protect the belts and pulleys against contamination with oil and grease.

F.3. CHECKING THE CONDITION OF SOME UNITS AFTER OPERATION

Before starting any maintenance works on the machine disconnect the electric supply, unplugging it from the mains.

Drawing of belts

After the first 10 work hours it is necessary to check up the stretching of the driving belts.

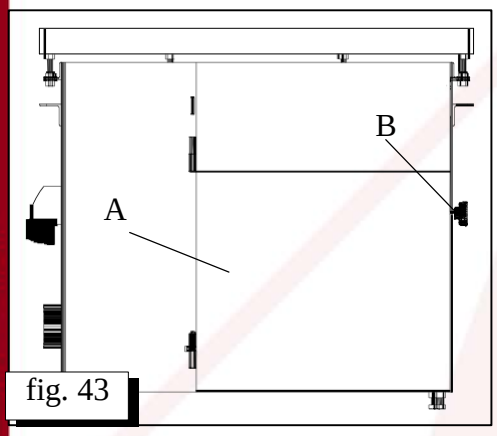


fig. 43

For this purpose do following:

- Open the door A by handle B /fig. 43/
- Drop the handle D /fig. 44/.
- Stretch belt by turning the electric motor around bolt C and bind fast handle D.

At every six months it is necessary to check up stretching of the driving belts again.

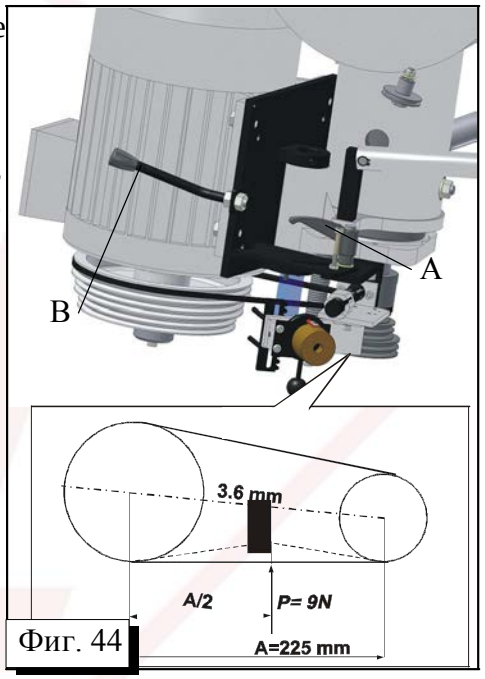
The belts must not be stretched much strongly to not overload bearings.

Much strong stretching leads to lengthening of the belts and its fast wearing out.

Pollution of the belts with oil, lubricant, solvent, paint etc., must be avoided.

The driving belts and channels of belt pulleys are clean and dry with soft brush only and woolen or paper towel.

Never use solvent and water.



Фиг. 44

Control of the electronic brake for electrodynamics stopping of engine

The machine has electronic brake for electrodynamics stopping of engine.

The time for full stopping of the tool turning must not surpass 10 seconds from switching of the engine.

This stopping time must be controlled every month.

If it is more than 10 seconds electrician must check up the brake.

The frequency of the switching on of this brake must be most 10 for on hour.

Control of safety equipment

Safety work depends on safety equipment (see section B.2.).

Checking of protective box with fulcrum

Before beginning check:

Fixing of protective box with fulcrum rulers on the table;

For cracks and breakings of protective box;
Fixing of the fulcrum rulers on the box;
Bending of the rulers;
Cracked and broken boxes must not be used.
Bended or defected fulcrum rulers must not be used.
Every week check up the work of the switches on the doors of the milling unit. If the doors are open machine must not start.

Control of the horizontal and vertical pressing device.

- For cracked, broken or worn out vertically pressing shoe
- If there is whole pusher;
- If there all handles for adjustment and if they are in order.

Cracked, broken and worn out details must be change with new ones.

GENERAL PROVISIONS

Check regularly for availability of warning plates on the machine and their good condition.

The plates must be available and legible.
It concerns especially the plate “Safety instructions”.

Removal from operation, storage – disassembly (rejection) of the machine

Switch off all electrical equipment during removal of the machine.
Provided the machine would not be use for some time, after switching off of all electrical equipment, clean it thouroughly and process the operation board, the shaft of the circular disk and the other unpainted parts by roof-protection product.
You should not store the machine in damp places and must protect it from environmental effects.
The machine is produced by non-toxic and safe materials. Upon rejection divide the metal and plastic parts and smash them afterwards.

Emergency situations /states/

Switch off the electric supply immediately in case of flood of the operation area.
Before re-operation of the machine, it must be checked by trained authorized technician.
Switch off the electric supply in case of fire and use fire extinguishers.
Direct the jet to the base of the flame.
Before re-operation of the machine, it must be checked by trained authorized technician.
The operation area around the machine (please refer to Section C.1.) must always be unoccupied.
You must not operate the machine in environment presenting danger of explosion.

F.4. TROUBLE-SHOOTING

Before starting any repair works switch off the electric supply of the machine.

The machine has been tested in the production plant and you can freely operate it.
The incorrect and out of function use of the machine may result in damages.

Fault:
The machine does not start

Reason:	Repair:
-The main switch is in position zero ”0”.	Turn the main switch in position one ”1”.

-Some button for breakdown stopping is turn on.	Turn off the breakdown stop by dragging and turning it to right.
-The safety fuse in the operating circuit is broken.	Change the fuse. Remove the cause of fuse breaking.
-Automatic switch is turn off.	Restore the automatic switch. Remove the cause.
-The door of the milling unit is not closed well.	Check the door and close it.
-Falling the current of one or more phases.	Check the voltage of the all-3 phases.
- The handle blocks the milling shaft and switch is operated.	Unblocked milling shaft.

Fault:
The machine is stopping during the work

Reason:	Repair:
-Falling the current of one or more phases.	Check the voltage of the all-3 phases.
-The safety fuse in the operating circuit is broken.	Change the fuse. Remove the cause of fuse breaking.
-Heavy work more than 4 kW /overloading/ thermo-contactor of the engine is turned off.	Wait for some time to engine become cool. Do not overload the machine.

Fault:
The site of the operating detail does not conform to the turned size of the fulcrum ruler

Reason:	Repair:
- The ruler is displaced.	Tune the ruler. /see section 5.4. /
- The scale is displaced.	Tune the scale.

Fault:
Vibration during the work

Reason:	Repair:
- Misbalanced tool.	- Sharpen the tool corrected. - Bind fast rods for blockading mandrel position at height and at slope. - Level machine well on the four rest points. - Check the balance of the tool.

Fault:
Jamming of the material at the beginning or at the end of feed during milling

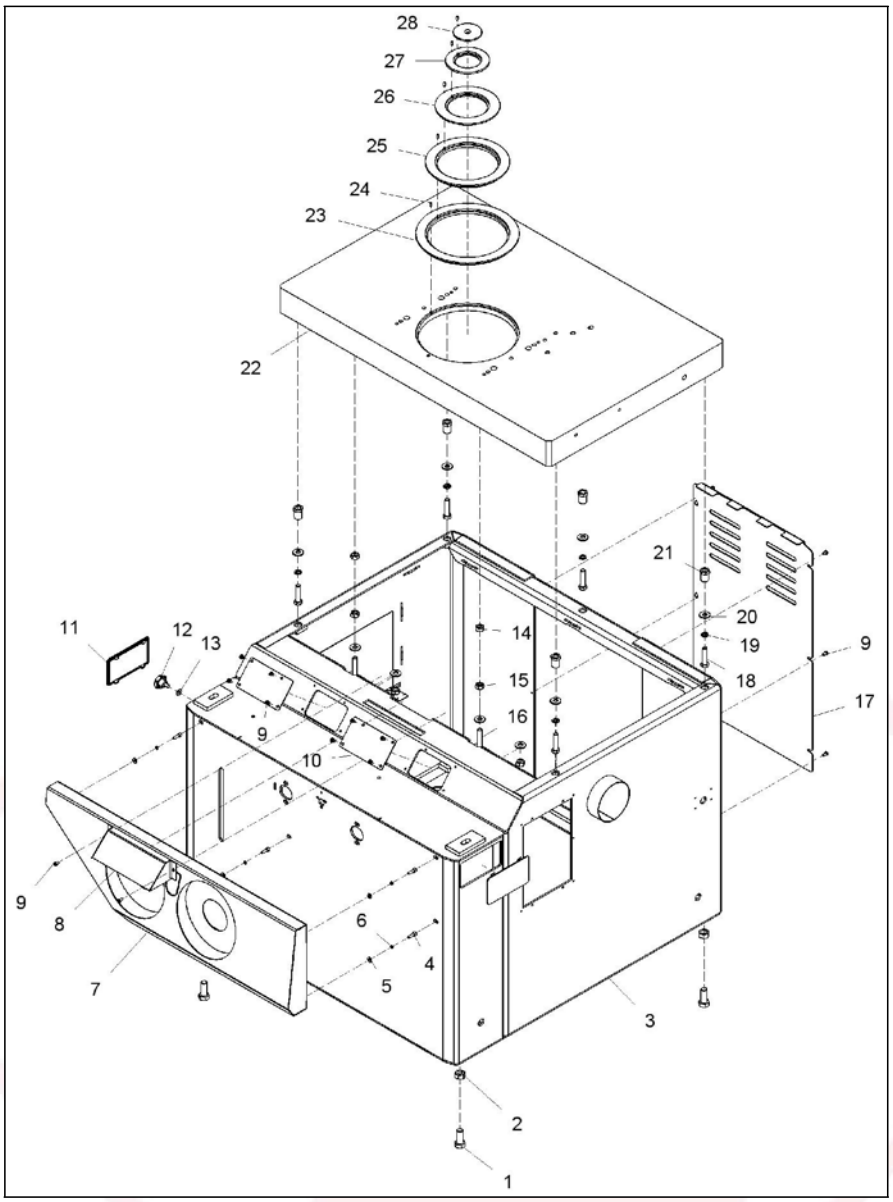
Reason:	Repair:
- Irregularly planed material.	Plane the material again, to reach a good planning.

SECTION G: APPENDICES

G.1. WIRING DIAGRAM AND LIST OF THE ELECTRICAL COMPONENTS

G.2. ELECTRIC CABINET – LAYOUT OF COMPONENTS

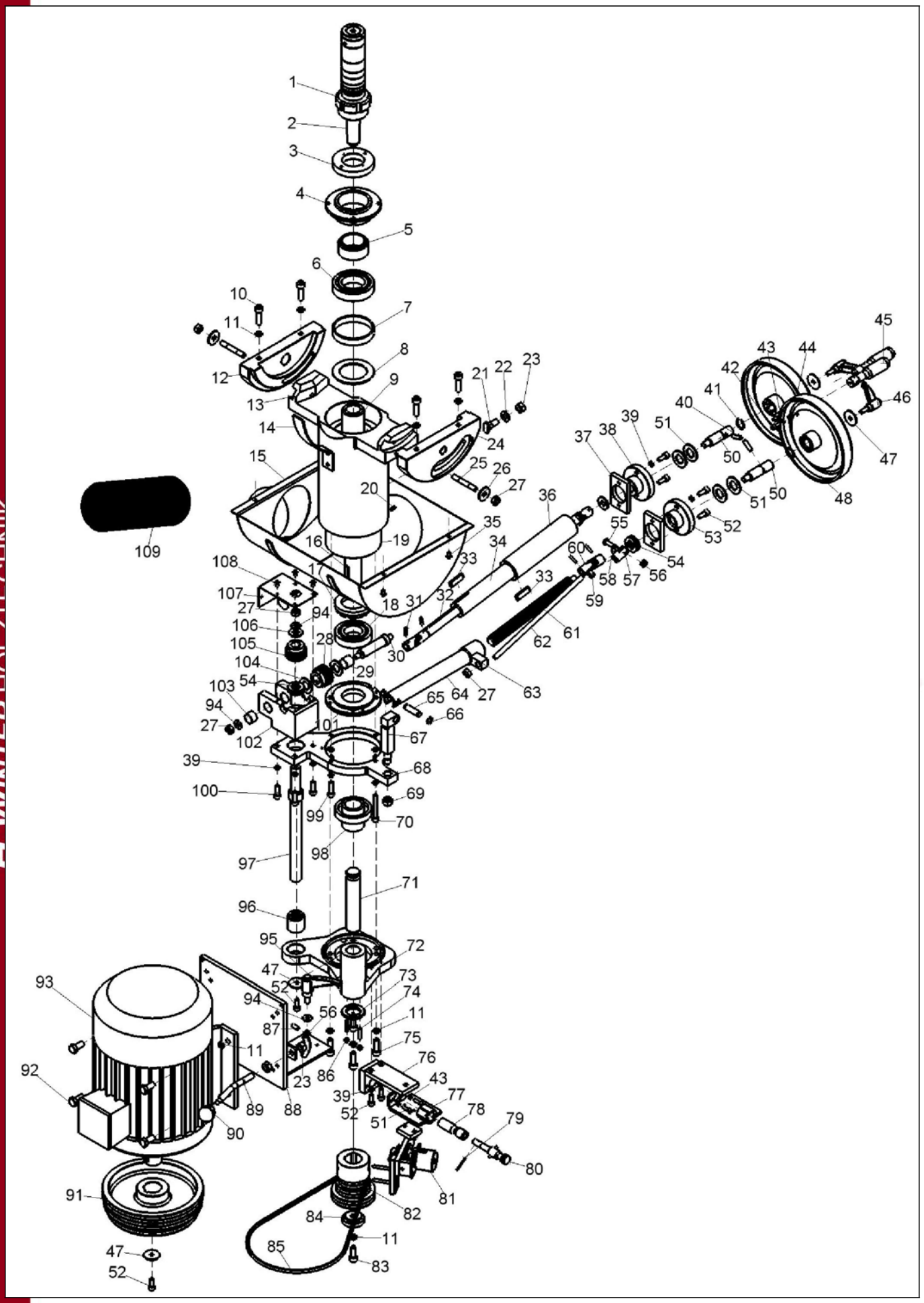
SECTION H: CATALOGUE OF SPARE PARTS



T1002.51.00.00.00 BODY AND BOARD – MF ZHX

1	DIN 933	BOLT M16X40	4
2	DIN 934	NUT M16	4
3	T1002.51.01.00.00	CORPS - MF ZHX	1
4	DIN 912	SCREW M 6X20	4
5	DIN 134	WASHER M 6	4
6	DIN 7980	SPRING WASHER 2-6H	4
7	SF2.50.17.00.00	FRONT COVER SF2 -T1002-ZHX	1
8	T1002.01.00.03.00	COVER	1
9	ISO 7380	SCREW M 6X10	16
10	T1002.50.00.00.22-01	COVER	2
11	-	COVER POLYAMIDE 150x80x6	2
12	T1001.01.00.00.04	HANDLE STAR	1
13	DIN 125A	WASHER AM 8	1
14	DIN 934	NUT M12	4
15	DIN 985	NUT M 12	2
16	DIN 913	FIXING SCREW M12x100	2
17	T1004.01.00.00.13	REAR COVER	1
18	DIN 931	BOLT M12X50	5
19	DIN 7980	SPRING WASHER 2-12H	5
20	DIN 134	WASHER M12	9

21	ST01.01.00.00.13	HOLLOW BOLT	5
22	T1002.01.00.02.01	BOARD	1
23	T1002.01.00.01.02	RING Ø210	1
24	DIN 1481	SPRING PIN Ø 5X12	5
25	T1002.01.00.02.03	RING Ø160	1
26	KPF.00.03	RING Ø105	1
27	SF2300.01.00.02.05	RING Ø65	1
28	SF2300.01.00.02.06	COVER	1

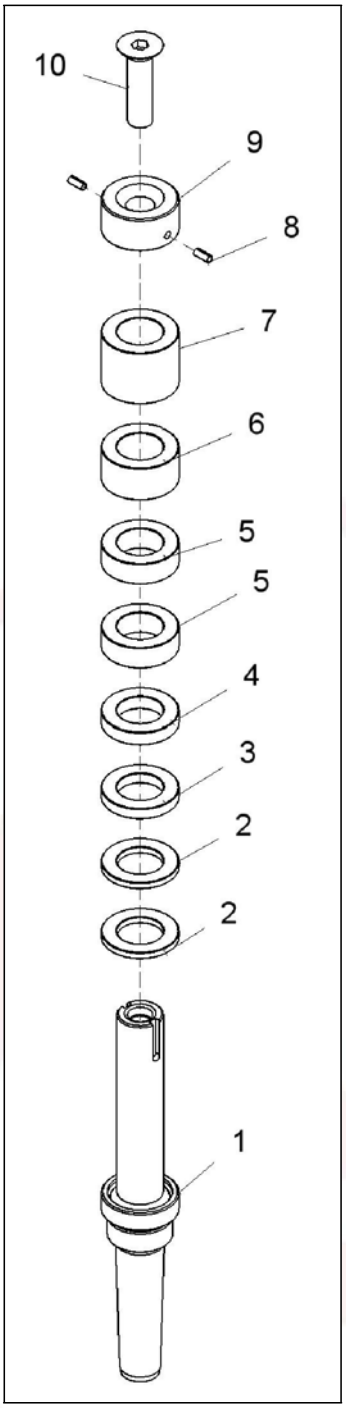


T1002.02.00.00.00 MILLING UNIT

T1002.02.00.00.00 MILLING UNIT

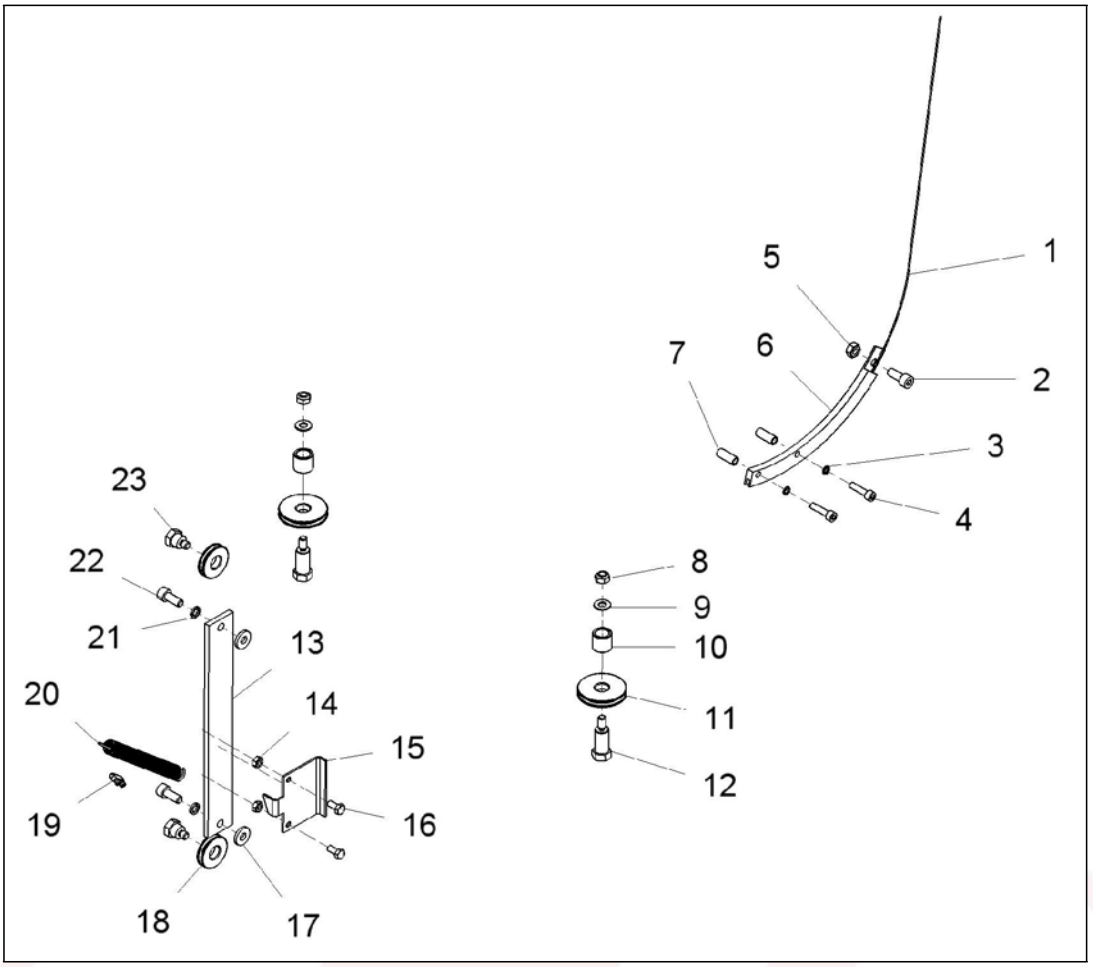
1	T1002.02.00.00.29	DIFFERENTIAL NUT	1
2	T1002.02.35.00.00	CUTTER ARBOR A4X30X125	1
3	T1002.02.00.00.28	NUT LABYRINTH	1
4	T1002.02.00.00.25	COVER LABYRINTH	1
5	T1002.02.00.00.38	PRESSING NUT	1
6	T31884	SPINDLE BEARING B 7210 C.T.P4S-UL	1
7	T1002.02.00.00.41	DISTANCE RING	1
8	T1002.02.00.00.42	WASHER, SUPPORTING	1
9	T1002.02.00.00.36	SPINDLE	1
10	DIN 912	SCREW M10X35	4
11	DIN 7980	SPRING WASHER 2-10H	13
12	SF250M.02.00.00.09	LEFT SECTION	1
13	T1002.02.00.00.18	BODY	1
14	T1002.02.00.00.14	SUPPORT	1
15	T1002.02.00.36.00	CHIP COLLECTOR	1
16	DIN 6885A	KEY 10X8X70	1
17	T1002.02.00.00.39	PRESSING BUSHING	1
18	T31626	SPINDLE BEARING B 7208 C.T.P4S-UL	1
19	T1002.02.00.00.24	PINOLE	1
20	DIN 71412	NIPPLE FOR PRESSURE GREASING M6-7	2
21	F250M.02.00.00.74	GUIDING KEY	1
22	DIN 125A	WASHER AM12	1
23	DIN 934	NUT M12	3
24	SF250M.02.00.00.05	RIGHT SECTION	1
25	SF250M.02.00.00.06	STUD M10X70	2
26	F250M.02.00.00.52	WASHER	2
27	DIN 985	NUT M 10	5
28	T1002.02.00.00.61	GEAR Z=11	1
29	PAP 2020 P10	SLIDING BUSHING	1
30	T1002.02.00.00.62	INPUT SHAFT	1
31	DIN 1481	SPRING PIN Ø5X20	6
32	T1001.02.106.00.03	TELESCOPIC SHAFT Ø20	1
33	T1001.02.106.01.02	KEY	2
34	T1001.02.106.02.01	BUSHING Ø20	1
35	DIN 84	SCREW M6 X10	4
36	T1002.02.106.01.01	BUSHING Ø36	1
37	T1001.02.00.00.81	STRAP	2
38	T1001.02.00.00.91	GUIDE	1
39	DIN 7980	SPRING WASHER 2-8H	14
40	КРМЩ.11.07	PIN	2
41	DIN 471	RING FOR SHAFT Ø20	2
42	DIN 912	SCREW M 6X16	4
43	DIN 7980	SPRING WASHER 2-6H	6
44	DIN 125A	WASHER AM 6	2
45	EFN.95.S.D.20-C1	FOLDABLE LEVER	2
46	A583-63-M8-20	LEVER M8X20	2
47	UN 732	WASHER Ø9xØ35x2,5	4
48	T1001.02.00.00.78	FLY WHEEL Ø200 WITH PIN	2
50	T1001.02.00.00.86	SHAFT	2
51	DIN 912	SCREW M 6X20	2
51	T1001.02.00.00.85	WASHER	4
52	DIN 912	SCREW M 8X20	8
53	T1001.02.00.00.80	GUIDE FOR BEARING	1
54		AXIAL BEARING 8104	2
55	T1001.02.00.00.79	THREADED PIVOT	1
56	DIN 934	NUT M8	2
57	T1001.02.00.00.96	FORK	1
58	S2300.02.00.00.17	WASHER	2
59	DIN 934	NUT M10	1
60	UL808.1-20-12-62E	UNIVERSAL JOINT	3
61	T1002.02.00.00.121	SCREW FOR TILTING	1

62	T1002.02.00.00.122	STUD	1
64	T1001.02.00.73.00	TELESCOPIC NUT	1
65	SF250M.02.52.00.13	SMALL PIVOT	1
66	DIN 471	RING FOR SHAFT Ø12	3
67	T1002.02.00.75.01	PIVOT	1
68	T1002.02.00.00.56	PLATE	1
69	DIN 985	NUT M 12	1
70	DIN 912	SCREW M 8X60	1
71	T1001.02.00.00.44	PIVOT	1
72	T1002.02.00.00.50	CARRIER	1
73	T1001.02.00.00.47	BUSHING	1
74	DIN 915	STOP SCREW M 6X30	2
75	DIN 912	SCREW M10X30	4
76	T1001.02.00.71.00	CONSOLE GUIDE	1
77	T1002.02.00.96.00	BASE - GUIDE	1
78	T1001.02.00.00.101	FIXATION	1
79	DIN 94	COTTER PIN 3. 2x25	1
80	T1001.02.00.98.00	STEM	1
81	T1001.02.07.00.00	ROTATION DISPLAY DEVICE	1
82	T1002.02.00.00.99	SPINDLE PULLEY	1
83	DIN 912	SCREW M10X25	1
84	T1002.02.00.00.100	END WASHER	1
85		SERRATED BELT 7M L=1000	2
86	DIN 934	NUT M6	3
87	DIN 914	STOP SCREW M 8X20	1
88	T1002.02.00.51.00	MOTOR CARRIER	1
89	T1001.02.00.00.40	LEVER	1
90	I108-32-M12	PEAR LEVER 38 M12	1
91	T1002.02.00.00.06	MOTOR PULLEY	1
92	DIN 933	BOLT M12X25	4
93		ELECTRIC MOTOR	1
94	DIN 125A	WASHER AM10	3
95	A583-80-M10-20	LEVER M10X20	1
96	SF250M.02.00.00.38	NUT	1
97	T1002.02.00.00.71	SHAFT LIFTING SCREW	1
98	T1002.02.00.00.81	BUSHING LABYRINTH	1
99	DIN 912	SCREW M 8X30	3
100	DIN 912	SCREW M 8X25	4
101	T1002.02.00.00.080	COVER	1
102	T1002.02.00.00.66	GEAR BOX BODY	1
103	PAP 2015 P10	SLIDING BUSHING	1
104	T1002.02.00.00.63	WASHER	2
105	T1002.02.00.00.61	GEAR WHEEL Z=11	1
106	T1002.02.00.00.69	GASKET	1
107	T1002.02.00.00.70	COVER	1
108	ISO 7380	SCREW M 6X10	8
109		ASPIRATION HOSE	1



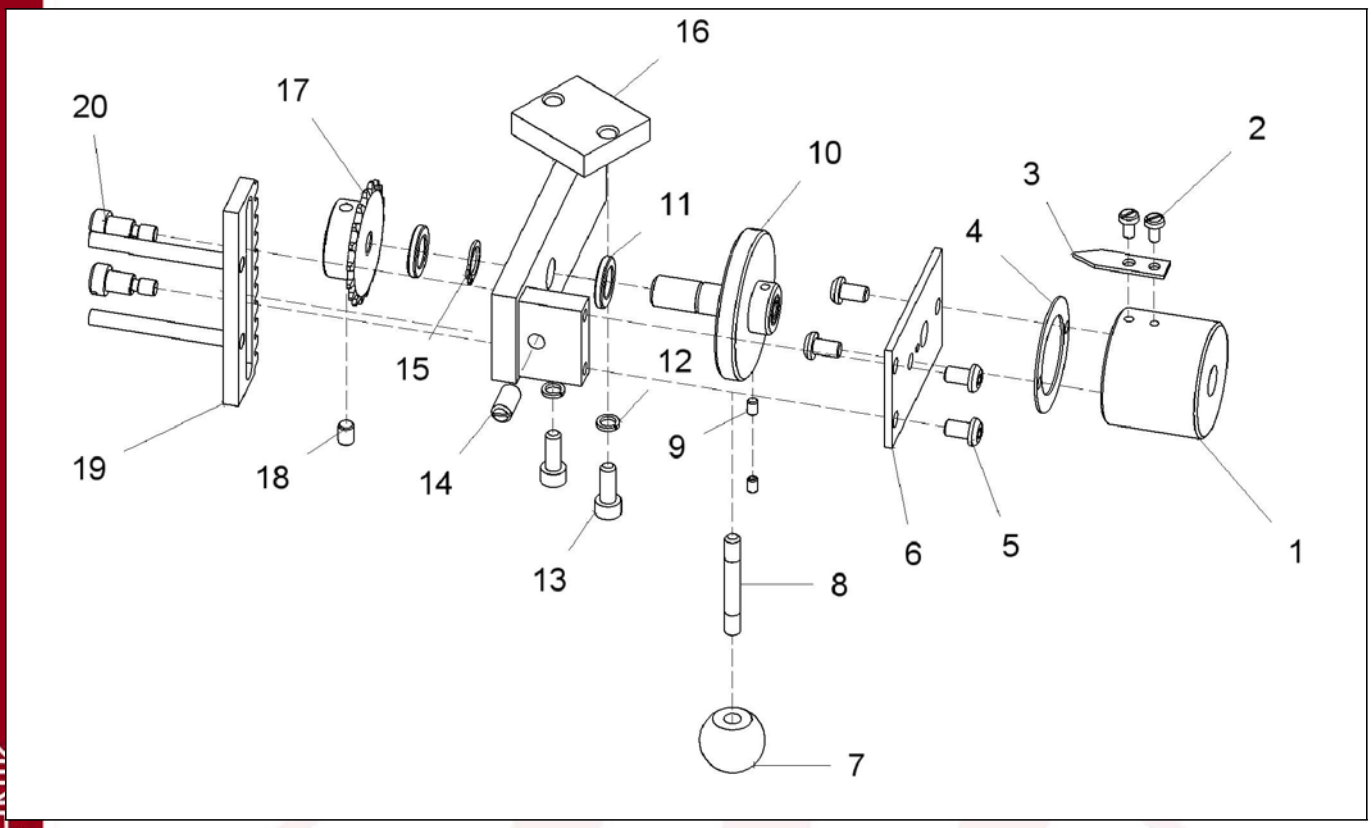
T1002.02. 35.00.00. CUTTER ARBOR A4Xø30X125

1	T1002.02.35.00.01	CUTTER ARBOR A4Xø30X125	1
2	SF250M.02.00.18.01	DISTANCE BUSHING ø30X5	2
3	SF250M.02.00.18.02	DISTANCE BUSHING ø30X8	1
4	SF250M.02.00.18.03	DISTANCE BUSHING ø30X10	1
5	SF250M.02.00.18.04	DISTANCE BUSHING ø30X16	2
6	SF250M.02.00.18.05	DISTANCE BUSHING ø30X25	1
7	SF250M.02.00.18.06	DISTANCE BUSHING ø30X40	1
8	T1004.02.00.00.25A	PRESSING BUSHING	1
9	DIN 1481	SPRING PIN ø5X12	2
10	DIN 7991	SCREW M16x60	1



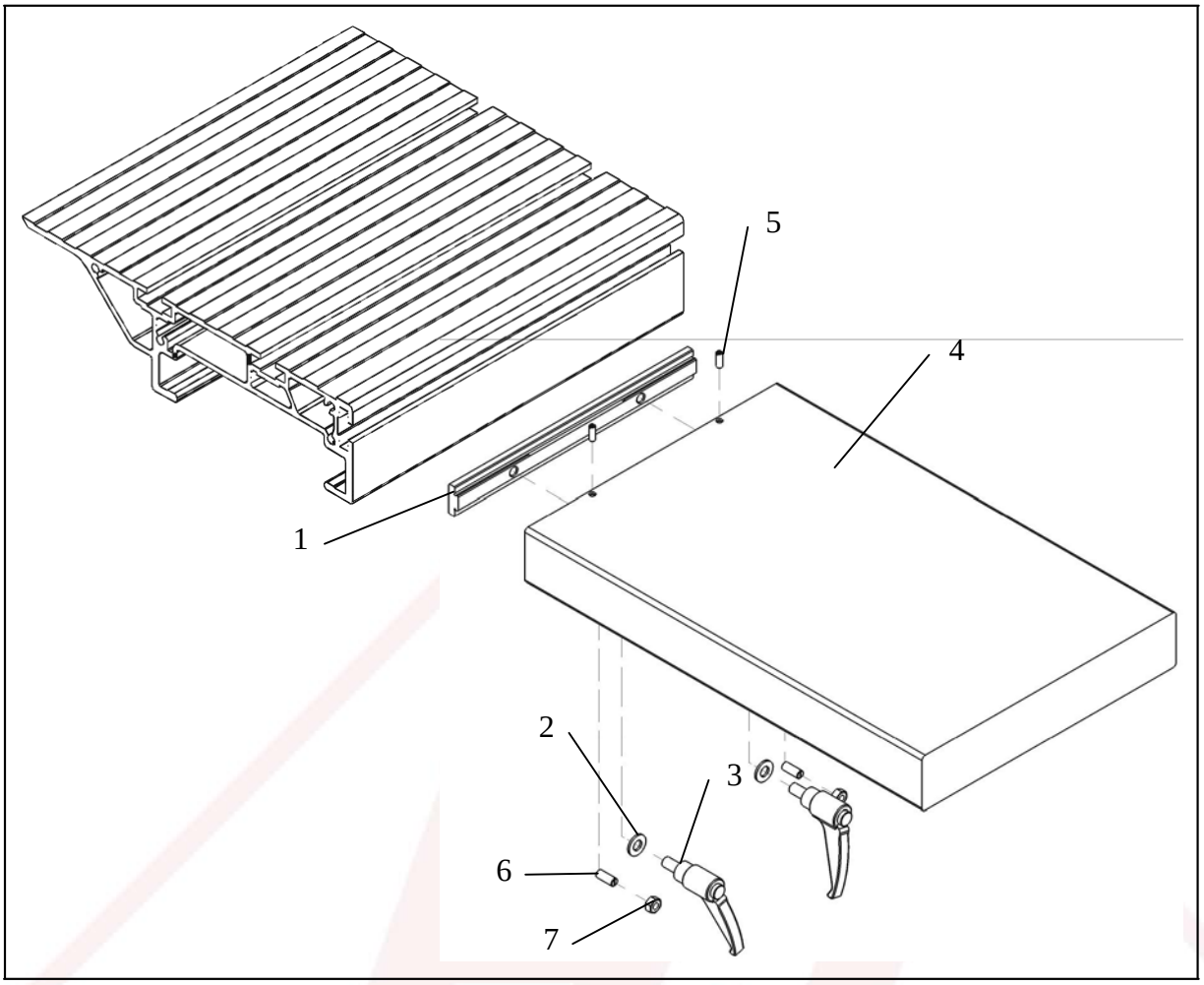
T1002.02.08.00.00. MILLING CUTTER INCLINATION ANGLE READING DEVICE

1	LD-E1X71-Z-H1770	STEEL ROPE Ø1.4	1
2	T1001.02.00.04.21	SCREW	1
3	DIN 7980	SPRING WASHER 2-6H	2
4	DIN 912	SCREW M 6X25	2
5	DIN 934	NUT M8	1
6	T1001.02.00.04.16	SECTOR	1
7	T1002.02.00.08.17	BUSHING	2
8	DIN 985	NUT M 8	2
9	DIN 125A	WASHER AM 8	2
10	T1001.02.00.04.01	DISTANCE BUSHING	2
11	T1001.02.00.04.02	ROLLER Ø40	2
12	T1001.02.00.04.03	LONG AXIS	2
13	T1001.02.00.04.09	PLATE	1
14	DIN 934	NUT M6	2
15	T1001.02.00.04.12	ARROW	1
16	SF250M.02.60.00.18	BOLT M6X14	2
17	T1001.02.00.04.08	WASHER Ø20XØ8,5X3	2
18	T1001.02.00.04.06	ROLLER Ø26	2
19		TERMINAL A 6,0	1
20	SF250M.02.60.00.22	SPRING 15X11 L=166	1
21	DIN 7980	SPRING WASHER 2-8H	2
22	DIN 912	SCREW M8x20	2
23	T1001.02.00.04.07	SHORT AXIS	2



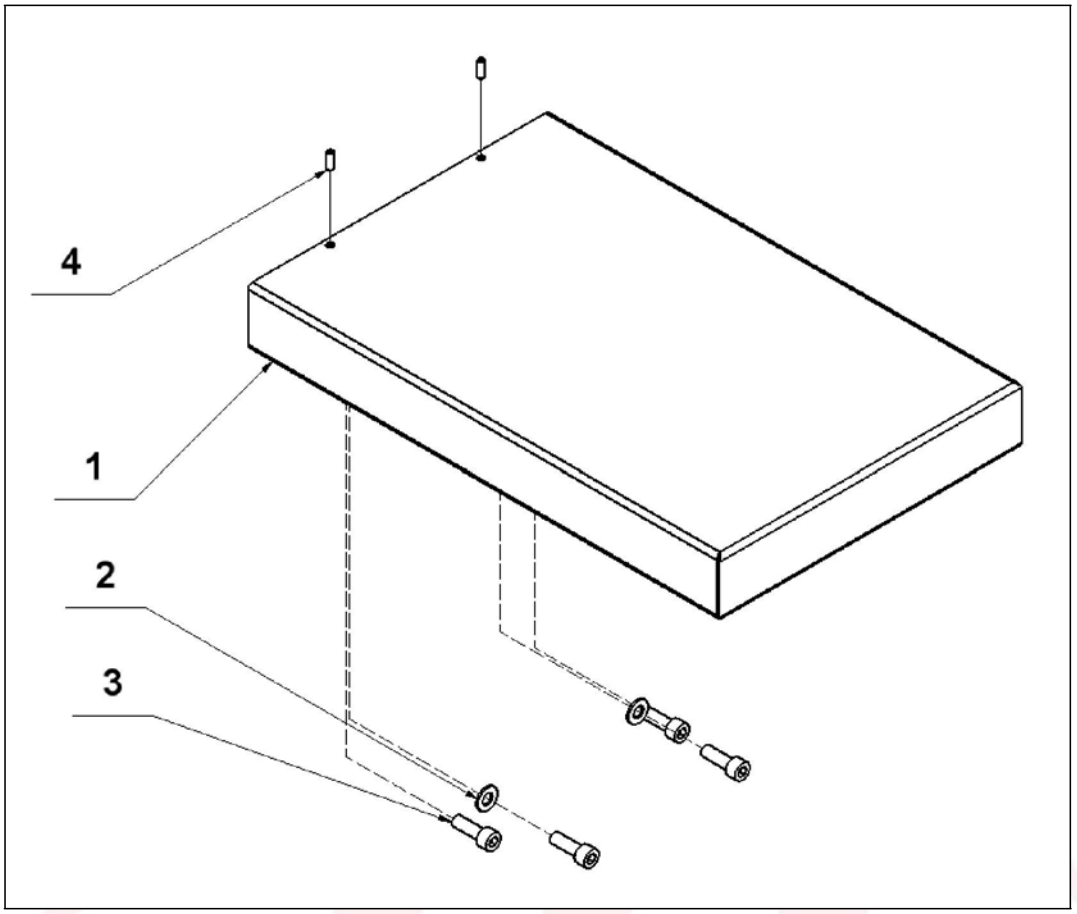
T1002.02.07.00.00 ROTATIONS INDICATION DEVICE

1	T1001.02.05.00.01	COVER	1
2	DIN 84	SCREW M 4x8	2
3	T1001.02.05.00.03	ARROW	1
4	T1001.02.05.00.05	GASKET	1
5	ISO 7380	SCREW M 6X10	4
6	T1001.02.05.00.04	PLATE	1
7	DIN 319-KU-25-M8-C	HANDLE BALL ø25	1
8	T1001.02.05.00.18	STUD	1
9	DIN 913	FIXING SCREW M 4X 6	2
10	T1002.02.07.13.00	INDEXING DISC	1
11	T1001.02.05.00.12	DISTANCE WASHER	2
12	DIN 7980	SPRING WASHER 2-6H	2
13	DIN 912	SCREW M 6X16	2
14	W830.VB08	SPRING FIXING	1
15	DIN 471	RING FOR SHAFT Ø12	1
16	T1002.02.05.14.00	SUPPORT	1
17	T1002.02.05.00.11	CHAIN WHEEL Z=18	1
18	DIN 913	FIXING SCREW M6X8	1
19	T1002.02.07.08.00	LIMITER	1
20	T1002.02.05.00.09	GUIDE	2



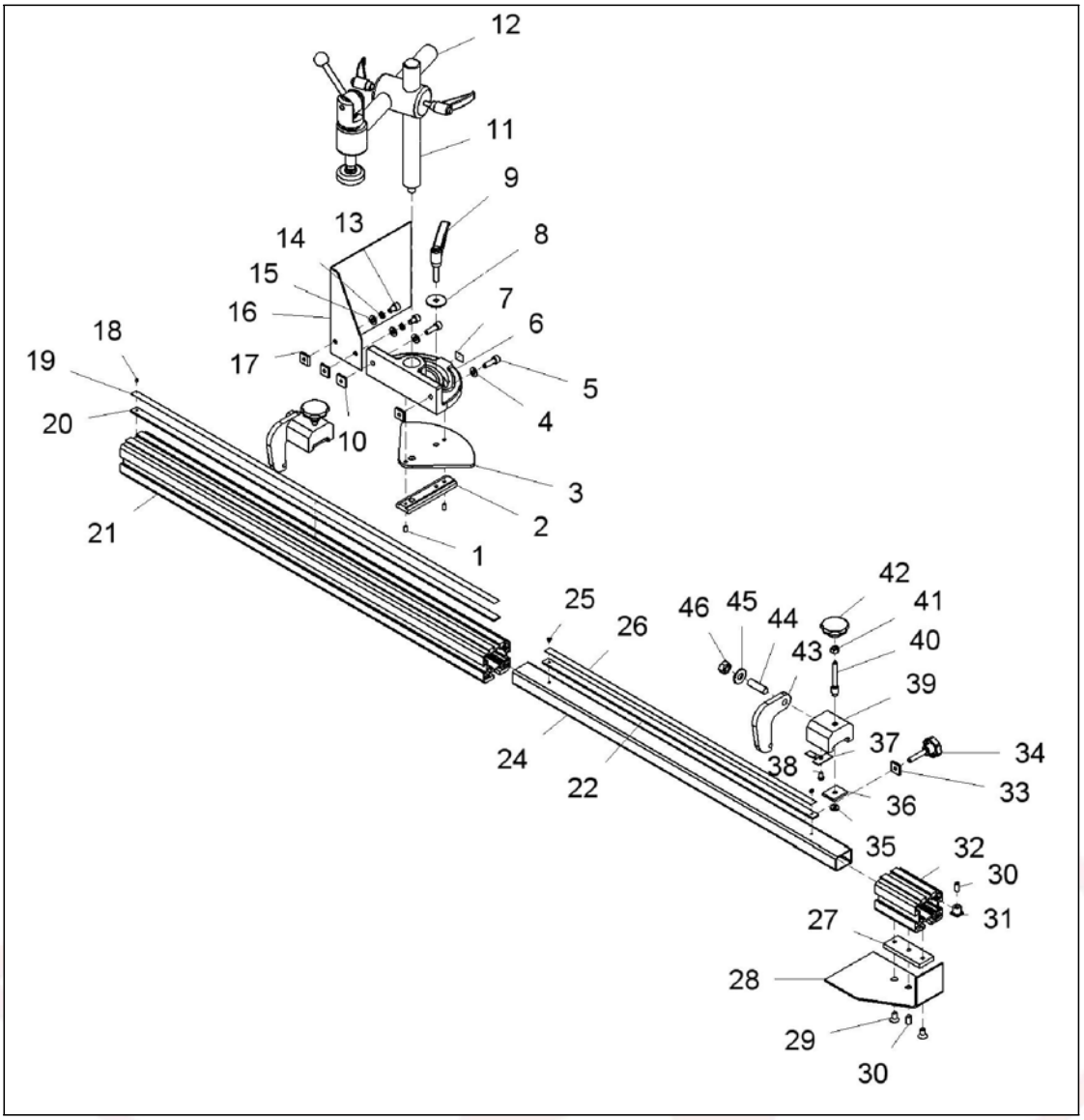
SF250M.08.00.00.00 BRACKET TABLE FOR FULCRUM OF DETAIL (OPTION)

1	S315.109.00.01.00	COTTER	1
2	DIN 7934	WASHER AM10	2
3	A583-73-M10-30	HANDLE	2
4	S315.32.01.00.00	EXTENSION TABLE500X320	1
5	DIN 914	FIXING SCREW M6X16	2
6	DIN 551	FIXING SCREW M8X20 -POLYAMIDE	2
7	DIN 555	NUT M8 - POLYAMIDE	2



S315.50.00.00.00 ELONGATION TABLE 500X320 MM (OPTION)

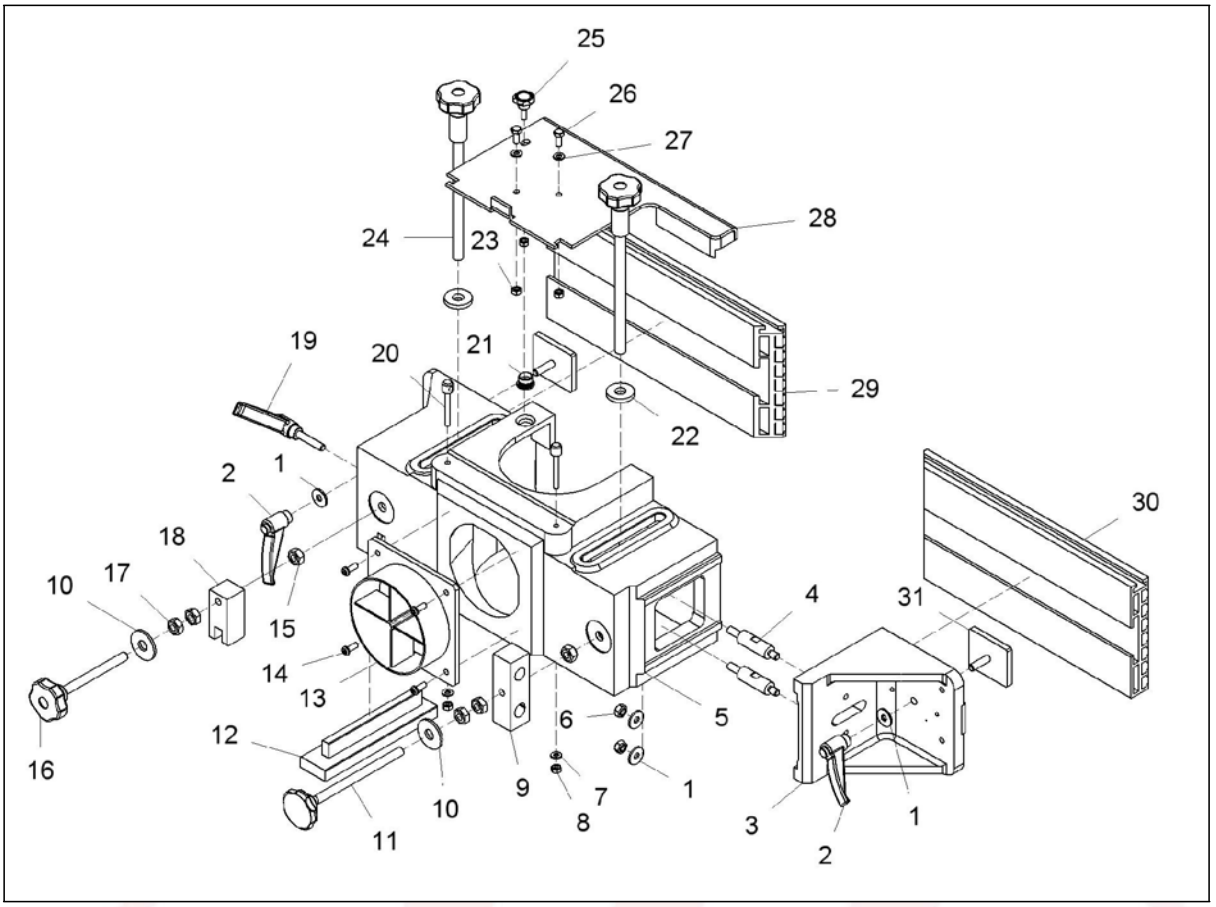
1	S315.32.01.00.00	ELONGATION TABLE 500x320	1
2	DIN 125A	WASHER M10	2
3	DIN 912	SCREW M10X30	4
4	DIN 913	FIXING SCREW M6X16	2



LVF.00.00.00.00 REVOLVING RULER FOR MILLING MACHINE (OPTION)

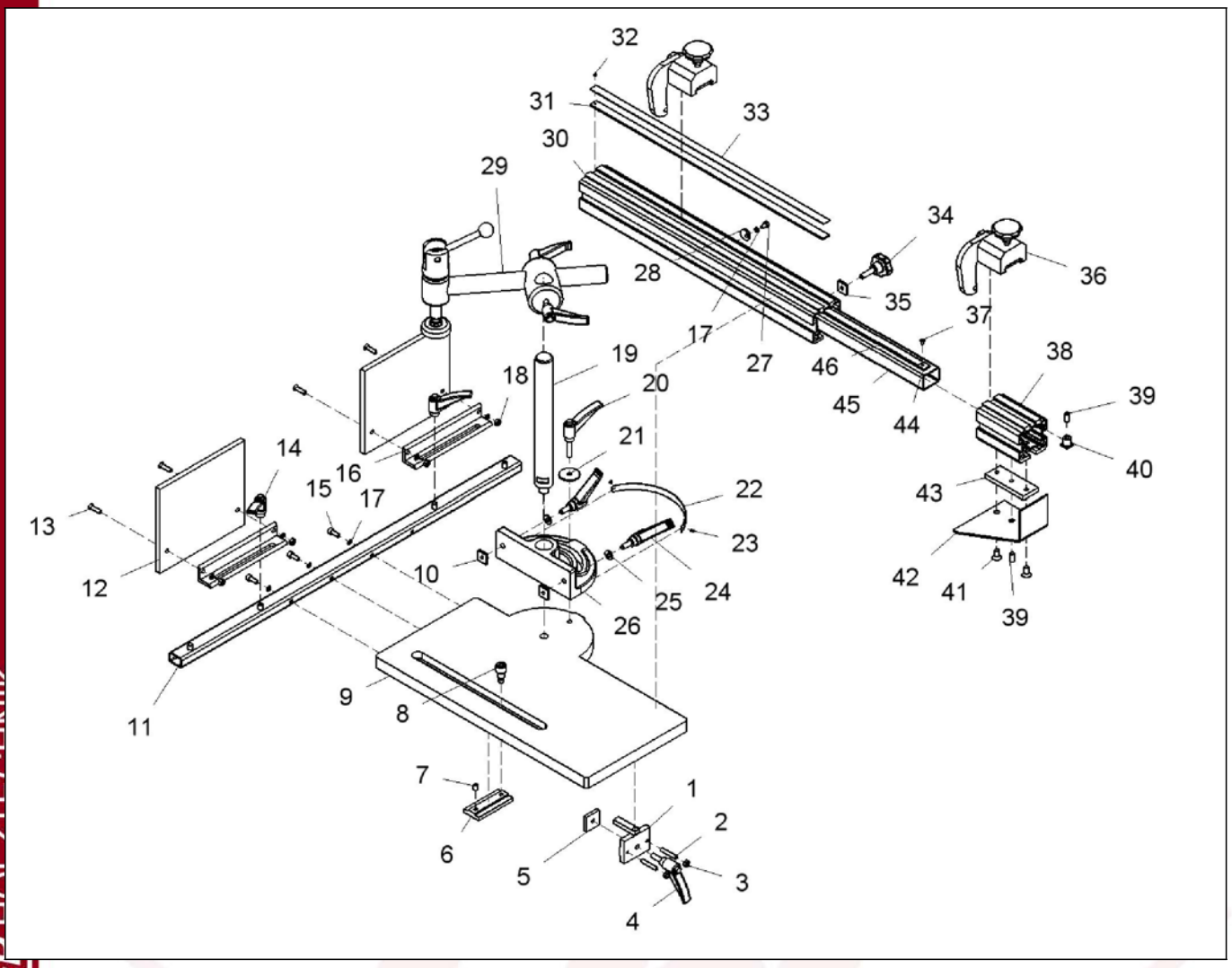
1	DIN 1481	SPRING PIN Ø 5X12	2
2	LVF 00.00.00.03	COTTER	1
3	LVF 00.00.00.05	PAD	1
4	DIN 125A	WASHER AM 8	2
5	DIN 912	SCREW M8x25	2
6	LVF 00.00.00.10	BASE	1
7	ТАБ.113	RULER ARROW	1
8	UN 732	WASHER ø35xø9x2,5	1
9	A583-65-M8-35	HANDLE M8X35	1
10	S315.46.00.00.05	COTTER QUADRATIC	2
11	LVF 00.11.00.09	COLUMN	1
12	LVF 00.11.00.00	CLAMPING DEVICE	1
13	DIN 912	SCREW M 8X12	2
14	DIN 7980	SPRING WASHER 2-8H	2
15	DIN 125A	WASHER M8	2
16	LVF 00.12.00.01	PROTECTOR	1
17	S315.46.00.00.05	COTTER QUADRATIC	2
18	DIN 551	FIXING SCREW M 4X5	1
19		RULER 0 - 900	1
20	S315.47.00.00.07	RIM15x3, L=900MM	1
21	S315.47.00.00.06	PROFILE T4564, L=900	1
22	LVC 1219U-35.00.07	RIM 15X3	1
24	LVC1219U-35.00.06	TUBE	1
25	DIN 7337 A	BLIND RIVET Ø4X8	2

26	H 110 - 2000L	RULER 0-2000 LEFT - RIGHT	1
27	S2300.13.00.00.10-01	PLATE	1
28	LVF 00.01.00.32	PLATE	1
29	DIN 7991	SCREW M 8X16	2
30	DIN 913	FIXING SCREW M 8X16	2
31	LVC1219 X.00.00.09	COTTER QUADRATIC	1
32	LVC 600U-35.00.01	SHORT PROFILE	1
33	S315.46.00.00.05	COTTER QUADRATIC	1
34	F178-40-M08-40	HANDLE STAR M8X40	1
35	S2300.13.00.00.18	WASHER	1
36	U.00.07	PLATE	1
37	TS315.21.02.02.11	ARROW	1
38	ISO 7380	SCREW M 6X10	1
39	TS315.21.02.02.01	SLIDER	1
40	U.00.06-00	SCREW	1
41	DIN 934	NUT M8	1
42	F175-50-M8	HANDLE STAR M8	1
43	TS315.21.02.02.07	STOP	1
44	DIN 913	FIXING SCREW M12x40	1
45	DIN 134	WASHER M12	1
46	DIN 985	NUT M 12	1



PF180-00.00.00-01 PROTECTION DEVICE ø180MM WITH INTEGRAL RULERS (OPTION)

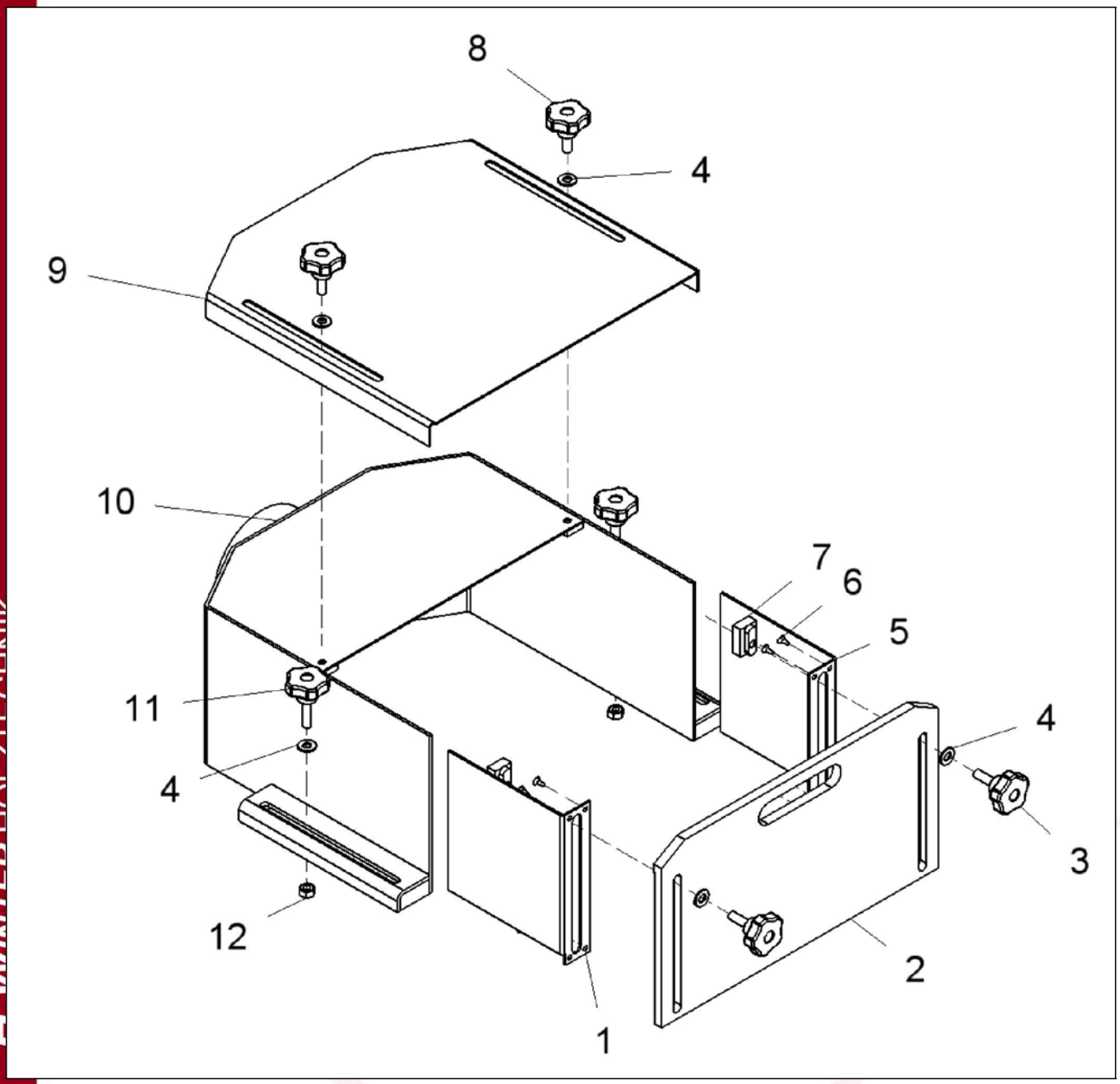
1	DIN 9021 A	WASHER M 8	4
2	A582-65-M8	HANDLE M8	2
3	PF180-00.04.00	SLIDER	1
4	PF180-00.00.12	AXIS	2
5	PF180-00.01.00	CORPS	1
6	DIN 985	NUT M 8	2
7	DIN 125 A	WASHER AM 6	2
8	DIN 934	NUT M6	2
9	PF180-00.00.06	BLOCK	1
10	DIN 9021 A	WASHER M12	2
11	PF180-00.10.00	SCREW M10X145	1
12	PF180-00.25.00	CENTERING PLATE	1
13	PF180-00.27.00	FLANGE	1
14	ISO 7380	SCREW M6X16	4
15	DIN 985	NUT M10	2
16	PF180-00.11.00	SCREW M10X110	1
17	DIN 934	NUT M10	6
18	PF180-00.00.24	BLOCK	1
19	A583-65-M8-40	HANDLE M8X40	1
20	PF180-00.00.19	SCREW	2
21	PF180-00.00.16	NUT	1
22	PF180-00.00.23	WASHER Ø32XØ13X5	2
23	DIN 985	NUT M 6	3
24	PF180-00.22.00	HANDLE M12	2
25	PM 625	HANDLE STAR 25M6x16	1
26	DIN 933	BOLT M6 x16	2
27	DIN 125A	WASHER M6	2
28	PF180-00.16.00	COVER FOR INTEGRAL RULER	1
29	PF180-00.02.00	INTEGRAL RULER RIGHT	1
30	PF180-00.03.00	INTEGRAL RULER LEFT	1
31	PF180-00.32.00	PLATE C SCREW	2



MSH .00.00.00 TENONING TABLE FOR MACHINES WITH FORMAT BOARD (OPTION)

1	MSH.25.01.00	GUIDE	1
2	DIN 913	FIXING SCREW M 6	2
3	DIN 934	NUT M6	2
4	A583-65-M8-25	HANDLE M8X25	1
5	MSH.25.00.02	NUT	1
6	MSH.00.00.21	COTTER	1
7	DIN 913	FIXING SCREW M 8X10	1
8	MSH.00.00.22	AXIS - GUIDE	1
9	MSH.00.00.09	MOBILE TABLE	1
10	S315.46.00.00.05	COTTER QUADRATIC	2
11	MSH.00.01.00	SUPPORT	1
12	MSH.00.00.02	PROTECTOR	2
13	DIN 963A	SCREW M 6X20	4
14	A582-65-M8	HANDLE M8	2
15	DIN 912	SCREW M 6X16	3
16	MSH.00.00.03	V-SHAPE	2
17	DIN 7980	SPRING WASHER 2-6H	8
18	DIN 934	NUT M6	4
19	MSH.00.00.14	COLUMN	1
20	A583-65-M8-35	HANDLE M8X35	1
21	UN 732	WASHER ø35xø9x2,5	1
22	T1304	SCALE 60° – 0° – 60°	1
23	DIN 7337 A	BLIND RIVET Ø2,4X6	2
24	A583-65-M8-20	HANDLE M8X20	2
25	DIN 125A	WASHER M8	2
26	LVF 00.00.00.10	BASE	1

27	DIN 933	BOLT M6X10	1
28	DM5-401.91.50.22	ECCENTRIC	1
29	LVC600.27.00.00	CLAMPING DEVICE	1
30	MSH.00.11.24	RULER L=550	1
31	MSH.00.11.25	RIM 15X3 L=548	1
32	DIN 551	FIXING SCREW M 4X5	1
33		RULER 0 - 600 LEFT - RIGHT	1
34	F178-40-M8-30	HANDLE STAR Ø40 M8X30	1
35	S315.46.00.00.05	COTTER QUADRATIC	1
36	TS315.21.02.02.00	STOP	2
37	DIN 7337A	BLIND RIVET Ø4X8	2
38	S2300.13.00.00.22	SHORT PROFILE	1
39	DIN 913	FIXING SCREW M 8X16	2
40	LVC1219 X.00.00.09	COTTER QUADRATIC	1
41	DIN 7991	SCREW M 8X16	2
42	MSH.00.11.32	SUPPORT	1
43	S2300.13.00.00.10-01	PLATE	1
44	MSH.00.11.02	RIM 15X30 L=630	1
45	MSH.00.11.06	RECTANGULAR PIPE	1
46		RULER 0-600 LEFT - RIGHT	1



FDM5-321.90.00.00 TENONING HOOD ø320

1	FDM5-321.90.00.11	RIGHT ANGLE	1
2	FDM5-321.90.00.03	FRONT COVER	1
3	F175-40-M8-25	HANDLE STAR Ø40 M8X25	2
4	DIN 125A	WASHER AM 8	6
5	FDM5-321.90.00.13	LEFT ANGLE	1
6	DIN 7981	SCREW FOR WOOD 4X10	8
7	FDM5-321.08.00.12	COTTER	2
8	F178-40-M8-20	HANDLE STAR Ø40 M8X20	2
9	FDM5-321.90.00.03	UPPER COVER	1
10	FDM5-321.90.10.00	CORPS	1
11	F178-40-M8-30	HANDLE STAR Ø40 M8X30	2
12	DIN 934	NUT M8	2