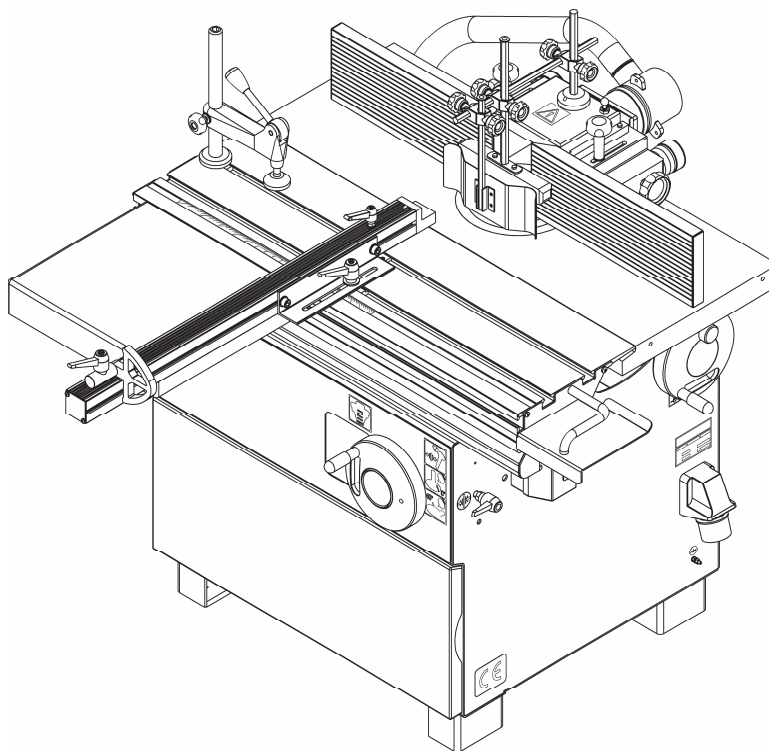




SINGLE-SPINDLE MILLING MACHINE

WITH A TILTING SPINDLE AND SLIDING TABLE

FSN 300A



translation of an original
Service instructions handbook

updated 3 / 2017

ROJEK

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Foreword

These instructions have been created by the device manufacturer and are an integral part of the machine delivery. They contain basic information for qualified operating staff and describe the environment and manners of the machine use for which it has been designed, and also contain any information necessary for the correct and safe operation.

The machine is equipped with various safety devices protecting both the operator and the machine for its common technological use. Nevertheless these measures cannot cover all safety aspects and therefore it is necessary that the operator should read and understand these instructions before starting to use the machine. Errors made in the course of installation as well as during operation itself will thus be avoided.

Do not try therefore to put the machine into operation before you have read all instructions for use supplied together with the machine and before you have understood all its functions and working procedures.

Certain information or drawings may not be intended directly for the machine purchased by you as these instructions contain any information for various variants of this type made by our company. By comparing the respective part of the instructions with a particular machine you will find out whether or not they correspond to each other.

The manufacturer reserves the right to make partial alterations within continuous technical machine development.

For emphasis of important passages in the basic text the bold characters and marking with a certain of the following symbols have been used:



The appeal recommending to use the procedure according to the following regulation exclusively. A failure to observe this regulation may result in death or serious injuries of the operating staff.



A warning against improper working procedures or use of the machine that may cause a danger to human health, machine functioning, the environment or economic losses.



Caution is an appeal to take due care while the following activities are being performed. Any failure to comply with this appeal may cause small injuries or damage to the machine.

Follow the instructions shown on the plates with which the machine is equipped. Do not remove or damage such plates. In the case of any damage caused to the plate contact the manufacture and renew the plate.

Note

The text and picture part of the instructions is an intellectual property of the ROJEK Co. and will remain in the company's ownership. No part of the instructions may be copied or reproduced without a prior consent nor any third persons are allowed to become acquainted with these instructions or with any part thereof.

1 Use of the machine

1.1 Purpose of the machine

The machine is designed as a single-spindle vertical milling machine with a manual workpiece feeding. Machine has a fixed table and a sliding table, both making a common plane. Vertical spindle is tiltable with adjustable height.

Machine enables semifinished products made of wood or materials based on wood to be milled with a vertical spindle.

Machine is designed for operation performed by one worker only.

Machine may not be handled by children and youngsters in any way.

1.2 Workers' qualifications

Only and expert skilled in the field of wood-machining or a worker instructed and trained by such expert may operate the machine, regardless of the sex. While working on the machine the operator must get familiar with these instructions and comply with any safety rules, regulations and provisions in force in the respective country.


1.3 Working environment

The machine must be operated in a workshop environment the temperature of which does not exceed +40° and does not drop below +5°. The relative humidity of air from 30% to 95% - non-condensing. The height above the sea level up to 1000 m. The environment classification – danger of inflammable dust fire (BE2N2).

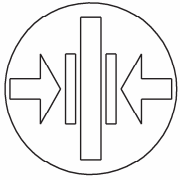

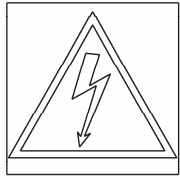
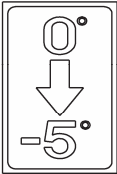
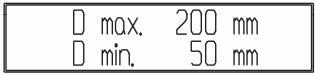

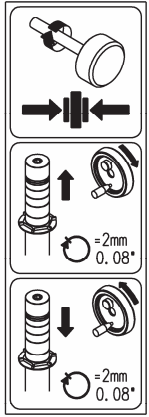
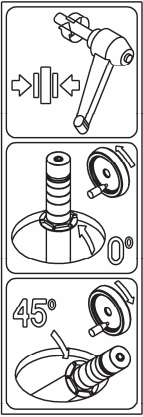
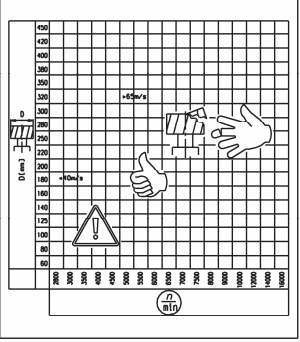
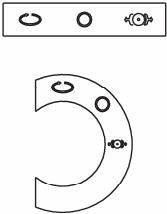



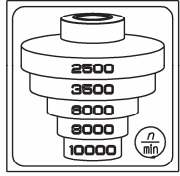
2 Machine marking

The type of machine can be identified according to the manufacturing plate fixed to the machine stand.

FSN 300 A vertical spindle milling machine with a tilting spindle and sliding table CV

ROJEK DŘEVOOBRÁBĚČÍ STROJE 517 50 ČASTOLOVICE ČESKÁ REPUBLIKA		
		
[]	[]	[]
TYP STROJE PRODUCT TYPE MASCHINENTYP	VÝROBNÍ ČÍSLO SERIAL NUMBER ERZEUGNISNUMMER	ROK VÝROBY YEAR OF MANUFACTURE BAUJAHR
	DOVOZCE IMPORTER EINFÜHRER	[]
NAPĚTÍ POWER SUPPLY SPANNUNG	[]	VÝKON POWER OUTPUT MOTORLEISTUNG
KMITOČET FREQUENCY FREQUENZ	[]	PROUD CURRENT STROM

Information plates as well as plates warning about a danger are placed on the machine.

 <p>1</p>	 <p>2</p>	 <p>3</p>
 <p>4</p>	 <p>5</p>	 <p>6</p>
 <p>7</p>	 <p>8</p>	 <p>9</p>
 <p>10</p>	 <p>11a</p>  <p>11b</p>  <p>11c</p>	 <p>12</p>

1 tightening

3 attention ! electric device

5 proper cutters

7 vertical spindle height set-up

9 range of optimal spindle rotation speed

11 a) rotating direction

11 b) OFF; still stand

11 c) electric brake released

2 attention !

4 vertical spindle position stopper

6 main switch

8 spindle tilt

10 switch of spindle electric brake release

12 setting of spindle rotation speed

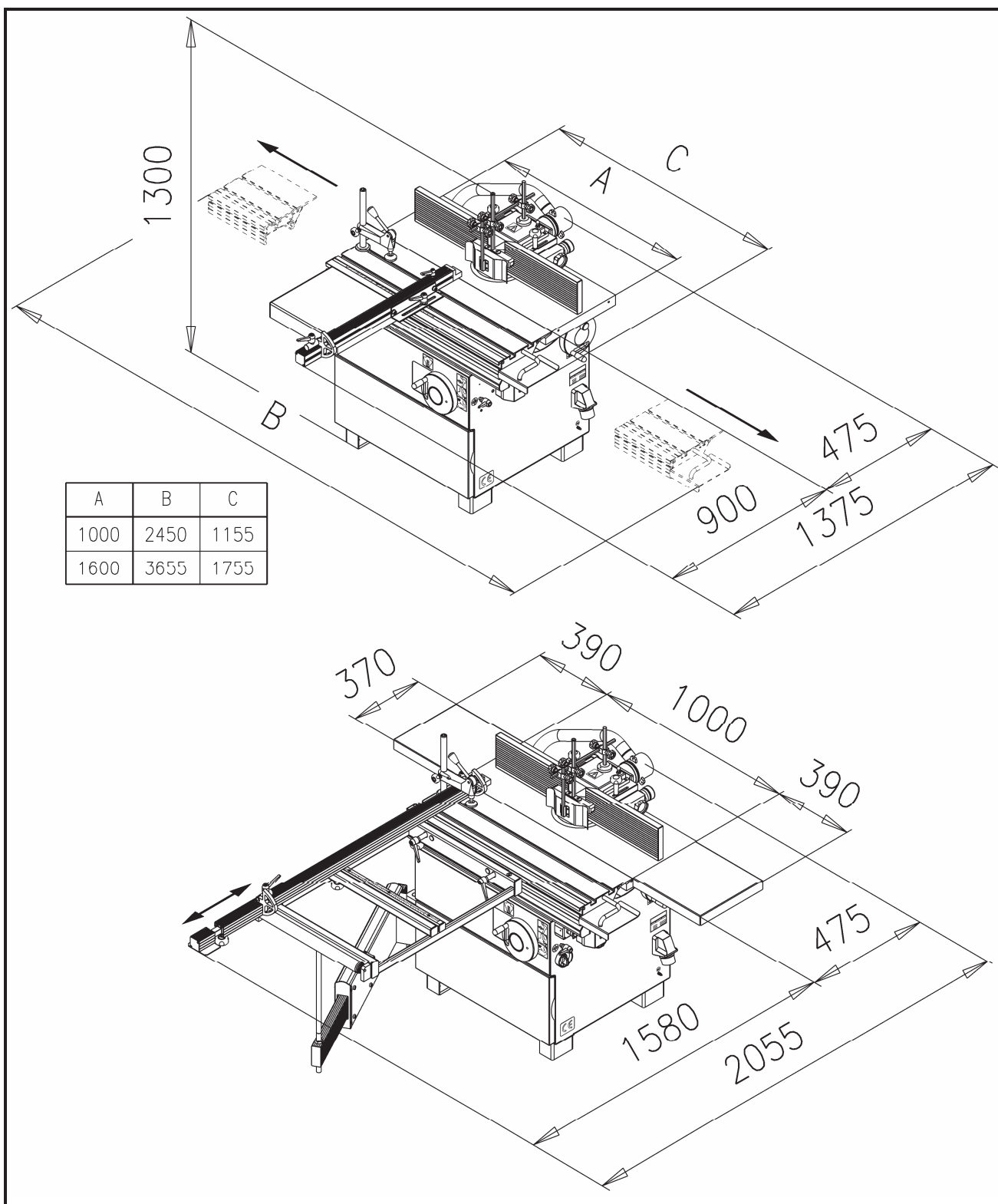
3 Technical specifications

		FSN 300 A
Motor power	kW	3; (2,2; 3,7*)
Motor rotating speed at 50 Hz	RPM	2 865
60 Hz	RPM	3 438
spindle diameter	mm	30 [35; 40; 50; (5/4)“; (5/4)”/(3/4)“]
spindle rotating speed	RPM	2 500, 3 500, 6 000, 8 000, 10 000
max. spindle lift	mm	140
spindle length	mm	130
spindle tilt		-45° ÷ + 5°
max. diameter of hole in table	mm	220
max. tool diameter under table	mm	175
max. tool diameter above table	mm	200
machine dimensions		
length		1155
with CV 310 long 1m	mm	1755
with CV 310 long 1,6 m	mm	
width with supporting table	mm	1375
with CV frame	mm	2055
table height	mm	892
max. machine height	mm	1 300
table diameters	mm	1 000 x 370
exhausting nozzle diameter	mm	100
weight (with CV long 1 m)	kg	240**
other parameters		
voltage / frequency		1f + PE + N ; 230 V / 50 (60) Hz (only 2,2 kW) 3f + PE + N ; 400(230) V / 50 (60) Hz
safeguarding	A	16 (25)
sliding table CV 310 long 1 mm		
table dimensions	mm	1000 x 310
travel length	mm	1295
sliding table CV 310 long 1,6 m		
table dimensions	mm	1600 x 310
travel length	mm	1900.

* el. motor with power output equal to 3.7 kW only for voltage 3 x 400 V / 50 (60) Hz

** 3kW; CV table extension; fixture; angular ruler; hose

3.1 Machine dimensions



3.2 Possible machine variants

	FSN 300 A
electric motor power output	
2.2 kW 1 phase	1
3 kW 3 phases	1
3,7 kW 3 ph.(3 x 400 V)	1
operating voltage:	
1 x 230 V	1
3 x 230 V or 3 x 400 V	1
frequency: 50 or 60 Hz	1
spindle	
with a push-type spring collet for a shank tool Ø 8; 12; 12.7 mm	
one-piece – fixed	1
two-piece – replaceable	1
Sliding table	
CV 310 long 1m 1,6 m	1
milling spindle brake releasing (only for machines with CEG motors)	1
undercarriage	1

3.3 Values of chips removed, feed and power output

power output (kW)	feed (m/min)	machined width (mm)	chip removal (mm)
2.2	5	130	4.5
3	5	130	7

The value given above apply for spruce wood of a common quality with humidity equal to about 12 to 15%, with sharp tools. These values may be thought initial while the machine is being put into operation. The inverse proportion applies between the machined surface (machined width x chips removed) and the feed (the larger the surface the smaller the feed) and the direct proportion applies between the machined surface and the power output (the larger the surface the higher power output). The values in the table may roughly be used for both planing and thicknessing as well as for milling with a vertical spindle. After a long use of the machine these values may become changed a little. E.g. when hard wood is machined and the tool is a bit blunt, an appropriate decrease of the values above should be taken into account.

The size of chips removed depending on the machined width and hardness of the workpiece may be chosen only up to such values with which the driving electric motor does not become overloaded. Otherwise the electric motor thermal protection will be engaged and the machine will stop.

While any material with a low thickness is being machined, a worse quality of machining must be taken into account due to the part springing.

3.4 Specifications concerning noise of the device (EN 848-1:1999; ISO 7960:1995)

		FSN 300A
Level of noise L_{pf}	without tool	$L_{pA_{eq}} = 70.4 \text{ dB(A)}$
	with tool	$L_{pA_{eq}} = 83.0 \text{ dB(A)}$
Level of acoustic output A (L_{WA}) EN ISO 3746:1995 K = 4 dB	without tool	$L_{WA} = 78.6 \text{ dB(A)}$
	with tool	$L_{WA} = 88.5 \text{ dB(A)}$

The values given are those of emissions and do not necessarily mean any safe working values. Although there is a correlation between the value of emissions and the levels of exposure, these values cannot be used for reliable determination whether or not additional measures are necessary. The factors influencing actual levels of workers' exposure include the properties of the working area, other sources of noise etc., e.g. the number of machines and the other neighbouring procedures. Also the highest permissible levels of exposure may vary in different countries. This information should help the machine user to evaluate the risk and the risk rate in a better manner.

3.5 List of used source documents

Directive **2006/42/EU** stating technical demand on machinery.

Directive **2014/30/EU** about assessing products conformity from view point of electromagnetic compatibility when delivered on market

Directive **2014/35/EU** about assessing conformity of electric devices intended for use under specific limit voltages when delivered on market

EN ISO 12100 : 2011 (EN ISO 12100 : 2010)

Machinery safety - General fundamentals for designing - Risk assessing and reducing

EN ISO 13857 : 2008 (EN ISO 13857 : 2008)

Machinery safety - Safe distances to avoid dangerous places reaching by hands/arms ~ feet/legs

EN 349+A1 : 2008 (EN 349 : 1993 + A1 : 2008)

Machinery safety - the smallest gaps to avoid human parts being pressed

EN ISO 13850 : 2016 (EN ISO 13850 : 2015)

Machinery safety - Emergency stopping - Fundamentals for designing

EN ISO 14120 : 2016 (ISO 14120 : 2015) Machinery safety - Guards - General fundamentals for designing and production of fixed and movable guards

EN ISO 13849-1: 2016 (EN ISO 13849-1 : 2015)

Machinery safety - Safety parts of cotroling systems - Part 1: General fundamentals for designing
EN 848-1+A2 : 2013 (EN 848-1 : 2007 + A2 : 2012) Woodworking machinery safety - One-sided shapers with rotating tool - Part 1: One-spindle vertical shapers

EN 1037+A1 : 2008 (EN 1037 : 1995 + A1 : 2008) Machinery safety - avoiding an unwished start

EN ISO 14119 : 2014 (EN ISO 14119 : 2013)

Machinery safety. Blocking devices connected with guards. Fundamentals for designing +choice.

EN 55011 ed.3 : 2010 (EN 55011:2009) Industrial, scientific and medical equipments - Characteristics of high frequency interference - Measuring limits and methods

EN 60204-1 ed. 2 : 2007 (EN 60204-1 : 2006)

Machinery safety - Electric equipment of machines - Part 1: General fundametals

EN 60073 ed.2 : 2003 (EN 60073 : 2002)

Basic and safety fundamentals for interface man-machine, for marking and identification - informers and controlers coding fundamentals

EN 80416-1 ed.2 : 2009 (EN 80416-1 : 2009)

Basic rules for signs for using on objects - Part 1: Making of graphical signs for registration

EN 80416-2 : 2002 (EN 80416-2 : 2001)

Basic rules for graphical signs to be used on objects - Part 2: Arrows form and using.

4 Safety instructions

4.1 General

This machine is equipped with various safety devices protecting both the operator and the machine. Nevertheless, this cannot cover all safety aspects and therefore the operator, before putting the machine into operation, must read this chapter and understand it fully. Furthermore the operator must also take into account other aspects of danger relating to the surrounding conditions and material. This handbook comprises three categories of safety instructions.



The appeal recommending to use the procedure according to the following regulation exclusively. A failure to observe this regulation may result in a death or serious injuries of the operating staff.



A warning against improper working procedures or use of the machine that may cause a danger to human health, machine functioning, the environment or economic losses.



Caution is an appeal to take due care while the following activities are being performed. Any failure to comply with this warning may cause small injuries or damage to the machine. Follow the instructions on plates with which the machine is equipped. Do not remove or damage such plates. In case of any damage caused to a plate contact the manufacturer and renew the plate.

4.2 Basic safety requirements



Do not touch, under any circumstances, the low-voltage devices on the electric control panel, transformers, motors and terminal blocks which are equipped with a plate.

- Before connecting the machine to the mains make sure that all safety items are in their active positions and check their functioning. If it is necessary to remove the doors or protective covers, switch off the main switch and lock it or disconnect the machine by pulling the plug out.



Do not connect the machine to the mains while the door or protective cover is removed.

In order to avoid improper operation get acquainted with location of switches before switching the machine on.

Remember the position (location) of the emergency stop switch

so that you can use it promptly at any time.

- Be careful and do not touch any switches incidentally while the machine is being operated.
- Do not touch any rotating tool with naked hands or with any other object under any circumstances.
- In the case that you are not going to work on the machine, turn off the machine by the switch on the control panel and disconnect the power supply from the machine.
- Before cleaning the machine, switch off and lock the main switch or disconnect the machine by pulling the plug out.
- Before doing any maintenance work inside the machine switch off and lock the main switch or disconnect the machine by pulling the plug out.
- If the machine is used by more workers, do not proceed to other work without informing the other worker about what procedure you want to use.

- Do not alter the machine in any manner which might cause any risk to its safe operation.
- If you have any doubts on correctness of your procedure, contact a responsible person.



- Do not neglect performance of regular inspections in accordance with the instructions for use.
- Check and make sure that no disturbances occur on the machine caused by the user.
- After the work is finished, adjust the machine so that it is ready

for another series of operations.

- Should a failure in power supply occur, switch off the main switch immediately or disconnect the machine by pulling the plug out.
- Do not paint, make dirty, cause any damage to, alter or remove safety plates. If they become illegible or lost, contact the manufacturing plant and renew the plates.

4.3 Clothes and personal safety



- Experience shows that injuries are caused by various personal articles, e.g. rings, watches, bracelets etc. Therefore take them off before starting the work, button the sleeves, take off a tie, which may be caught with various parts of the working ma-

chine. Pin your hair together so that it does not flutter freely and wear suitable shoes recommended or prescribed by labour-safety regulations of all countries.

- Wear safety outfit (goggles, apron, safety shoes etc.).
- In the case of any obstacles above your head – in the working area - wear a helmet.
- Always wear a protective mask while machining any material that produces dust while being machined.
- Never wear any loose working clothes.
- Do not work on the machine under influence of drugs or alcohol.
- If suffering from dizziness, weakness or faintness, do not work on the machine.

4.4 Safety regulations for machine operator



Do not put the machine into operation before you get acquainted with the contents of the instructions for use.

- Make sure that electric cables are not damaged so that injuries caused by electric current leaking (electric shocks) are avoided.
- Check regularly that safety covers are mounted properly and that they are not damaged. Repair damaged covers immediately or replace with other ones.
- Do not put the machine with the cover removed into operation.
- Never use any tools that are distorted or broken.
- Always use the tool suitable the work given, which corresponds to the machine specifications.
- Replace blunt tools as soon as possible as blunt tools are often a cause of injuries or damage.
- Never use the tools at speeds higher than those recommended by the respective manufacturer.
- Do not remove or interfere otherwise in safety devices such as covers, end switches, and do not block them mutually.
- While handling parts above your possibilities, ask for assistance.
- It is recommended not to work on the machine during a storm.

4.5 Safety regulations for maintenance

Do not do any maintenance work before you get acquainted with the instructions for maintenance thoroughly.



- Before you start to perform any maintenance work, always turn off the main switch and lock it, or disconnect the machine by pulling the plug out. A possibility of accidental putting the machine into operation by another person is thus avoided.
- Any maintenance work on electric parts of the equipment may be done by a qualified person only.
- Even if the machine is stopped, the power supply is not disconnected. Always switch off the main switch and lock it or disconnect the machine by pulling its plug out.
- Do not clean the machine or its peripheral devices even if the machine is completely out of operation, unless the main switch is switched off and locked or the plug is pulled out from the mains socket.
- Keep your fingers in a distance from belts and belt pulleys.
- While replacing electrical parts of the equipment, switch off the main switch, lock it or disconnect the machine by pulling the plug out. Faulty parts should be replaced only with products having the same specifications as the original ones.
- Do not remove or alter blocking of limit switches or any other safety devices.
- Do not switch the machine on before all covers removed for the purposes of maintenance are put in their places again.
- Always keep the maintenance area including the working place clean.



- Any maintenance work must be done by a qualified staff in accordance with the instructions issued by the machine manufacturer.
- Read the instruction manual for maintenance men carefully and completely.
- For replacement of parts and necessary things, get in advance those being identical with the original type and complying with standards.
- Use only specified kinds or lubricating oils and grease or those equivalent to them.
- Do not use compressed air to clean the machine or to remove chips.
- Always check the results while a responsible person is present.

4.6 Safety regulations for working place



- Always ensure a sufficient working area and free access to the machine and peripheral devices.
- Put tools and any other obstacles in the place designed for this purpose, in a distance from the machine.
- Ensure sufficient lighting in the working area which will not create shadows or cause the stroboscopic effect. For safe and quality work the hygienic standards specify the minimum intensity 500 lx.
- Never put any tools or any other objects on working tables or covers.

5 Transport and storage

5.1 Transport and storage

While transporting or handling the machine, be most careful and let this activity be done by qualified personnel especially trained for this kind of activity.



**While a machine is being loaded or unloaded, make sure that no person or subject gets pressed by the machine !
Do not enter the area under the machine lifted by a crane or a high-lift truck !**

During transport or storage the machine must be protected against

excessive impacts and humidity.

It should be stored in a shelter at temperatures ranging from -25°C to 55°C.

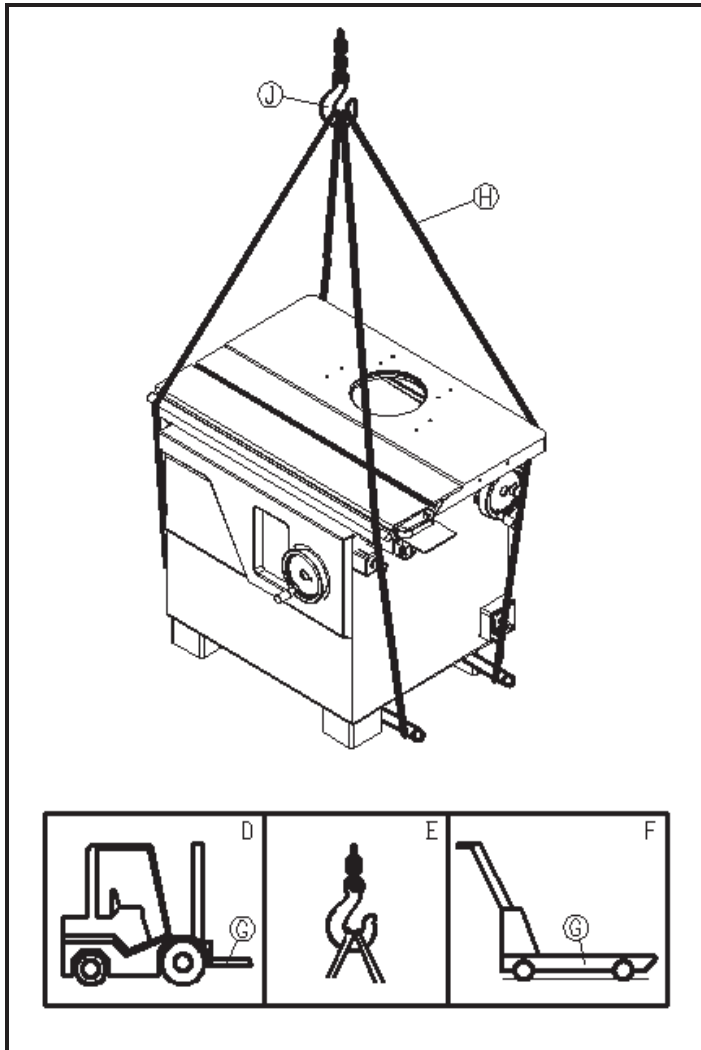
As standard, the machine is wrapped up in a foil and is transported this way. Upon request the machine may also be packed in a wooden box.

5.2 Machine lifting

The machine or its individual parts may only be lifted by means of an approved lifting device with verified lifting capacity. It is recommended to use: D - high-lift truck E - crane or any other lifting device F - manual lifting carriage



Use a high lift with forks of a sufficient length !



Prepare a high-lift truck (D) or a manual lifting trolley (F) with sufficient lifting capacity

- put the forks (G) below the machine.
- Should you use a crane (E) or a similar hoisting equipment, proceed as follows:
 - prepare 4 lifting ropes (H) at least 2 m long
 - fix the ropes to crane (J) hook with required capacity
 - place the other end of the ropes onto lifting rods according to figure left (rods are not a machine delivery) part
 - after lifting a machine slightly check stability of machine hanging on ropes
 - lift the machine carefully and slowly and then move it, without jerking, to chosen standing place.

The mass of a FSN 300 A is **260 kg**.

A machine can be heavier, the mass depends on a machine making as per ordered specification.

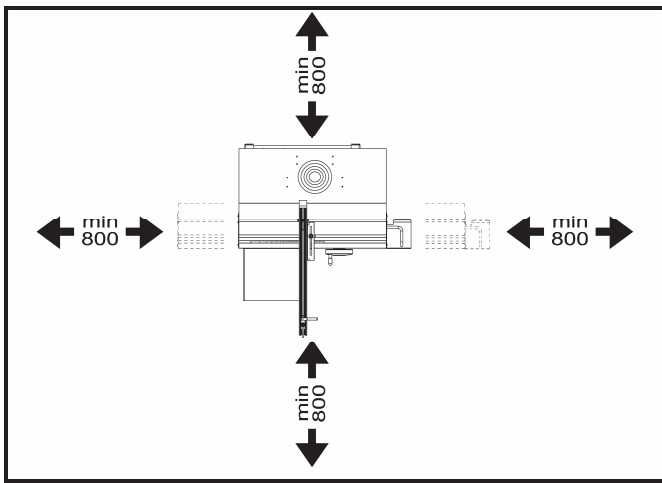
6 Positioning the machine

Remove the protective coating from the working tables and other parts of the machine either with paraffin oil or any similar solvent, do not use petrol or similar solvents for this activity – they might cause reduced corrosion resistance of certain parts of the machine.

The working area size depends on the type of the machine, assumed working operations and size of material machined.

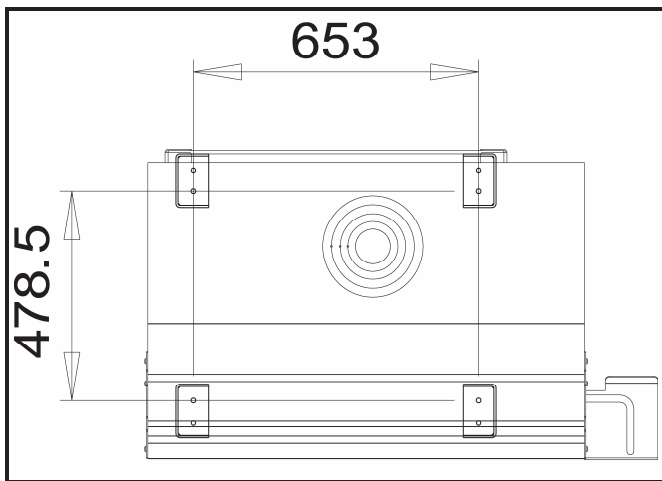
Do not forget about the space for location of a sufficiently effective exhausting system or connecting hoses for the central exhaustion.

6.1 Working area



It is important to maintain free area of 0.8 m around the machine, which is required for the working place. If any long material is machined, it is necessary to have a sufficient room in front of the machine as well behind it in the places of material input and output.

6.2 Levelling and fixing the machine



In the lower part of the stand the machine is equipped with legs with levelling bolts and holes for anchoring bolts. Use steel washers under the levelling bolts (included in the delivery) and level the machine horizontally with tolerance of 1mm/1000 mm and screw in to the floor (anchor). The attached drawing shows the location of the anchoring holes on the machine.

7 Connecting of exhaust system

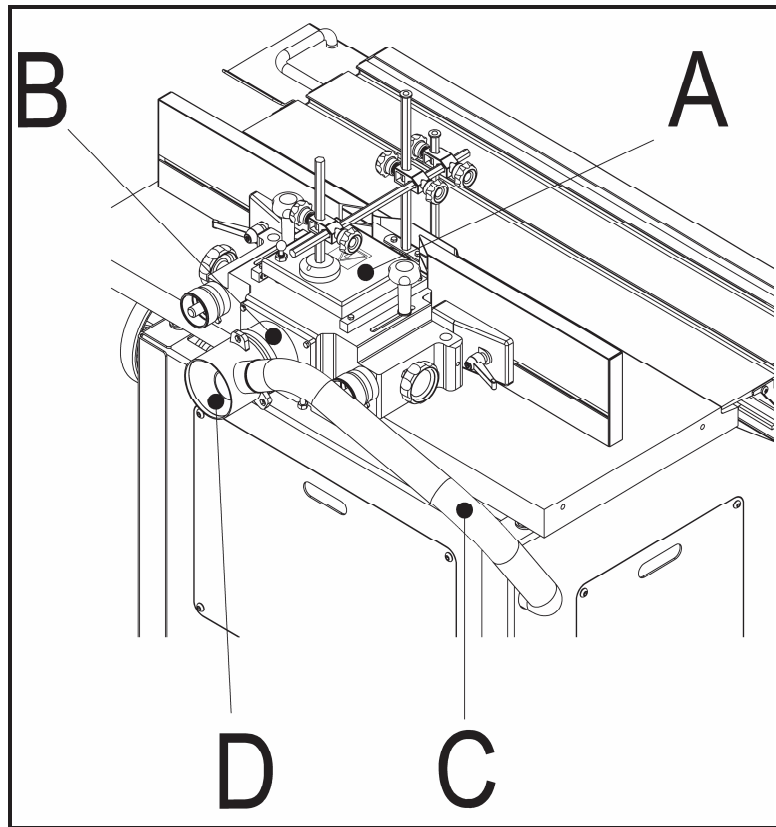
For the proper functioning of the machine, exhaustion equipment with minimum exhaustion capacity of 570 m³/hour and minimum speed of air in the pipes equal to 20 m/s for dry particles and 790 m³/hour and minimum speed of air in the pipes equal to 28 m/s for wet particles is necessary.



Work on the machine only with the exhaust system running !
Switch on the machine drive and exhaust system at the same time !

The exhausting is lead out by a hub **B** on vertical spindle guard **A**.
Connect it by a flexible exhaust-ing hose Ø 100 mm.

A unifying exhaustion nozzle (**D**) can be put onto hub (**B**). Nozzle can be connected with Ø 40 mm hose (**C** - lower exhaustion), and with Ø 100 mm hose, as well.



Wood waste should be liquidated in an environment-friendly manner so that the environment does not become deteriorated.

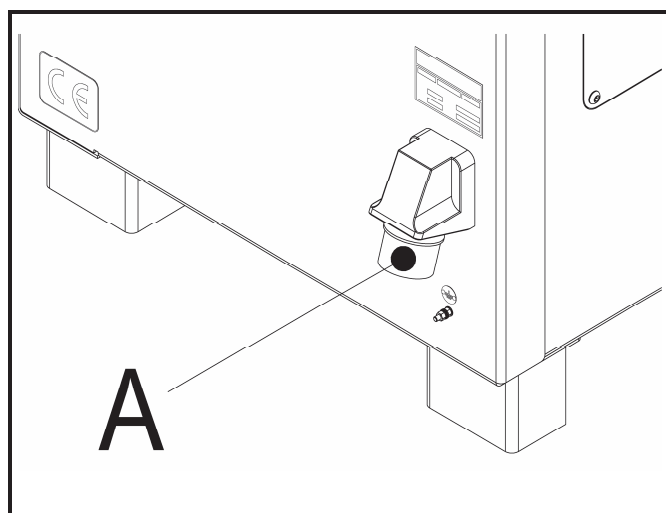
8 Connecting to the mains



The connection of the machine to the mains may only be made by a qualified person electrotechnically qualified. The person must know rated norms.

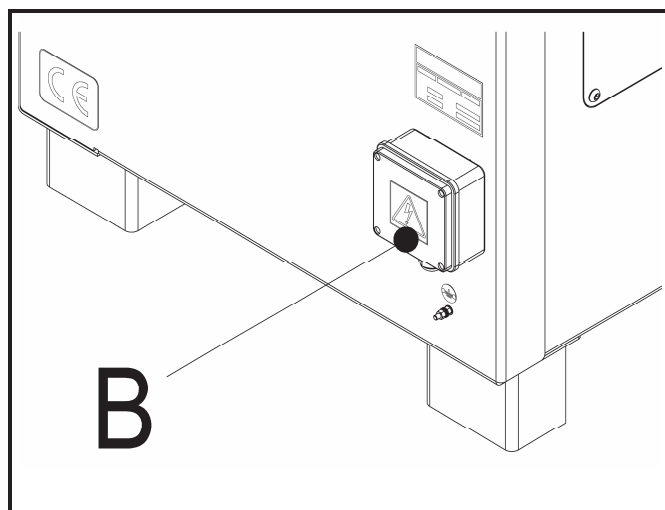
8.1 Connecting to the mains

8.1.1 Connecting the machine - up to 3 kW (installed power output up to 3 kW inclusive)



For the power supply a four-wire cable with plug CEE 16 amperes and socket CEE 16 amperes is used. The socket, from which the machine is supplied with power, must be grounded (or connected to the neutral wire) in compliance with regulations, protected by at least 16 A cut-out fuse or circuit breaker L.

8.1.2 Connecting the machine - above 3 kW (installed power output above 3 kW)



Before you start to connect the machine, make sure that the lead is not under voltage.

Unscrew the cover of terminal board (A), push the connecting cable through to the box with the terminal board and connect individual phase conductors with the corresponding terminals. Connect the protective conductor (yellow-green) to PE terminal and connect the central conductor (light blue) to terminal A, if it is required. Cross-sections of the phase conductors and of the protective wire must be in compliance with the standards prescribed.

Check that the connection is correct and screw the terminal board cover back.

8.2 Safety of operation



Damaged power supply cables must be replaced by the competent specialist immediately. Operation with damaged cables is dangerous to life and therefore forbidden !

Before putting the machine into operation make sure that the voltage and frequency specified on the machine type plate comply with the values of the mains to which it is connected.



Before adjustment and replacement of tools and before any adjustment work, alterations and maintenance work, always turn off the main switch and lock it or disconnect the machine by pulling the plug out. Putting the machine into operation by another person accidentally will thus be avoided.

8.3 Direction of rotation



When the spindles are rotating in the incorrect direction, the danger of injury is imminent.

The vertical spindle of the milling machine must turn anticlockwise - i.e. to the left, against the material – the manner of machining in the opposite direction.

Manner of machining in the same direction is forbidden.

In order to find out the direction of rotation switch on the machine for a moment.

8.4 Change in the direction of rotation

In the case of three-phase motors the direction of rotation may be changed by exchanging (reconnecting) two conductors mutually (two black ones or a black one and a brown one) in the power-input plug or in the terminal board. Be careful so that the yellow-green conductor with a phase conductor are not mistaken!

Any alteration of the electrical wiring may only be performed by an specialist with the appropriate electrical engineering qualifications !

8.5 Protection of electrical devices

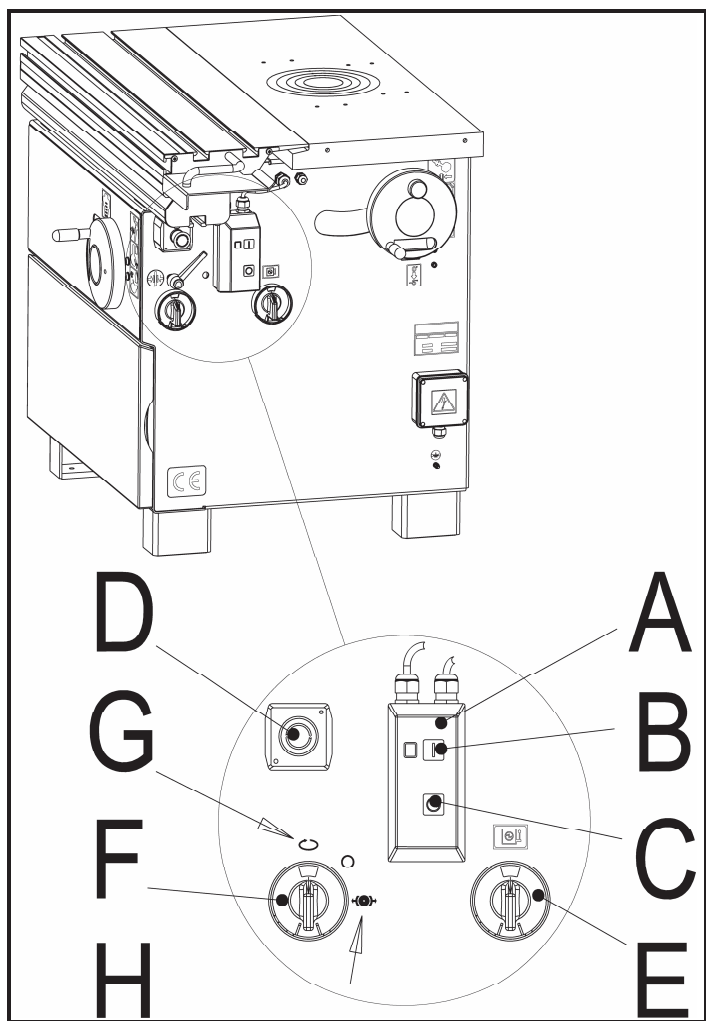
Electric motor of the vertical milling machine is equipped with an electric brake which is capable of stopping the machine in the required time – up to 10 s.

Should the electric brake fail to work properly (the spindle run-out time is longer than 10 s), it is not allowed to work on the machine !

Protection against dangerous contact with unlive wires is made by automatic disconnection from the power supply source in compliance with art. 6.3.1 of EN 60 204-1 and IEC 60 346-4-41.

8.6 Controlling the machine

8.6.1 Operating switch and emergency stop controller



Connection of the machine to or disconnection from the mains is performed by pushing the plug in a socket or pulling it out or by switching on and off by means of a lockable main switch (E). As long as the machine is not connected to the mains, it cannot be turned on by the operating switch (A.). The machine is switched on by pressing the green button (B) on the operating switch (A.). The machine is switched off by pressing the red button (C). After termination of work, disconnect the machine from the mains by pulling out the plug on the power supply cable or by switching off the main switch (E).

In the event of a power supply failure the switch will automatically turn off the machine by means of the protection controller, i.e. when the power supply is restored, the machine must be switched on again. If the motor is overloaded, the built-in circuit breaker for the motor will switch off the machine.

If the motor circuit breaker controller switches the machine repeatedly in short intervals (twice or three times), check the machine (motor functioning, blunt tools etc.).

The **emergency stop controller** (D) will remain secured in the switch-off position after use and must be released before a new start of the machine by turning the mushroom-like head slightly. Without such releasing the machine cannot be started!

The **emergency stop controller** (D) is accessible from particular working places.

8.6.2 Spindle brake releasing; motor brake releasing switch

For an easier manipulation with tool when changing the milling cutter in case of a motor with an electric brake - the machine can be equipped with a **motor brake releasing switch** (F).

position G - normal operation

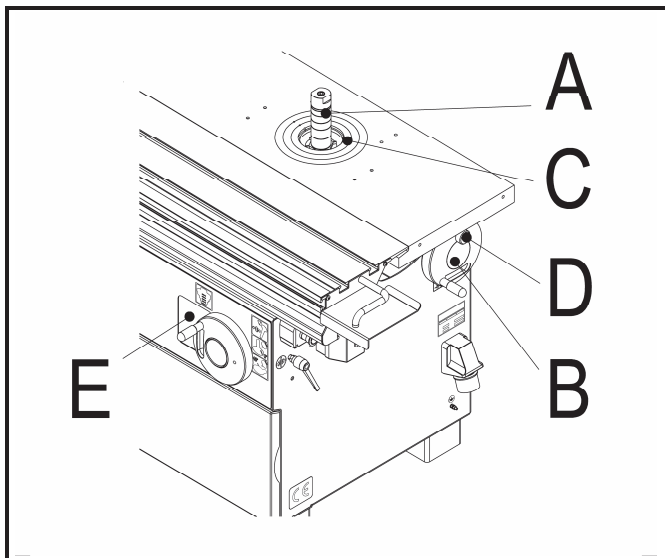
position H - brake released. After switching over to this position H, and pressing the green button (B) on the operation switch (A), the spindle brake will be released.

position 0 - OFF

If the switch is turned over through position 0, the machine must always be turned on by pushing the green button (B) on the operation switch (A).

9 Operating and adjusting the machine

9.1 Height setting



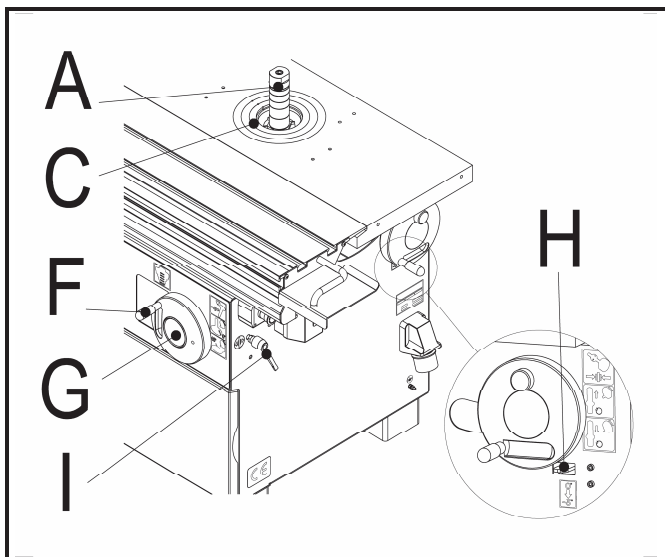
Set required spindle (A) height by hand wheel (B) and fix it by arresting rose (D).

turning right = height +
turning left = height -

Choose a proper table insert (C) as per used tool.

Set up spindle height can be read in a see-through window (E) at a measure scale.

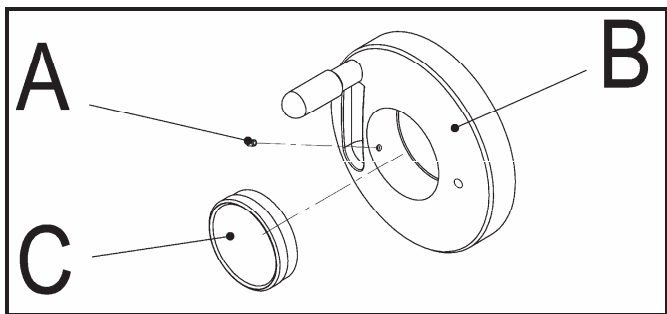
9.2 Tilting



The milling machine spindle may be tilted in the range from **minus 45°** in direction beyond ruler, means from machine operator, to plus 5° tilted from vertical in direction to the front of ruler i. e. to the operator (tilting from vertical to **+5°** is possible after pushing the backstop (H).

After releasing the fixing lever (I), the spindle (A) can be tilted by hand wheel (F). After setting required spindle position, the fixing lever must be tightened again. Tilted value is depicted at the scale of gravitational indicator (G).

Choose a proper table insert (C) as per used tool.



If gravitational indicator (C) does not read 0° in upright position, do release fixing screw (A) in hand wheel (B), take indicator out (e.g. by sticky tape), align the needle with 0° by turning the indicator. Put indicator into hand wheel and tighten fixing screw again.

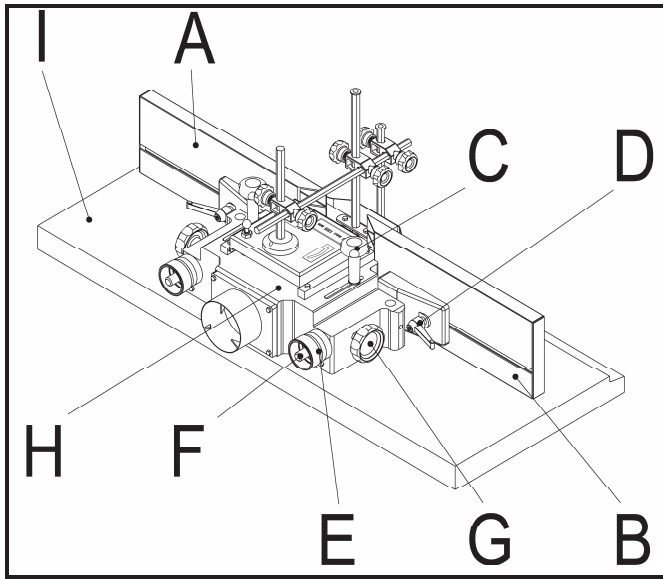


CAUTION

Adjust the machine only in machine still stand !

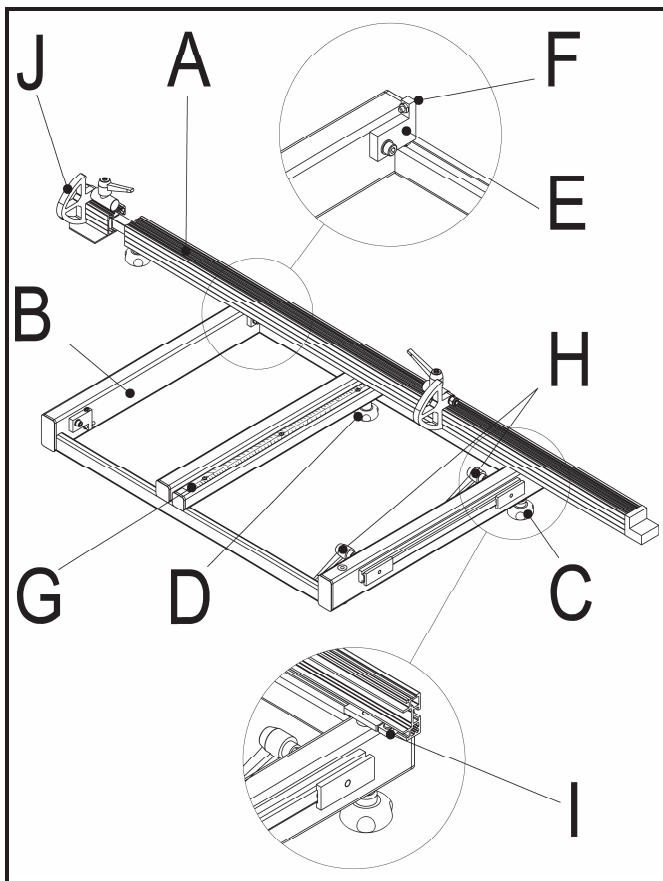
9.3 Setting the guide rulers

9.3.1 Guide rulers of the protection cover



Set the exhaustion nozzle with the cover of the milling machine and guide rulers (A,B) to the required position and fix them to the table (I) with screws with roses (C). Release setting screw (F) by roses (G). Adjust the rule position as per required splitter removal and fix the rule position. The gap between the guide rulers is set after handles (D) are released.

9.3.2 Setting the cross guide rule on sliding table CV



Setting the perpendicular position:

Cross guide ruler (A) is placed on supporting frame (B) and its perpendicular position to the saw circle is adjusted, after arresting stars (C+D) and arresting screw and counter nut (F) at tiltable stopper (E). After adjusting the screw position, do not forget to tighten the counter nut at tiltable stopper and other arresting elements.

Setting the cutting angle: Releasing arresting stars (C and D) and tilt over the stopper (E) to lower position. The cross ruler (A) can be adjusted in angle 0 - 45° according to measure scale (G).

Do not forget to tighten the arresting items after the position has been adjusted.

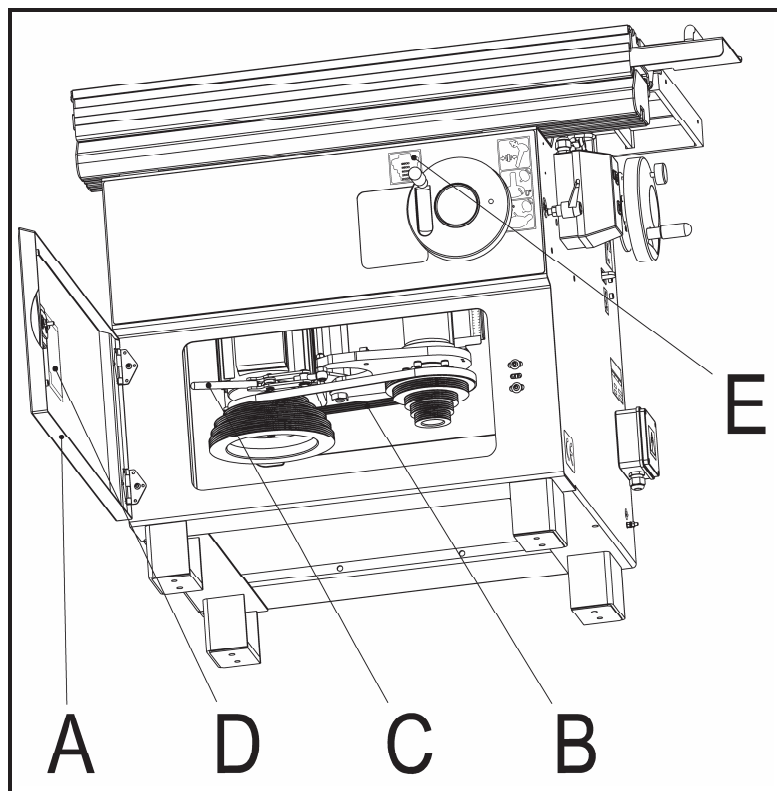
Setting the stops:

The milled workpiece width stoppers (J) are adjustable, (after releasing arresting lever), by shifting in profile groove of cross-ruler (A) with reading the value at the measure scale. Do not forget to tighten the arresting items after the position has been adjusted.

Setting the zero position: Release arresting screw (I) at the strap in lower groove of ruler profile. If the cutting width value, set by stopper (J) at cross-ruler measure scale, does not agree with reality, do repair the adjusting. Tighten arresting elements again.

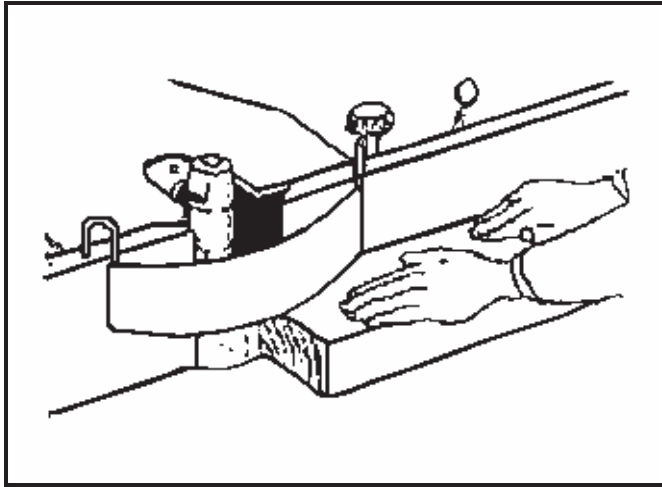
Position of the supporting frame: Release arresting levers (H). Supporting frame (B) with cross-ruler (A) can be shifted in a groove of fixed table. Cross-ruler (A) position can be also changed by replacing the ruler onto another frame (B) side. When changing the ruler position, the frame measure scale must be controlled, eventually adjusted.

9.4 Change of revolutions



Open the cover of gears (it is blocked electrically, i.e. upon opening the machine will be switched off). Release the belt (B) by lifting off the tightening lever (C). Shift the belt to the new position according to label (E) and tighten it with the handle back up to the self-locking position. Close and secure the cover of gears. Revolutions allowed for the used tool diameter are shown in the diagram (D) placed on hinged cover of the milling machine gear.

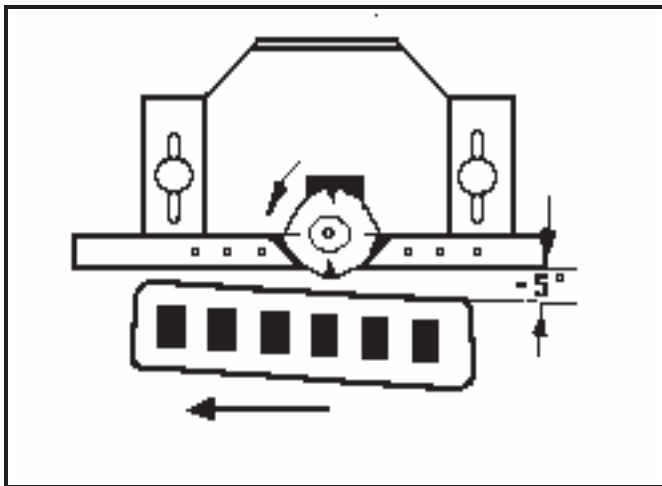
9.5 Longitudinal milling



Tool: Use suitable tools with defined chip thickness for manual feeding.

Working cycle: During any test milling, start work with a sufficiently long, wide and high workpiece. It is necessary to avoid the machine getting blocked or to use protection against kickback adapted to the workpiece dimensions. **Never adjust guide rulers while the machine being operated !** While working, feed the workpiece firmly and evenly along the guide ruler. If possible, the position of your hands must prevent the workpiece from being held along its whole perimeter.

9.6 Milling with mechanical feed

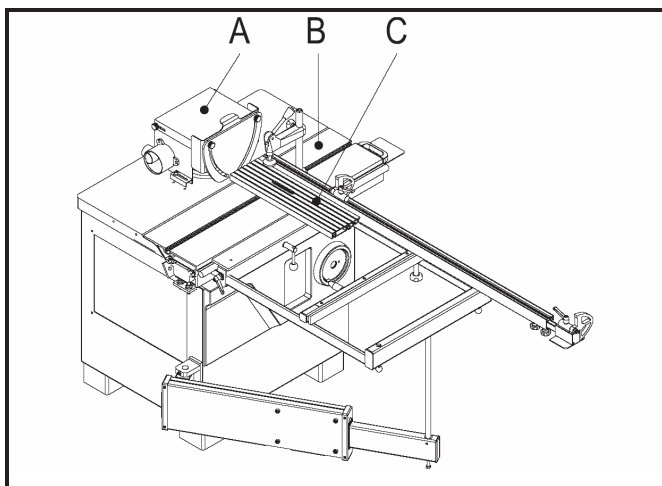


Tool: Use suitable tools for manual or partially mechanical feed for this purpose.

Working cycle: Adjust the milling ruler and fasten it duly. Set the feeding device in a slight angle against the feeding direction so that the workpiece is led safely along the guide ruler. Mount the feeding device always with its front cover close to the guide ruler even in the case of wide workpieces. Use the feeding device also for testing pieces.

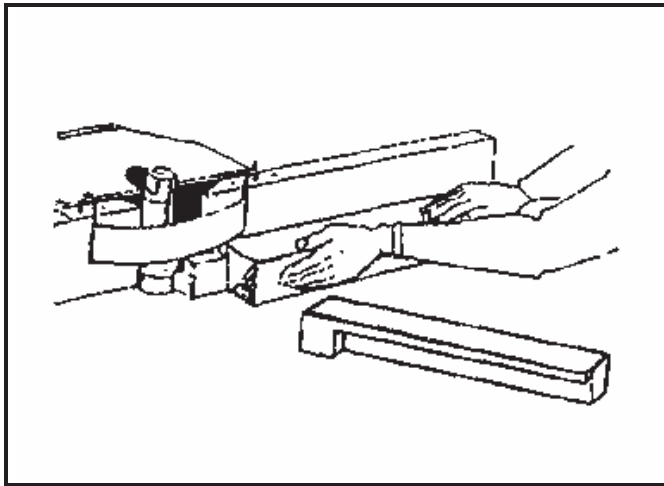
9.7 Milling of narrow workpieces - tenon jointing

Tool: Choose a tool suitable for manual feeding.



Working cycle: It is necessary to use feeding table (B) so that the workpiece can move safely while passing along the tool during tenon jointing. Fasten the workpiece by clamping to the sliding table (B). Use tool cover (A) designed for this operation. While making joints for short pieces, use aid (C).

9.8 Milling of workpieces with small cross-section



Tool: Choose the tool suitable for manual feeding.

Working cycle: Adjust the milling machine and put both halves of the ruler close to the tool. Machine the material only by means of a pressing piece! Choose the size of the pressing piece so that the hand may be put on it comfortably. According to the workpiece cross-section, create recessing for the workpiece clamping so that the workpiece is firmly pressed against the ruler and against the table of the machine.

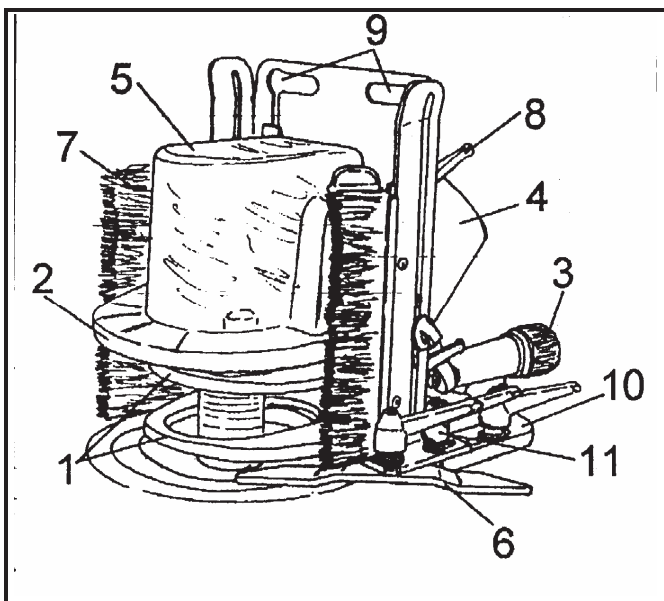
9.9 Cover of the tool for milling of bends

9.9.1 Technical specifications

the smallest radius of the milled bend allowed	mm	190
the largest diameter of the tool allowed	mm	160
spindle diameters allowed	mm	30; 35; 40; 45
exhaustion socket diameter	mm	120
height lift of the cover	mm	130
horizontal shift of the cover (largest milling depth)	mm	60*
largest milling height	mm	140
weight	kg	5.5
spindle rotation direction	± clockwise as well as anticlockwise.	

* 30 mm by the controller (3) + 30 mm by bar (10).

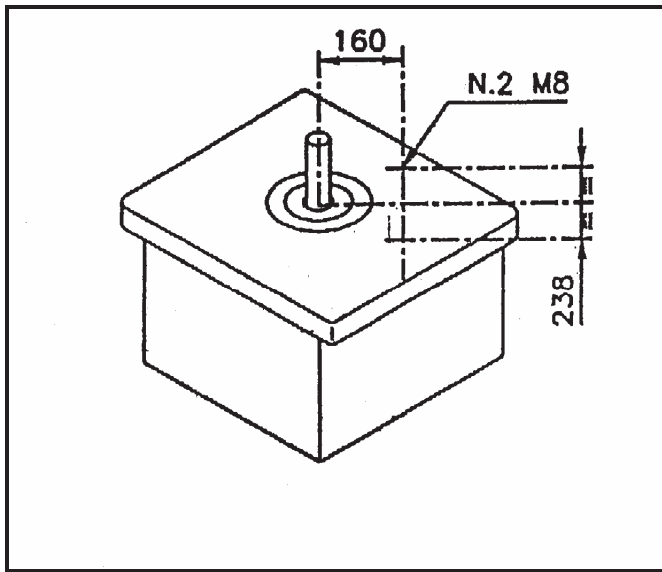
9.9.2 Description of the device



1. guide ring
2. pressing part of the cover
3. controller of adjustment of the max. possible chip removed and milling depth
4. exhaustion socket
5. cover
6. guide bar
7. brushes of the barrier for chips removed
8. handles securing the cover lift
9. groove cuttings
10. clamping bar
11. fixing lever.

The cover is designed for milling of formed, rounded and circular profiles of workpieces with use of the form plate led along the guide ring. The standard design contains the only ring suitable for the tool in the scope of 120 to 150 mm.

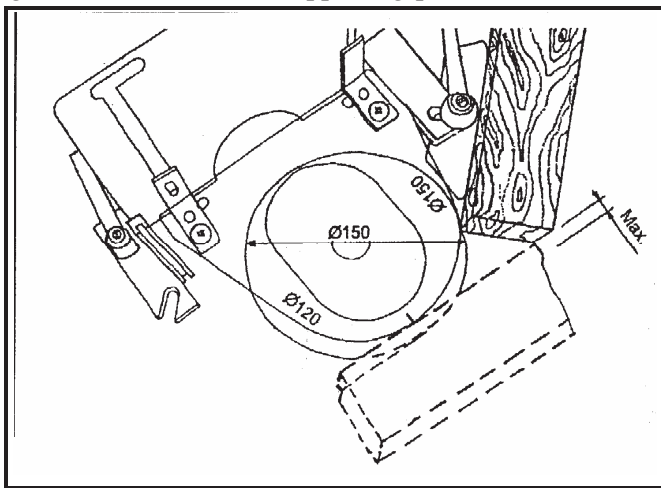
9.9.3 Mounting of the device



The cover must be fixed to the working table by means of two fixing levers with bolt M8. The threaded holes in the milling machine table have been made by the machine manufacturer or it is necessary to make them according to the form plate delivered together with the cover. **No other manner of mounting is allowed.** Mount and fix the circular ring fillers of the table, the milling machine tool and sliding ring of the guiding so that the milled workpiece lies on the working board of the milling machine table in the manner as stable as possible. Adjust the flat lower part of cover (2) so that it mildly presses on the workpiece. Check all fastenings, connect the exhaustion system and turn the tool before you switch on the spindle drive so that a possible contact with a fixed

9.9.4 Work on the machine with the cover

The height of the aluminium guide ring is adjusted above or below the tool and is secured in the groove of the vertical supporting plate. The machine may be moved in parallel with the milling machine table by means of the controller of



adjustment of the maximum possible chip removed and of the milling depth (3) and so the milling depth may be adjusted, which is given by the setting of guide ring (1) in relation to the tool. The position will be secured by fixing levers (11). Maximum and minimum diameters of the tool that may be used for the given ring are designated on the top side of the ring in its right and left part. This enables work with tools of various diameters in the scope of the ring (e.g. 120 – 130 – 140 – 150 mm). Before the tool for milling of bends is installed, it is necessary to make sure that the side from which the workpiece

approaches the tool is the side on which the diameter on the guide ring nearer to the diameter of the used tool is given. E.g. for the tool with $\varnothing 130$ mm it is the side of the ring designated with $\varnothing 120$, not the other side designated with $\varnothing 150$. If necessary, the ring may be turned so that its right part will be on the left and vice versa. For this case release transparent cover (5) by means of handles (8) and move it upwards in grooves (9) of the supporting plate. Release ring (1) by means of four fixing screws, turn it, install cover (5) and fasten all fixing items. The values of both diameters that may be used are designated on both sides of the ring.

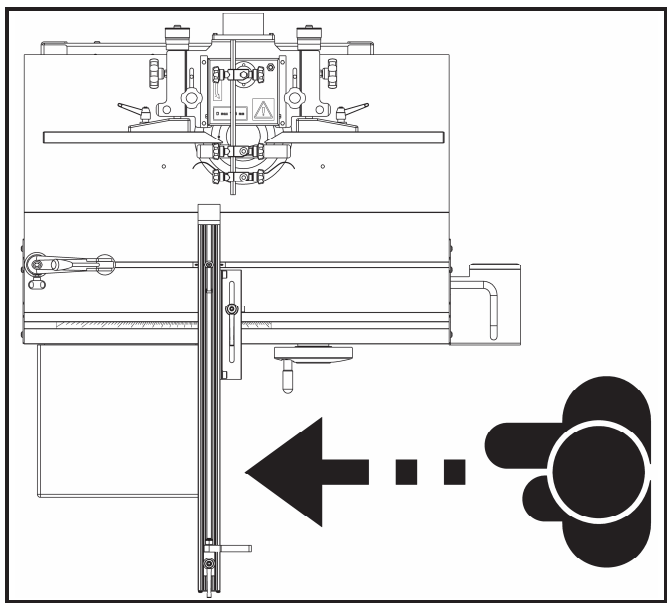
Transparent cover (5) must be adjusted so that it presses the workpiece to the working table of the milling machine lightly with its lower widened surface (2) and covers the tool at the same time.

The mark on the guide ring shows the place of the maximum material removal - maximum milling depth. Guide bar (6) should be used whenever possible. It may be mounted on both sides of the cover according to the character of work, and serves to adjust the angle under which the workpiece approaches the ring and to adjust the milling depth more easily.

It is recommended that guide ring (1) should be below the tool, if possible.

9.10 Working place

The picture shows location of the working place at the machine FSN 300A.



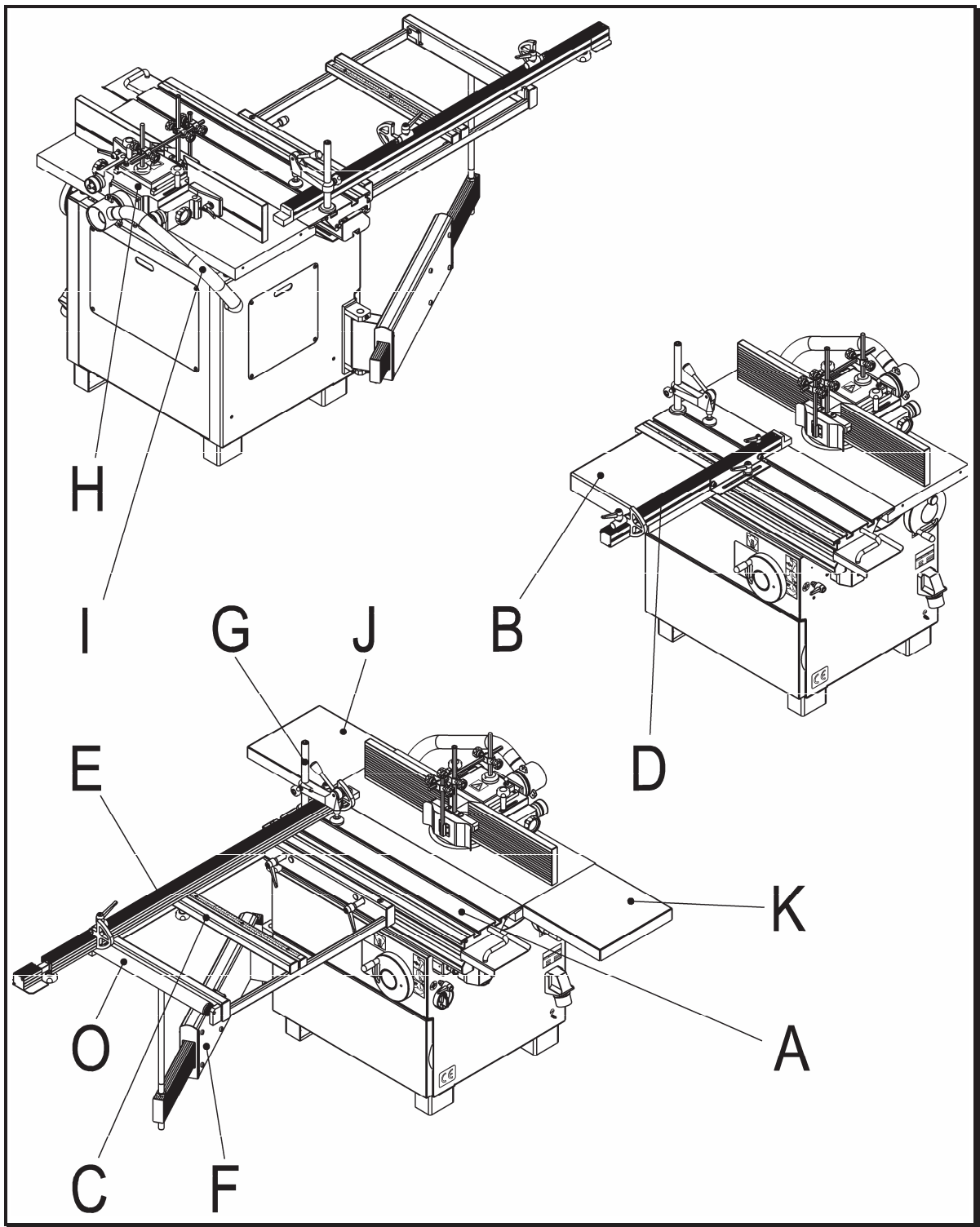
9.11 Protective aids

For work on the machine, a short strengthened apron and eye protection is prescribed. It is advisable to use appropriate ear protection and recommended working shoes. Working overall coats are not allowed to use.

9.12 Installation of removable parts

Parts which are removed should not be mounted on the machine before you read the whole instructions and become acquainted with the machine thoroughly.

- mount supporting table (B) with angular ruler (D) onto sliding table (A) or (as per machine configured) supporting frame (C) with cross-ruler (E). Frame(C) must be supported with supporting arm(F).
- frame (C) can be fitted with loading ruler (O)
- mount the fixture (G) into sliding table (A) groove
- mount vertical spindle guard (H) onto the machine cast iron table. Connect the guard with the hose (I) of lower exhausting.
- mount the left (J) eventually the right (K) table prolongation onto machine cast iron table, if the machine is herewith equiped.



9.13 Forbidden handling



On the machine, it is forbidden :

- perform any alteration of the machine safety items without the manufacturer's permission
- perform any manipulation inconsistent with safety instructions in this handbook (chap. 3.0)
- touch the tool or its close surrounding places and other moving parts
- machine any materials other than wood or those based on wood
- machine on the vertical milling machine in a simultaneous manner
- overload the machine while machining large semi-finished products
- remove chips from the place near the tools by hand or with any object while the machine is being operated
- use other tools than those delivered or recommended by the machine manufacturer.

10 Tools

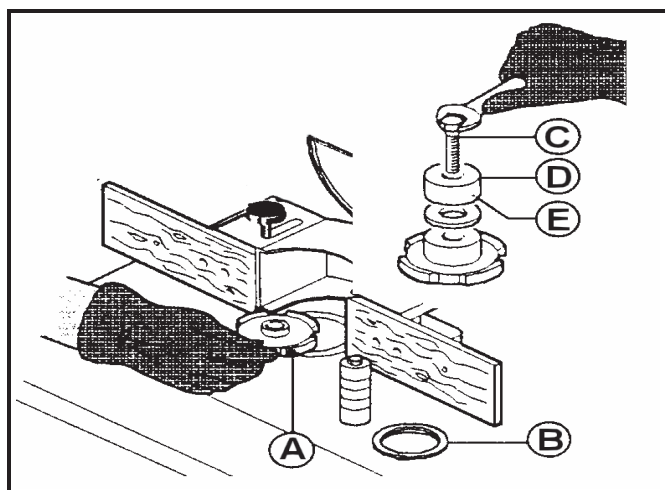
10.1 Recommended tools

Milling tools must be designated with the manufacturer's name or logo and with the maximum spindle rotation speed permitted.

Tools must be produced according to the norm EN 847-1: 2014.

The milling head FH 40, made by the ROJEK Co., is a suitable tool to be used with the machine.

10.2 Replacement of milling tools



Use only milling tools that are designed for manual feeding and may be clamped safely.

Before mounting tool (A) make sure that spacing rings (E) are clean and not damaged.

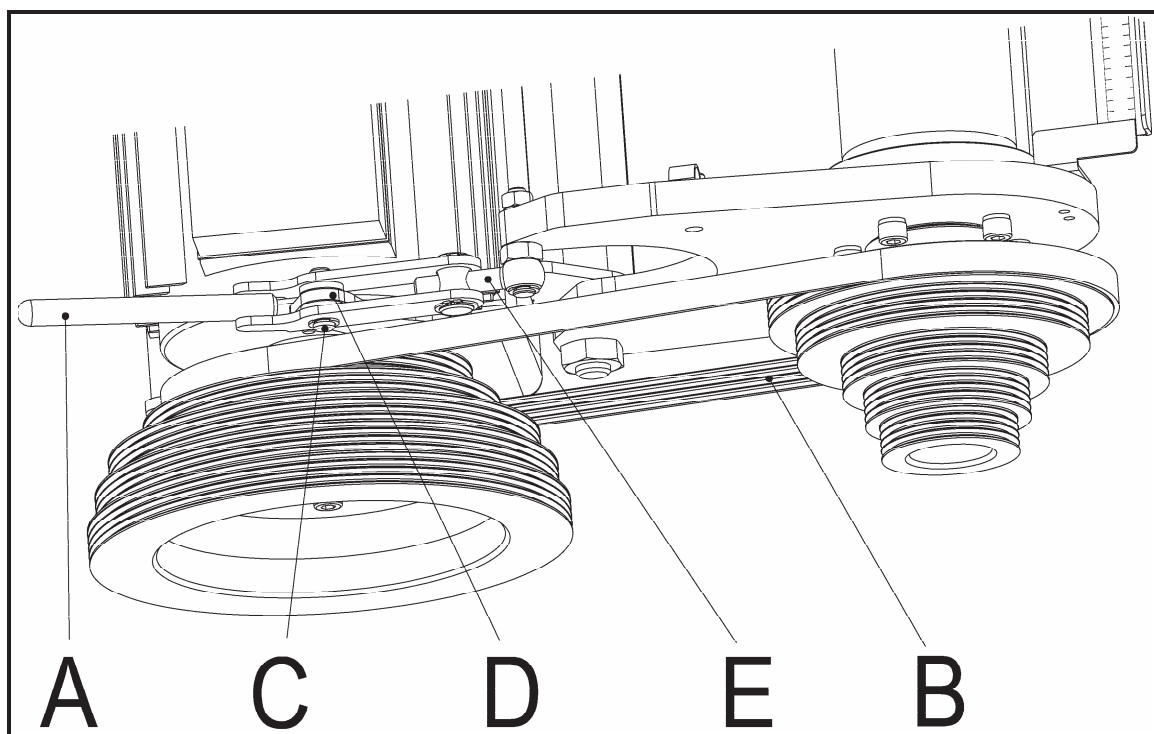
Pay attention to due fastening of bolt (nut) (C), which tightens, through closing ring (D), spacing rings (E) and tool (A) on the milling spindle! Adjust the hole in the table according to the diameter of milling tool (A) by removing rings (B).

11 Maintenance



Before starting maintenance or repair work always disconnect the machine from the mains! Switch off and lock the main switch or disconnect the machine by pulling out the plug.

11.1 Tightening the V-belt of the milling machine



After opening the cover (see chpt. 9.4) of the gears shift the tightening handle toward you by which the belt (B) will be released. Shift out a calliper-type locking washer on the pin (C) and remove the pin. Pay attention to spacers, that are put on pin (C). Shift out the lever (A) from the steel strip of the electric motor holder (D) and unscrew the stone on the bolt with the eye (E). This will cause an increasing of distance between axes of motor pulley and that of spindle (the spindle will be more tightened after assembling the group).

Mount all parts so that the original state is renewed, put the belt to the required position and fasten it. Do not tighten the belt excessively, it will increase the belt temperature and reduce the life of bearings. If you press the correctly tightened belt by hand with force of approximately 20 N (about 2 kg), it should become sagged by about 10 mm. Close the cover of the gears again.

11.2 Cleaning and lubricating

The machine should be cleaned and the rods, pins, threads and other parts liable to corrosion should be lubricated with a suitable oil. The interval for such activities will depend on the manner of work but it should be performed at least once a month.

The bearings of the electric motors and milling spindle have permanent grease filling, are closed on both sides and do not require any lubrication.

Clean the tables from resin with a suitable solvent.

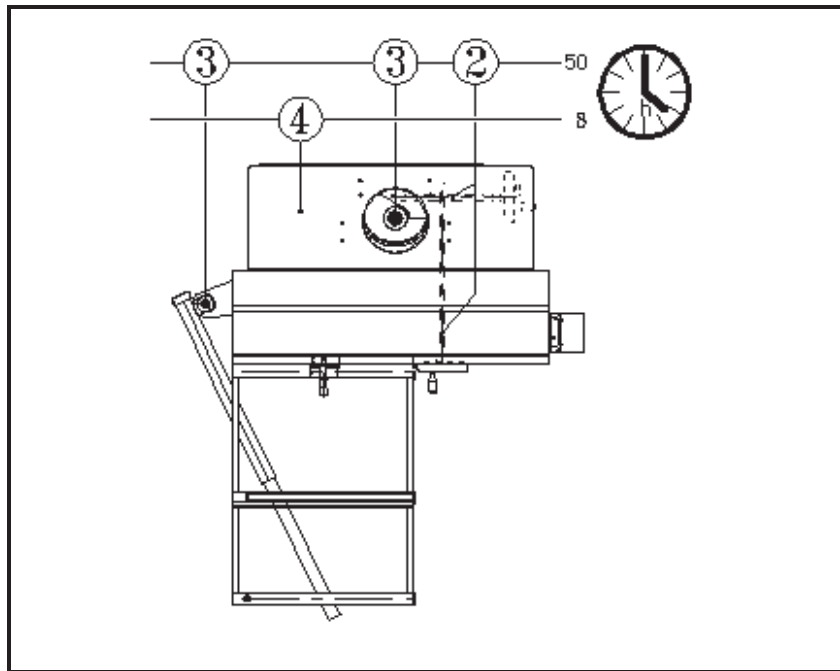
Avoid contamination of belts with oil or grease. If this occurs, clean the belt with paper only or dry it.

Removing the dust is best to be done with a vacuum cleaner. Perform this activity regularly, at least once a week.

List of greasing points - table of greasing periods

	Spindle bearings	Movement bolts	Cylinder seating of the milling machine spindle, tilting pins etc.	Table plates	Spindles and flanges (distance rings)
Greasing point nr. Necessary action	1 (after... hours)	2 (after hours)	3 (after ... hours)	4 (after..hours)	5 (after ... hours)
Permanent grease filling	when replaced				
Grease by spreading		50			
Lubricate with an oil can			50	8	if not fitted with tools or if the machine is out of operation
Plastic grease or oil	LV-2-3	LV-2-3	OL-B5	OL-B5	OL-B5
Equivalent	ISO-L-XCBEA 3		ISO – LAN 68		

Chart to the greasing table



11.3 Troubleshooting

No faults should occur while the machine is used correctly and maintained duly. If any saw dust becomes stuck on the milling tools, or if the exhausting hose is blocked with saw dust, the machine should be switched off before remedy, otherwise it might become damaged !

If a workpiece becomes jammed, turned off the machine immediately !

A blunt milling tool often causes that the electric motor becomes heated excessively and its power output decreases.

If the machine vibrates excessively, check its setting and anchoring, possibly also clamping and balancing of the tools used.

The machine does not work:

It will be necessary to check the electrical wiring and connection of the machine to the mains.

The machine output is low:

Tools are not sharp.

The chip with too large thickness is chosen – the width and hardness of the wood should be taken into account.

The V-belt is not tightened enough.

The motor does not work with the full power output – an expert should be called.

The machine vibrates:

Tools not sharpened or adjusted properly.

The tool is not balanced.

The machine is not standing on a flat ground, is not anchored properly.

Recess on the rear part of the machined workpiece:

Uneven lower guiding surface of the part being milled.

Incorrectly adjusted guide rulers in relation to the tool.

Incorrectly pressed or guided material during the milling operation.

12 Scope of delivery

Complete machine,
accessories according to the list of parts,
instructions handbook for use,
special accessories (if ordered).

12.1 Accessories

Name		pieces	note
Spanner 13 x 16		1	
Spanner 14		1	for spindle \varnothing 50 mm
Spanner 41		1	
Spanner 4		1	
Spanner 10		1	
Balancing shim		4	for levelling of the machine
Cardboard box	200x400x160 mm	1	for additional parts
Plastic bag on zip	250 x 350 mm	2	for manual + added packing.

13 Special accessories

	FSN 300A	note
Tenoning cover	1	
Feeding equipment	1	
Undercarriage PV 315 U	1	
Table extension	1	both-directional - in the direction of material feeding
Table of the feeder	1	May be fixed below the device.
Eccentric clamp	1	
Device for short pieces tenoning	1	
Frame with supporting telescopic arm and ruler (on CV)	1	
Cover of tool for milling of bends	1	

14 Spare parts

While ordering spare parts, always specify the serial number of the machine (from the manufacturing plate), machine type and year of manufacture. If these instructions include an appendix with the given spare parts, it is advisable to specify numbers and names of the required spare parts according to this appendix.

15 Guarantee

Work and activities not specified herein require a consent in writing granted by the ROJEK Co., Maysarykova 16, ČR, 517 50 Častolovice. The warranty certificate is attached to each machine and its accessories. The warranty certificate should be filled in upon purchasing the machine so that you may lodge warranty claims, and also in the interest of the product safety. Should the machine fail to be installed safely or should any manipulation not allowed be performed with it, damage or injury may occur for which we do not assume any liability in such case. Should you lodge any guarantee claim, do contact the machine seller.

After the warranty period has expired, you can have the machine repaired by any specialized firm.

16 Dealing with packing, machine- service life expiry

16.1 Dealing with packing

Our products are transported in packing from carton or PE folio. Producers of these packings issued a legal declaration about their product. They concluded a contract about filling duties of taking back and usage of the waste from packings with an authorized company. One of duties of these companies is also to inform the clients how taking it back is assured.

16.2 Dealing with machine

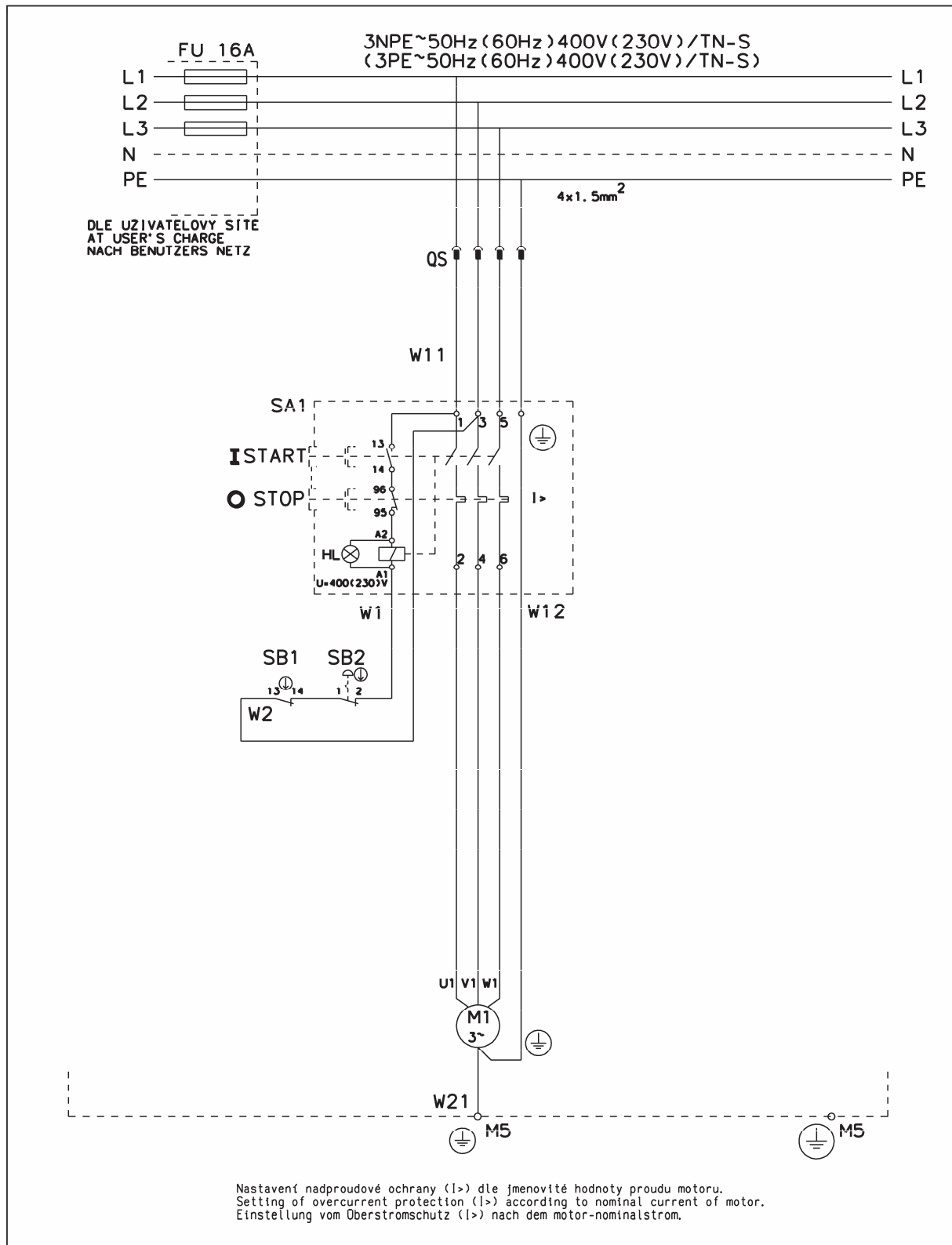
The service life of the machine essentially depends on the manner of using and on the intensity of working performance. The frequency and kind of maintenance performed also has a role that cannot be neglected. 10 years is the period for which, in accordance with the law, the machine manufacturer is responsible for any damage, caused to the customer, in a demonstrable manner by the machine.

After the service life of the machine has expired, the owner's duty is to ensure that the machine is liquidated in an environment-friendly manner so that the Act on Waste Materials is complied with and the environment is not endangered.

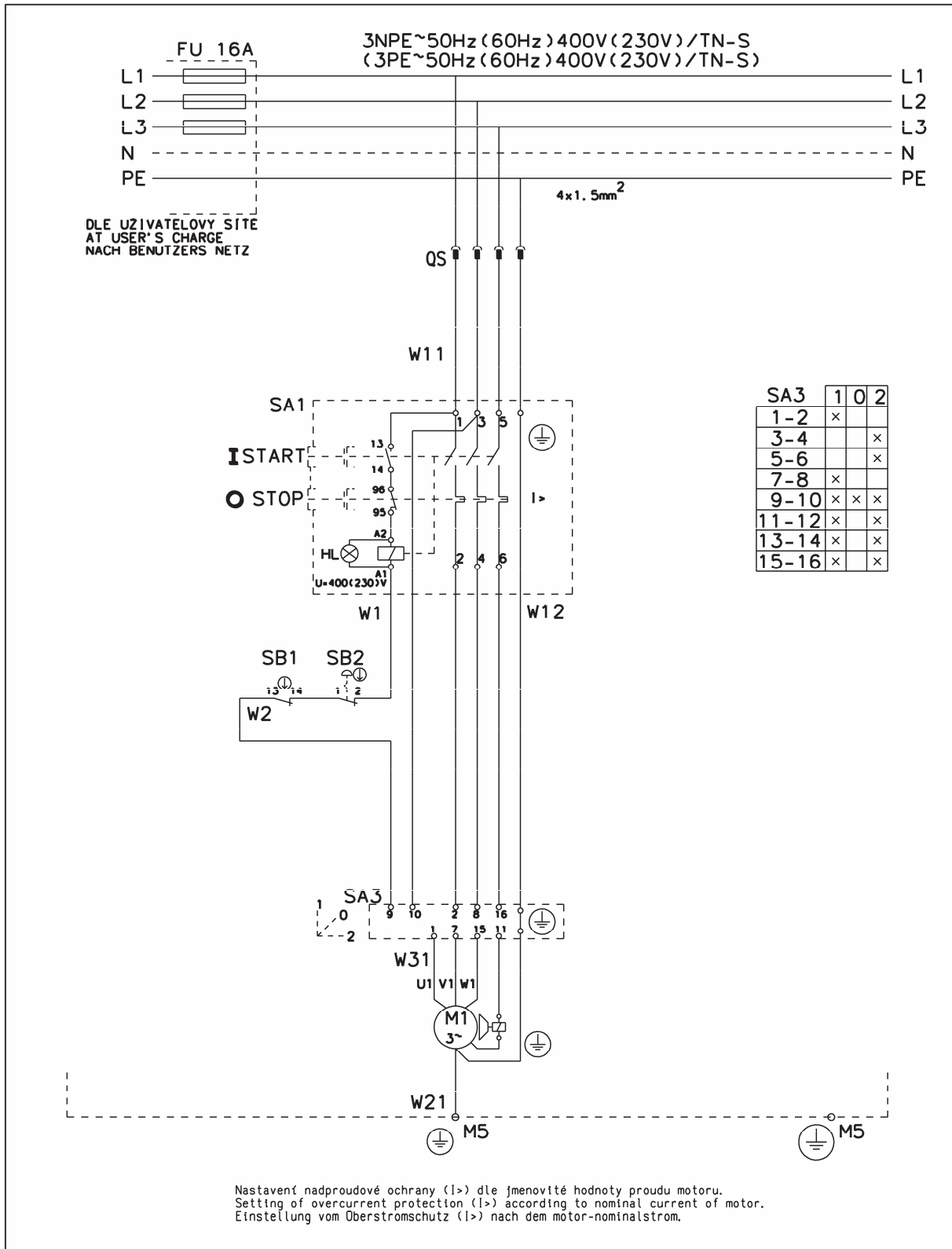
While the machine is being liquidated, the following procedure should be used:

- 1) Remove all plastic parts and put them in the respective waste containers.
- 2) Divide the remaining metals parts into two groups with ferrous and non-ferrous metals and have them liquidated by a respective specialized firm.

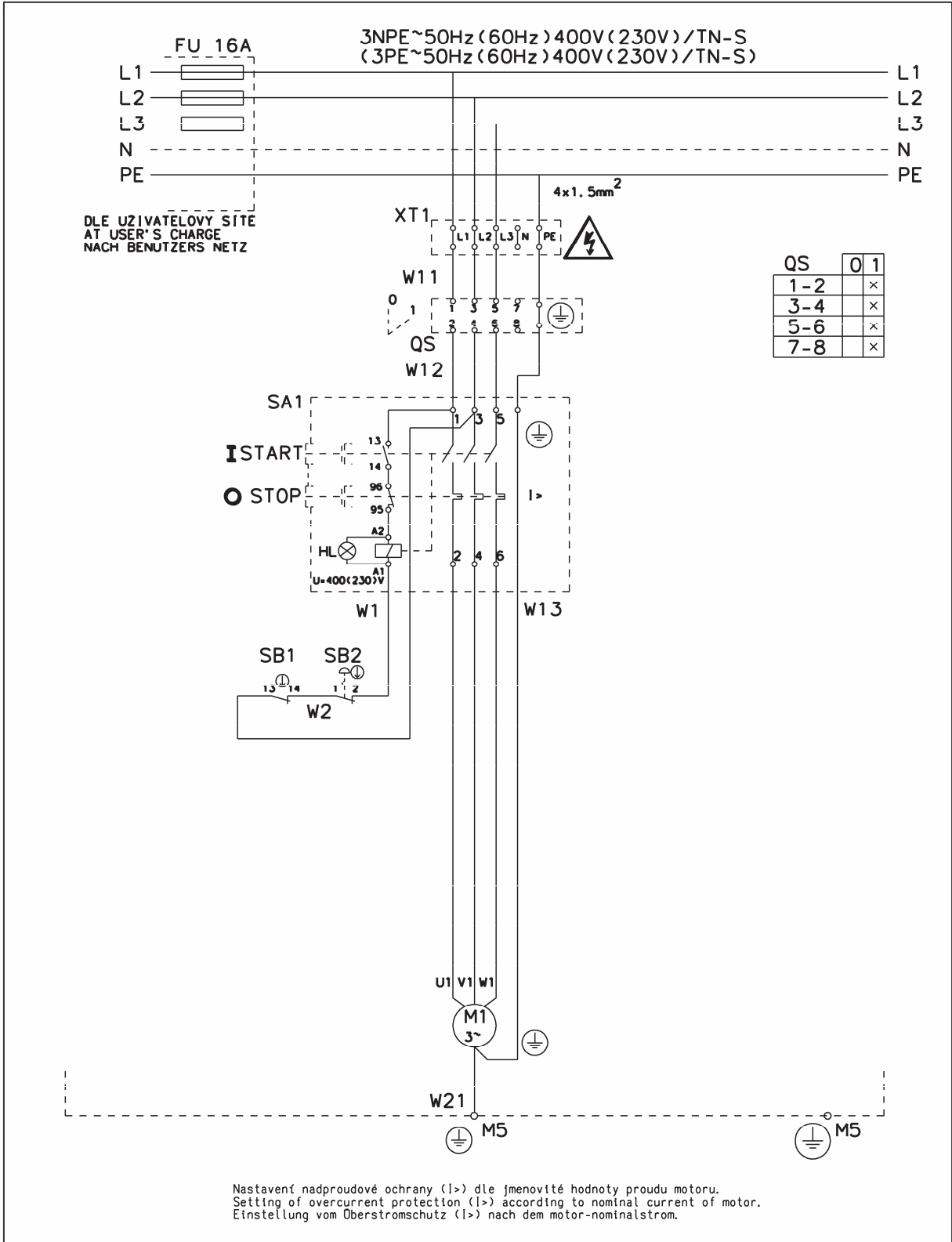
Enclosure A Electric connection diagram
 2,2 (3) kW, 3x400 (230) V, 50 (60) Hz, socket, stop-pusher



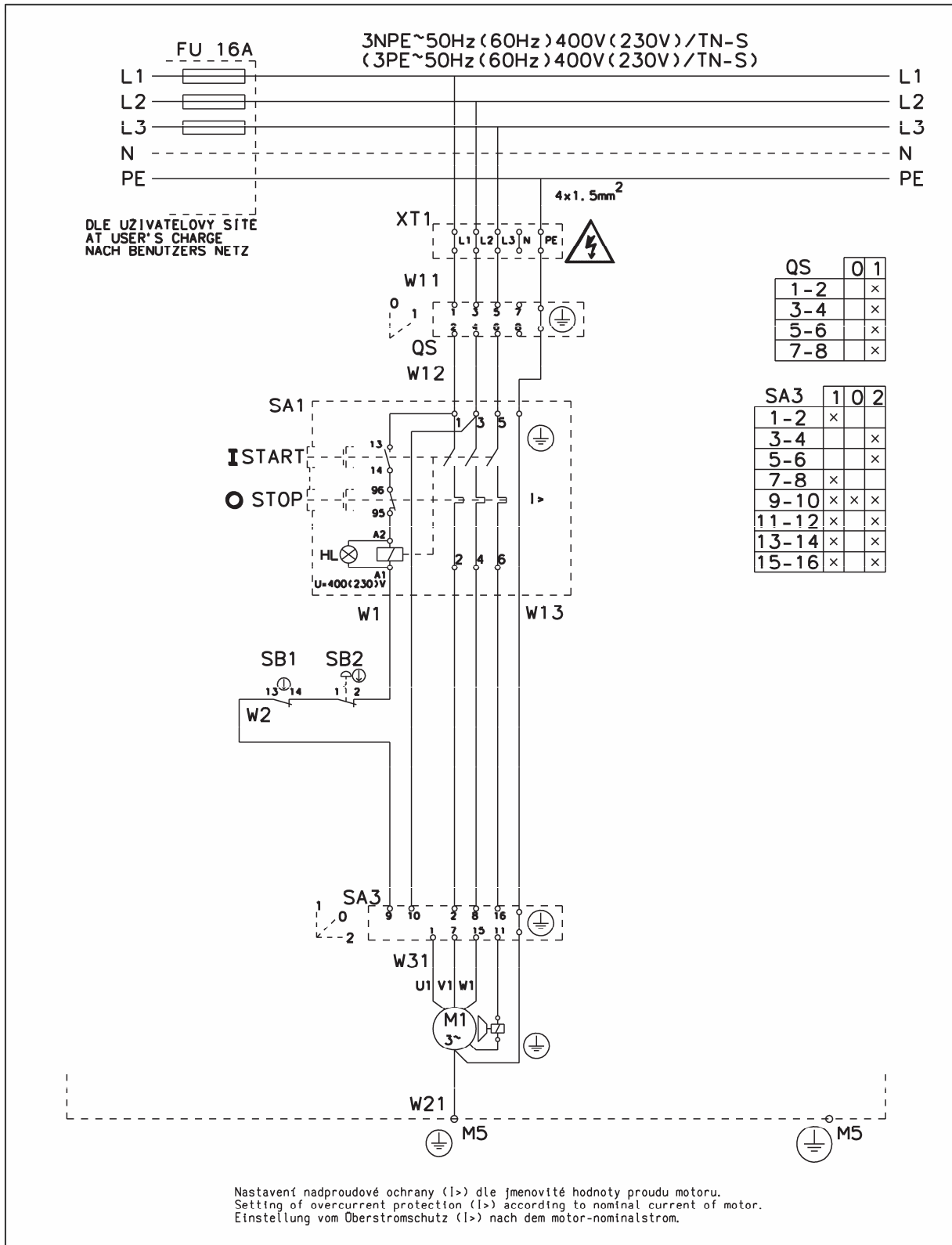
2,2 (3) kW, 3x400 (230) V, 50 (60) Hz, socket, stop-pusher, brake release



3,7 kW, 3x400 (230) V, 50 (60) Hz, main switch, supply terminal board, stop-pusher



3,7 kW, 3x400 (230) V, 50 (60) Hz, main switch, supply terminal board,
stop-pusher, brake release



ENCLOSURE B - LIST OF ELECTRIC PARTS

LIST OF ELECTRICAL PARTS FSN 300A									
Marking	function	type, specifications	1-phase 2.2kW pcs.	3-phase			supplier	alternative	note
				2.2 kW pcs.	3kW pcs.	3.7 kW pcs.			
ELECTRIC MOTORS									
M1	Vertical milling machine drive	BSNB 90L/2D-11R 2,2kW 1x230V 10,0A 50Hz 2760rev /min IM B3	1	-	-	-	ATB Austria	CEG M90lb/FPC 2,2kW 1x230V 13,4A 50/60Hz 2740 rev/min. B3	
		BSN 90L/2-7 2,2kW 3x400/230V 5,5/9,5A 50,60Hz 2820 rev/min IM B3	-	1	-	-	ATB Austria	CEG M90- 2/FPC 2,2kW 3x400/230V 4,8/8,4A 50/60Hz 2830 rev/min B3	
		CEG M90L-2/FPC 3,0kW 3x400/230V 6,55/11,3A 50,60Hz 2850 rev/min IM B3	-	-	1	-	CEG Italy		
		CEG M90L-2/FPC 3,7kW 3x400/230V 9,3/16,1A 50,60Hz 2840 /min IM B3	-	-	-	1	CEG Italy		only for voltage 3 x 400 V
SWITCHES									
SA1	Operation switch	LE 1 M35U716 Uc=230V/50,60 Hz Ie=16AUe=400V IP54	1	1	1	-	TELEME- CANIQUE France		for 3x230V
		LE – 1 M35U722 Uc=230V/50,60 Hz Ie=16AUe=400VIP54	1	-	-	-	TELEME- CANIQUE France		var. 1x230V with motor CEG
		LE – 1 M35N712 Uc=400V/50,60 Hz Ie=16AUe=400V IP54	-	1	-	-	TELEME- CANIQUE France		
		LE – 1 M35N714 Uc=400V/50,60 Hz Ie=16AUe=400V IP54	-	-	1	-	TELEME- CANIQUE France		
		LE – 1 M35N716 Uc=400V/50,60 Hz Ie=16AUe=400V IP54	-	-	-	1	TELEME- CANIQUE France		
SA3	brake re- lease switch	VZ1C PG21 Ie=16A VS 16Ue=400V IP54	0(1)	0(1)	0(1)	0(1)	OBZOR Zlín		brake release or reversion
SB1	Door end- switch	XCK – A 102 1“a“+1“b“ Ue=400V Ie=16A IP 54	1	1	1	1	TELEME- CANIQUE France		
SB2	Emergency stop button	XAL K 178 1“a“+1“b“ Ue=400V Ie=16A IP 54	0(1)	0(1)	0(1)	0(1)	TELEME- CANIQUE France		
QS	Main switch	VS 16 1104 A8 VSC VZ1C PG21 Ie=16A Ue=400V IP 54	-	-	-	1	VD OBZOR Zlín		
CONDUCTORS									
W1-10	Control circ.	H05VV-K1X1	according to machine variant					CYSY 2A x 1mm ²	
W11-20 W31-40	Power circuits.	H05VV-K3G2,5	according to machine variant					CYSY 3Bx2,5mm ²	
		H05VV-K4G2,5	according to machine variant					CYSY 4Bx2,5mm ²	
		H05VV-K4G1,5	according to machine variant					CYSY 4Bx1,5mm ²	
		H05VV-K5G1,5	according to machine variant					CYSY 4Bx1,5mm ²	
		H05VV-K7G1,5	according to machine variant					CYSY 5Bx1,5mm ²	
W21-30	Protection circuits.	H05V-K1G1,5	according to machine variant					CYA 1,5 mm ²	
XT1	Terminal board	Cable branch-joint box	-	-	-	1	GEWISS		

Note : The manufacturer reserves the right to change part(s) as well as supplier(s).



EU Conformity Declaration

Producer: **Rojek dřevobráběcí stroje a.s.** IČO 25266411

Place of business: **Masarykova 16, 517 50 Častolovice, the CZECH REPUBLIC**

Product term: **Single spindle vertical moulding machine**

Type designation: **FSN 300 A , FSN 550A , FS 550**

Product specification : Woodworking moulding machine with a vertical spindle for processing wood intermediates and those on wood base.

We, at own exclusive responsibility, declare that the explicit product was produced in accordance with following regulations and norms:

EU Directive 2006/42/ES stating technical requirements on machinery

EU Directive 2014/35/EU stating technical requirements on electrical appliances of low voltage

EU Directive 2014/30/EU stating technical requirements on electromagnetic compatibility

Applied norms:

EN ISO 12100 : 2010, EN ISO 13857 : 2008, EN 349 : 1993 + A1: 2008), EN ISO 13850 : 2015, ISO 447 : 1984, ISO 14120 : 2015, EN ISO 13849-1: 2015, EN 1037 : 1995+A1: 2008, EN ISO 14119 : 2013, EN 60073 : 2002, EN 80416-1 : 2009, EN 80416-2 : 2001, epv HD 60364-1 : 2008, epv HD384.4.482 S1 : 1997, epv HD 60364-5-51 : 2009, EN 55011:2009, EN 60204-1 : 2006, EN 60073 : 2002), EN 848-1 : 2007 + A2 : 2012.

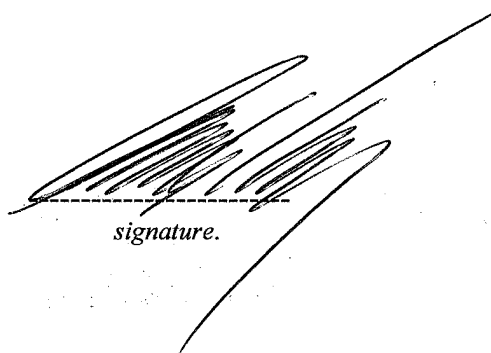
*The conformity was reviewed in cooperation with a notified body, the Czech state test facility :
Státní zkušební ústav SZÚ Brno, NB 1015*

EU certificate type: E-30-20062-18, E-30-20063-18, E-30-00119-18

The last 2 figures of calendary year nr., the electric device was granted the mark CE in: 02.

Častolovice
28.3.2018

Evžen Rojek
executive director



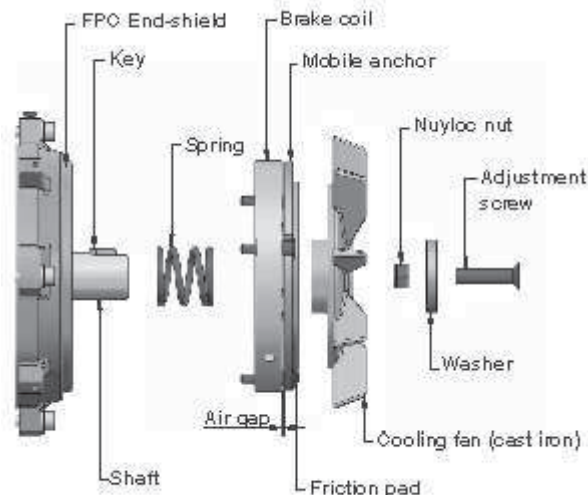
signature.

GRADUAL DC BRAKES MAINTENANCE ADJUSTING, INSTRUCTIONS

General information

This brake type is designed for machinery where a gradual but not necessarily precise braking is required. Thank to the single friction surface, the FCP brake provides noiseless controlled stopping with low a brake torque to prevent any damage to machinery and operator alike. The brake friction is applied by the action of a set of springs that push the armature plate against the internal surface of the cast iron cooling fan. When the coil is energized through an AC/DC rectifier, the brake is released.

The brakes are shipped adjusted to the the nominal values air gap and must be reset when a wear occurs. The extent of a brake wear depends on the machine service conditions.



Maintenance and readjusting

All parts of the brake must be checked frequently as the friction work depends on a number of factors, mainly on the inertia moment, the motor speed and the frequency of motor starts. A common criteria to establish what will be the brake life in each particular application is by periodical checking the air gap between coil surface and mobile anchor.

Due to a braking surface wear, the air gap increases. As soon as the air gap achieves 0.5 mm, a restoring is required (see following instructions : air gap setting-up, fitted with each motor). The armature plate must be replaced as soon as the wear of the friction material gets 1.5 mm. This means to replace the brake after every 4 up to 5 restoring operations.

After checking the brake make sure that the air gap is correctly regulated.

Carry out the brake servicing and repairing when the brake is disconnected having checked the earthing in beforehand, following the instructions.

A good functioning of the brake can only be guaranteed if the original components are used. If a restoring is required after a short time, the motor works under non-standard conditions and following needs to be revised : a too big motor inertia moment; or too many motor starts per hour. Both of them can overload the motor brake.

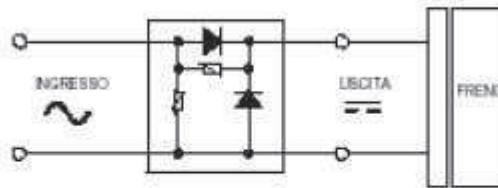
the air gap adjustment instructions

So as to re-adjust the air gap, it is necessary to tighten up the adjustment screw up to the rated values, scheduled below.

brake dimension	brake torque Nm	input power W	turn-on time ms	release time ms	air gap mm
M 63	2,5	15	20	40	0,2
M 71	4	15	15	100	0,2
M 80	9	20	15	120	0,2
M 90	9,5	20	15	120	0,25
M 100	12	30	10	200	0,25
M 112	12,5	30	10	200	0,25
M 132	23	30	10	200	0,3
M 160	23	60	13	215	0,3

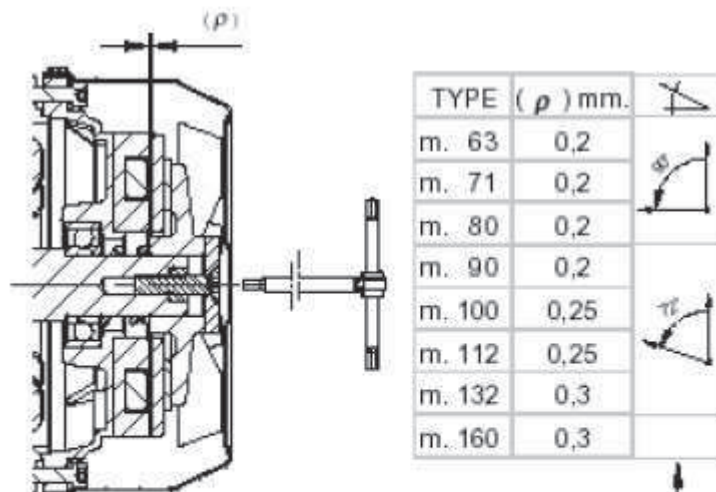
The adjusting screw is accessible without removing the air fan metal sheet - the picture below.

CONNECTION DIAGRAM FOR FPC BRAKE



BRAKE ADJUSTEMENT (or braking gap adjustment - ρ -)

Adjust the screw till you achieve braking gap value listed on the table below



NOTE : for a quicker but more approximate adjustment, first tighten the adjustment screw clock-wise till the bottom; then loosen it, turning it anticlockwise (see values listed on the table above)



EXCHANGEABLE SPINDLES of VERTICAL MILLING MACHINES

FSN 300 A
KPSN 300 A
KPSN 400 A
KPFN 300 A

original translation
of a Service instructions handbook

ROJEK

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Introduction

This manual is issued as an addition to the use instructions manual of machines with vertical milling spindle. Standard making of vertical milling machines is equipped with a one-piece spindle. When using the exchangeable spindle - it is segmented of 2 components. One is inbuilt closed in the milling head, the other one is intended for clamping of tools. This construction enables usage of various endings of spindle clamping part on one machine.

Notice

The text and picture part of this manual is a know how of the ROJEK Co. and continue to be the company's property. No part of the manual is allowed to be copied nor to let third persons learn the manual or its parts.

The producer reserves himself the right to particular changes within a continuous technical development of the machine.

1.0 Safety instructions

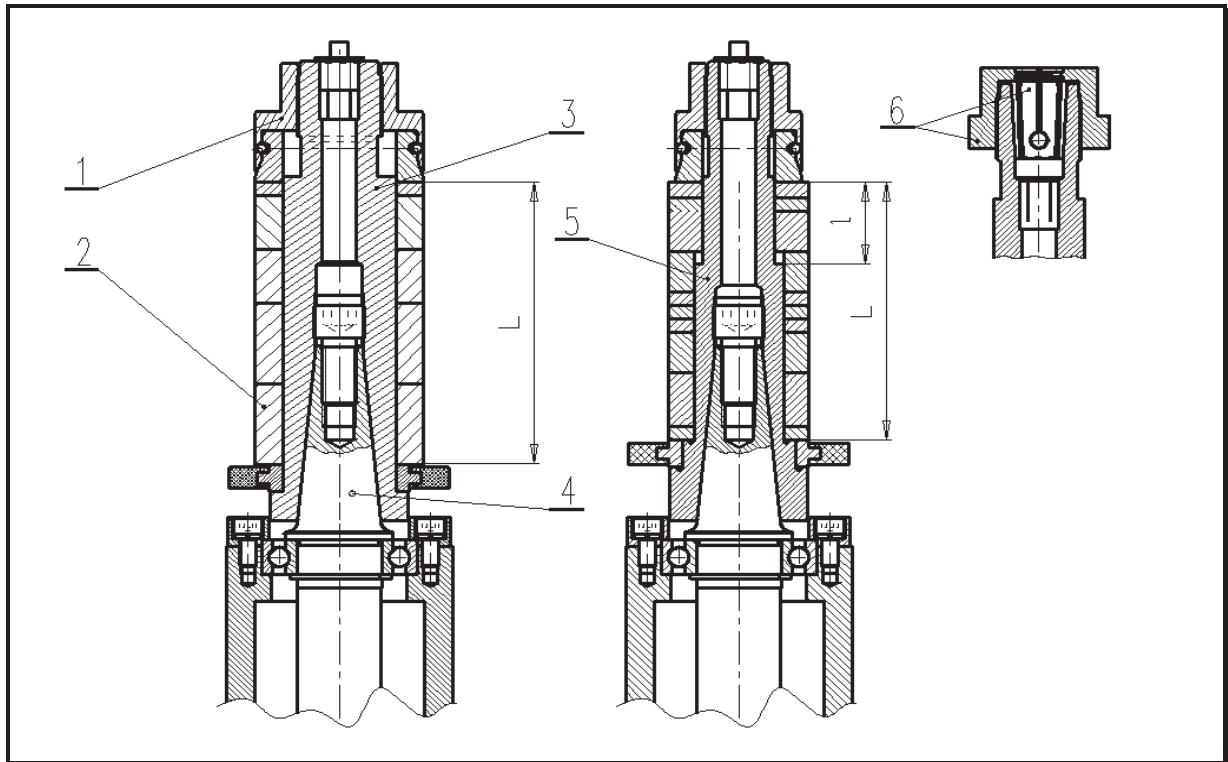


Caution recommending to proceed entirely according to following regulation. Non-performance of this regulation can cause a despatch or heavy injury of the machine operator.

- Proceed according to this manual during assembly and dismantling of the exchangeable spindle.
- Tighten the fixing screws and nuts by rated torsional moment without using of levers or beating onto the spanner.
- Make sure that fitting plates are clean, unbroken and perfectly flat on both sides before clamping of tool and distance rings onto the spindle.
- Never use deformed or cracked tools.
- Never use tools at a higher rotating speed than recommended by competent producer.
- Make sure, that all rotating tools are perfectly ballanced , properly sharpened, adapted and fixed.

2.0 Description of exchangeable spindle

2.1 Description



- 1 – fastening nuts
- 2 – distance rings
- 3 – exchangeable spindle
- 4 – steady spindle
- 5 – gradual replaceable spindle
- 6 – clamping chuck

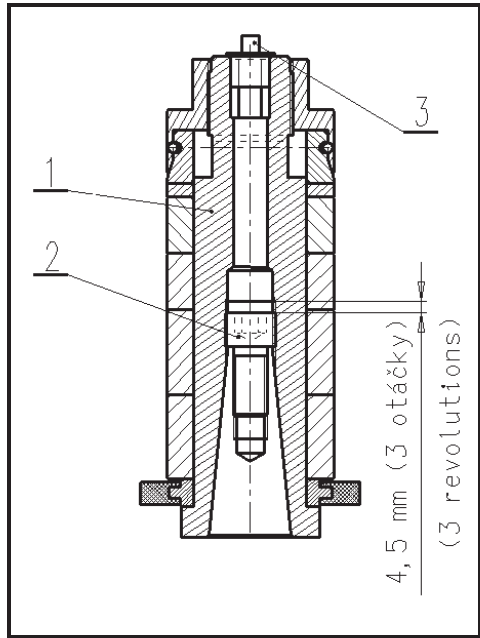
Replaceable part of the spindle (3, 5) can be fixed onto the steady spindle part (4) by help of a taper of various diameter and clamping length L or I. Exchangeable spindle can be gradual (5) for various clamping diametres of tools or equipped with a clamping chuck (6) for shank-type cutters (shank mills).

2.2 Making

exchangable spindle diameter	spindle diameter (h7)	clamping spindle part length L (I/L) (mm)	spindle ending part with clamping chuck	note
30	mm	70	ø 8 12 (12,7)	possible ø 10 14
30	mm	100	impossible	
30	mm	100	ø 8 12 (12,7)	possible ø 10 14
32	mm	70	ø 8 12 (12,7)	possible ø 10 14
35	mm	70	ø 8 12 (12,7)	possible ø 10 14
35	mm	100	ø 8 12 (12,7)	possible ø 10 14
35	mm	100	impossible	
40	mm	105	impossible	
50	mm	115	impossible	
3/4" 5/4"		30 100	impossible	
1" 5/4"		35 100	impossible	
1" 5/4"		79 100	impossible	
5/4"		70	ø 8 12 12,7	possible ø 10 14
5/4"		100	ø 8 12 (12,7)	possible ø 10 14

3.0 Exchangeable spindle assembly and dismantling

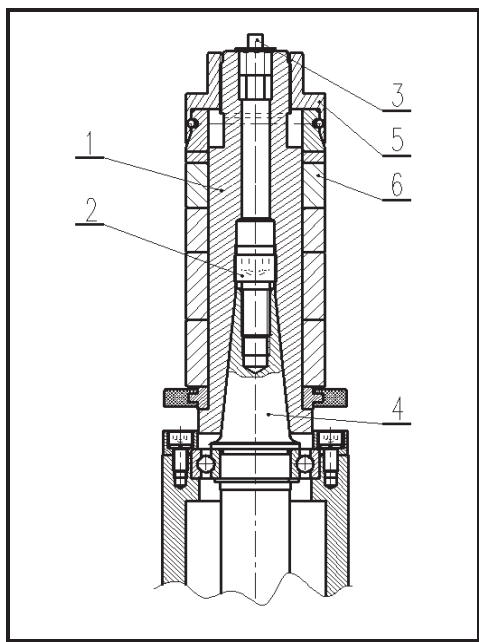
3.1 Assembly of exchangeable spindle



- Remove protecting plastic covering (3) at the upper part of exchangeable spindle (1).
- By help of hexagonal „T“ spanner screw the fixing screw (2) by turning to the left beyond to the end of thread in the spindle (1).

The fixing screw has thread in the shank and in the head as well. The threads differ in the lead. It is called a differential screw.

- Turn the fixing screw (2) 3 x around to the right so as to make a give of nearly 4,5 mm for releasing the spindle.



- Put the exchangeable spindle (1) onto conical part of the steady spindle (4). Screw in the fastening screw (2) to the warm in conical part of steady spindle by rotating with hexagonal „T“ spanner to the right. The exchangeable spindle (1) is rotating synchronously until both conical faces lump one on another.

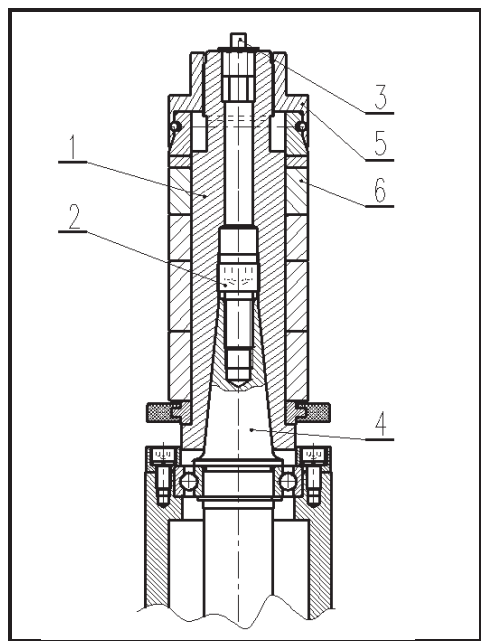
Synchronous revolving of the screw (2) and of exchangeable spindle (1) is necessary for keeping a give of about 4,5 mm for releasing of the spindle.

- After lumping of both conical faces one on another - tighten the fastening screw (2) slightly by twisting moment of about 10 Nm. The spindle (1) can be held not rotating by the fastening nut (5) or (after dismantling of that and of the distance rings 6) by the flats built up on the own spindle.

Attention ! The difference of the warm lead at the body and head of fastening screw is 0,25 mm, herewith a big thrust arises.

Do not forget to blind the hole with a plastic cap (3) after every mounting of the exchangeable spindle.

3.2 Dismantling of exchangeable spindle



- Take out the plastic cap (3) on the upper side of the exchangeable spindle (1).

Release the fastening screw (2) with the hexagonal "T" spanner. Differential warm lead of the body and head of fastening screw will pull off the exchangeable spindle (1) from the cone of steady spindle (4). The spindle (1) can be held not moved by the fastening nut (5) or (after dismantling of fastening nut (5) and of distance rings 6) by flats built up at the own spindle.

- Both exchangeable spindle parts will get detached by screwing out of the fastening screw (2) from the steady spindle (4) concurrently with revolving of exchangeable spindle.

4.0 Maintenance

It is necessary to keep all parts of spindle clean and entire. As far as the spindle or its parts are not mounted, attend it with engine oil.

5.0 Delivery extent

exchangeable spindle diameter	30	32	35	40	50	3/4"/5/4"	1"/5/4"	5/4"	30	35	5/4" 1" L = 4"
fastening nut	1	1	1	1	1	1	1	1	1	1	1
exchanable spindle	1	1	1	1	1	1	1	1	1	1	1
fastening screw	1	1	1	1	1	1	1	1	1	1	1
distance ring 5	2	2	2	2	2	5+2+3	5+4+3	2	2	2	5+10+4
dist. r. 10						1+1+2	1+2+2				1+6+5
dist. r. 15	1	1	1	1	1	3+1	3+1	1	1	1	3+2
dist. r. 20	2	2	2	2	2	2	2	2	2	2	2
dist. r. 30	2	2	2	2	2	1	1	2	2	2	1
"T" spanner nr. 6						1					
plastic cap	1	1	1	1	1	1	1	1	1	1	1
clamping chuck											
- nut		1	1					1	1		
- insert ø 8		1	1					1	1		
ø 12 (12,7)		1	1					1	1		
spanner size 10	1	1	1	1	1	1	1	1	1	1	1
span. 27 one-sided	1	1	1	1	1	1	1	1	1	1	1
spanner 32							1				1

