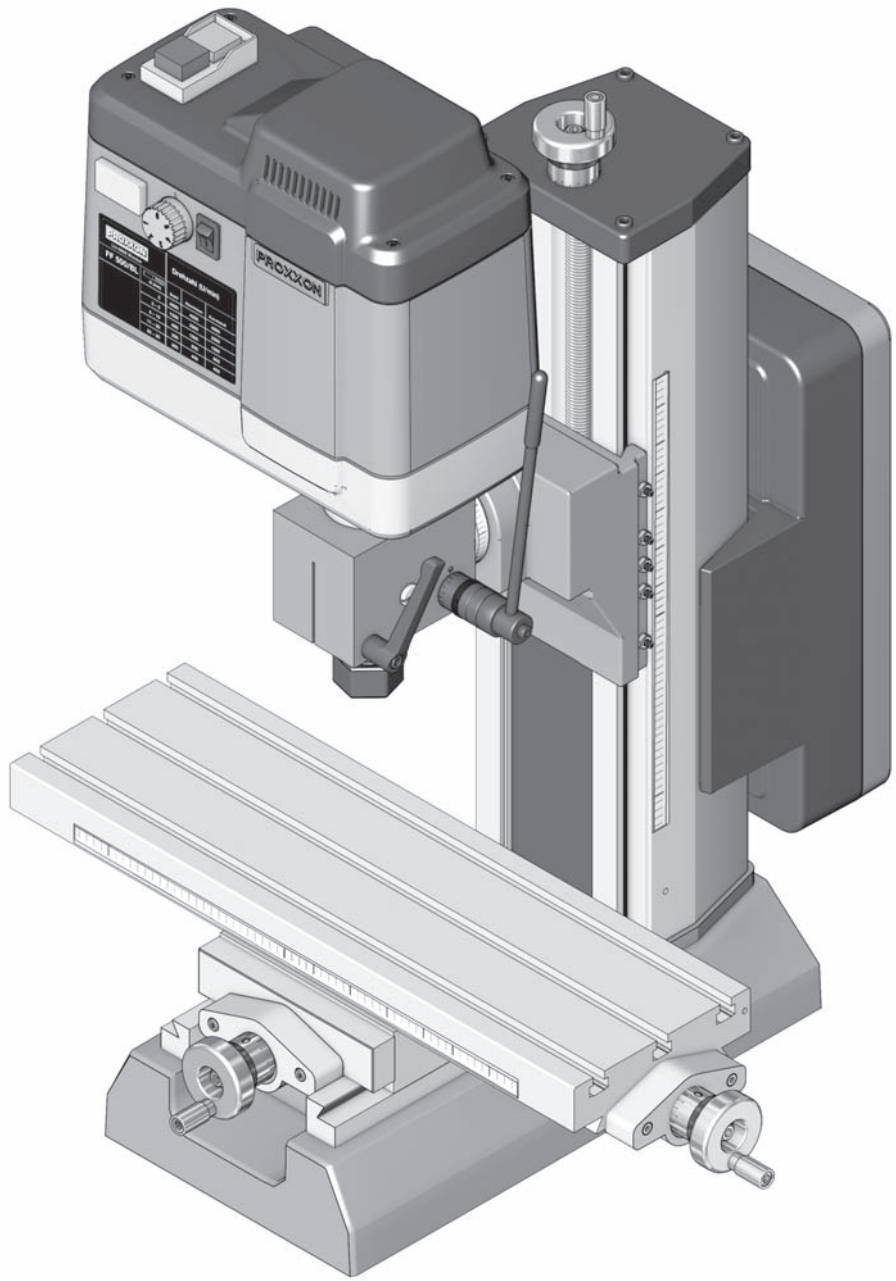
PROXXON

FF 500



Manual

Fig. 1

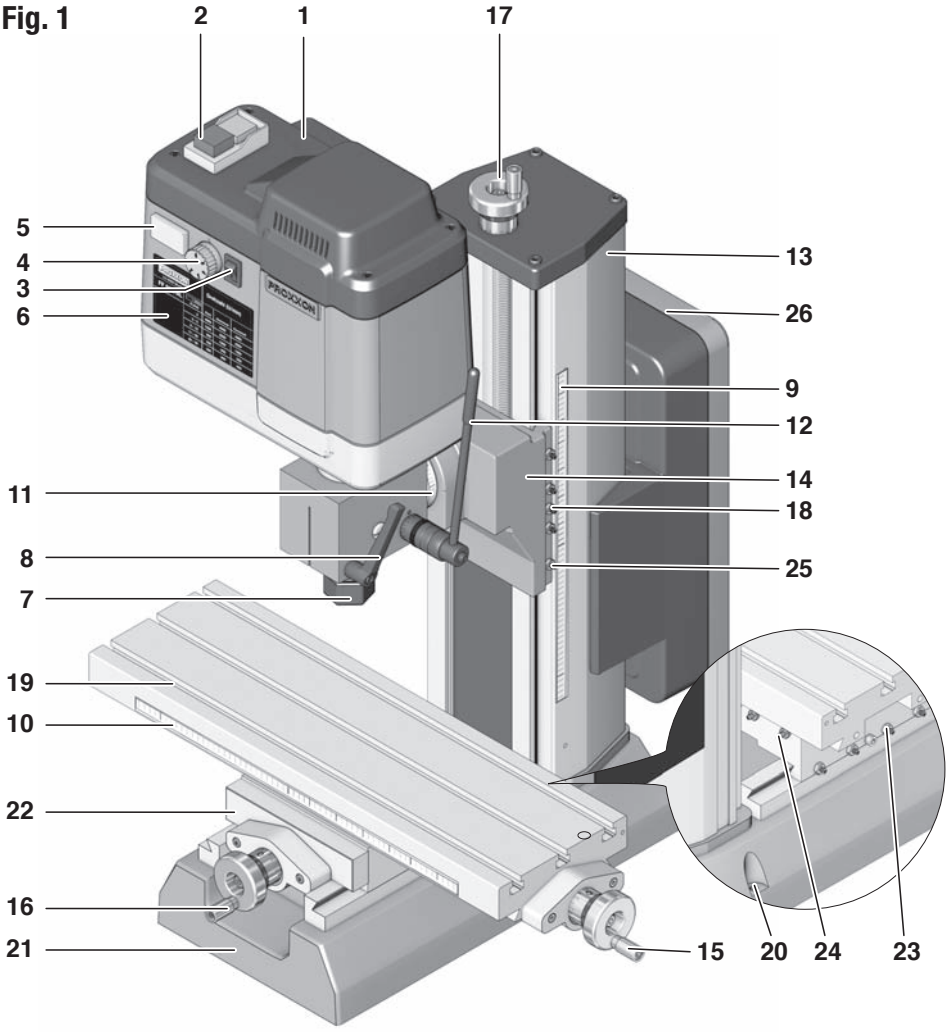


Fig. 2

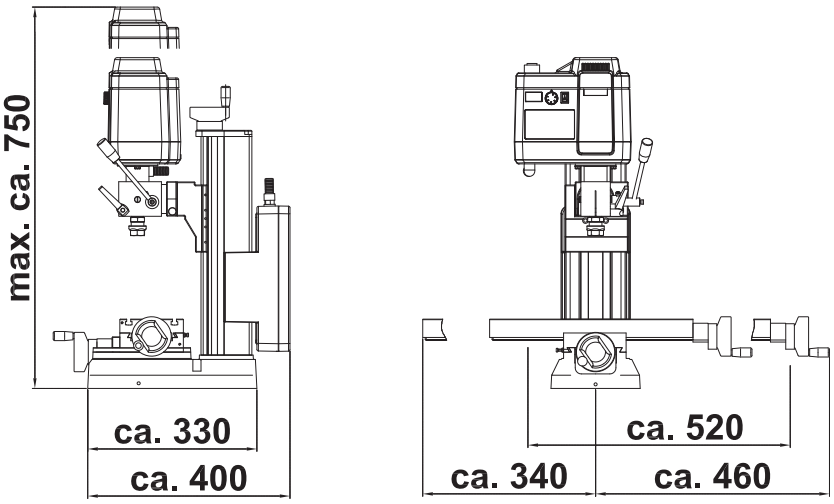


Fig. 3

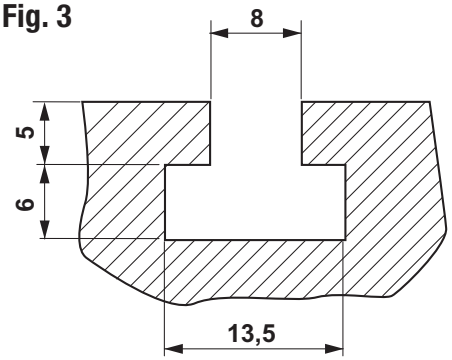


Fig. 4

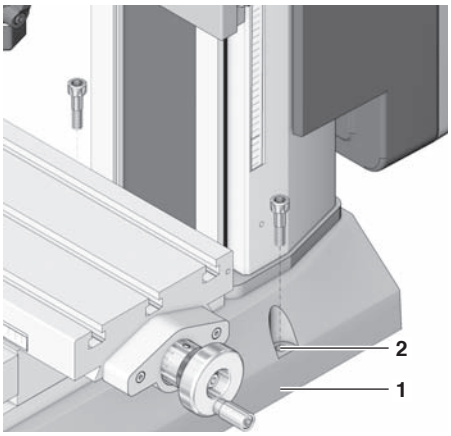


Fig. 5

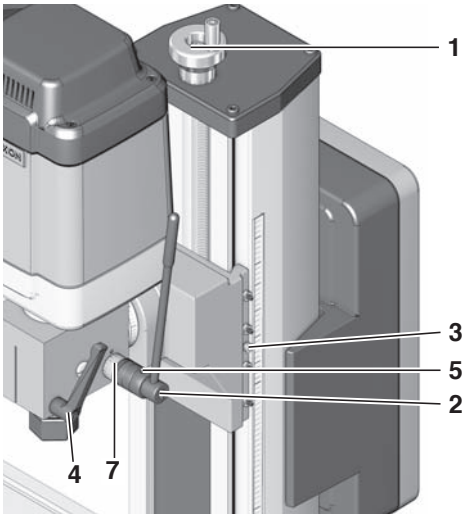


Fig. 6

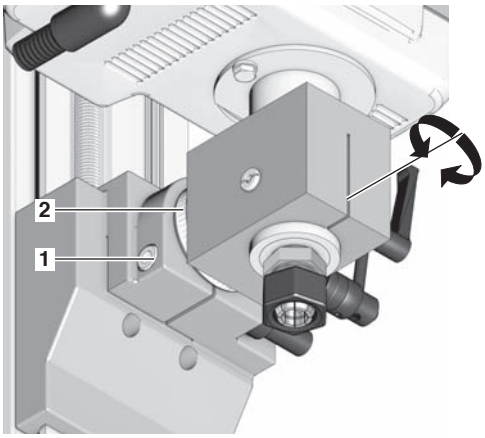


Fig. 7

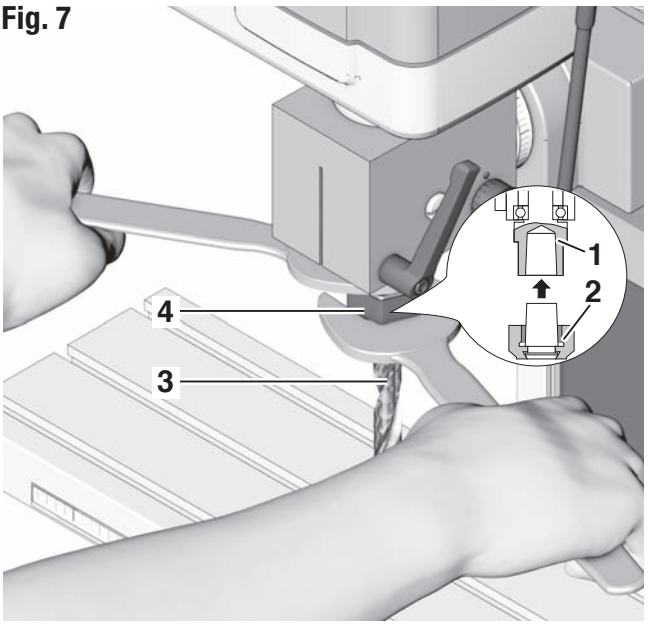


Fig. 8

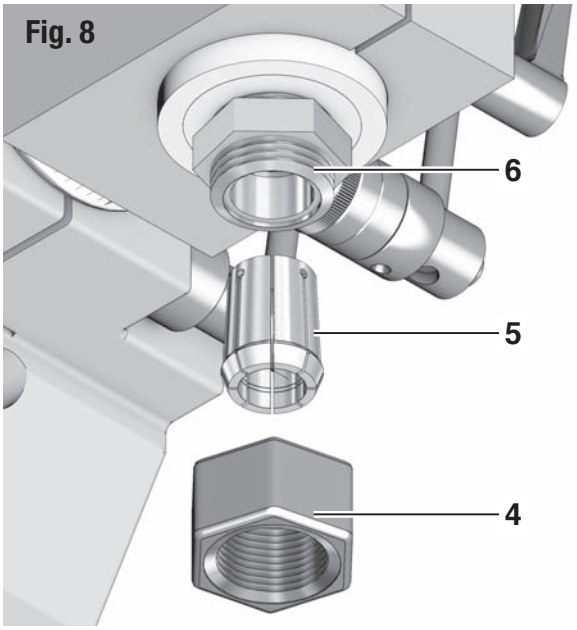


Fig. 9

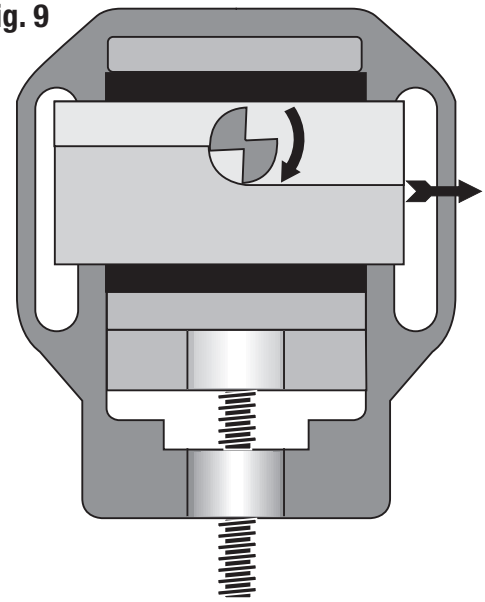


Fig. 10

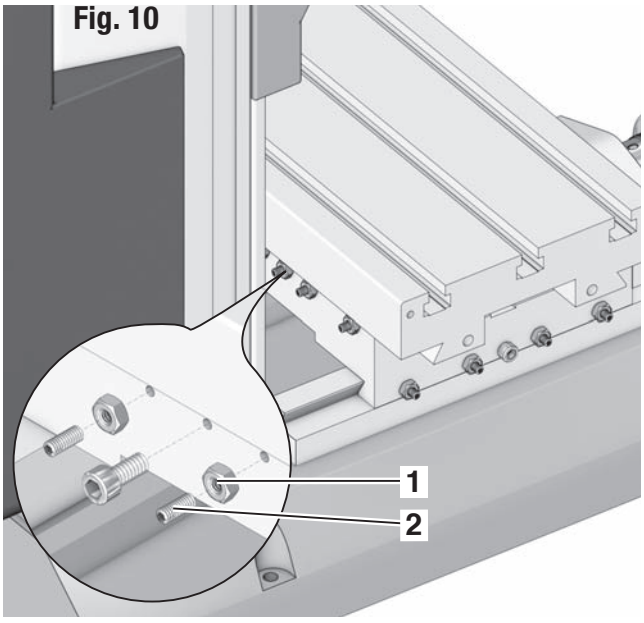
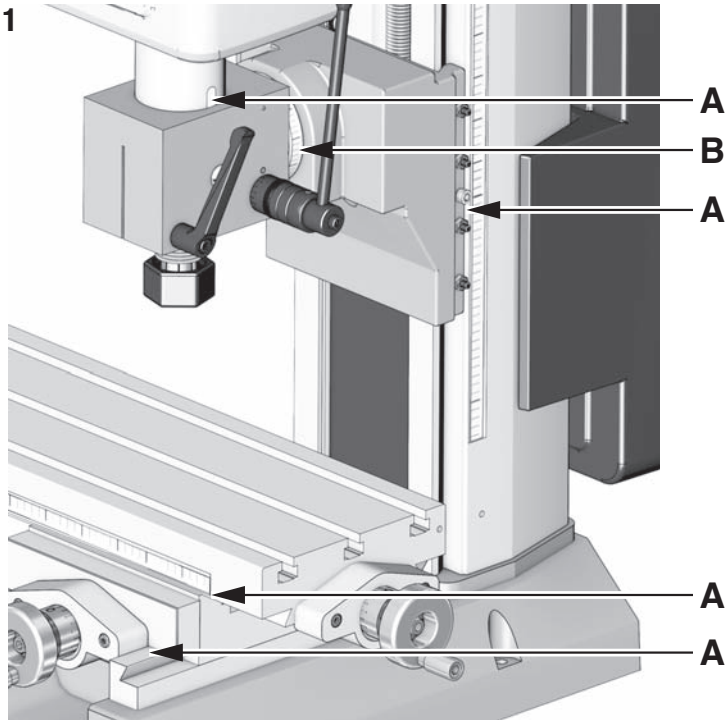


Fig. 11



GB Operating instructions FF 500/BL finishing miller

1 Preface

Dear Customer,

The use of these instructions

- **makes** it easier to become acquainted with the device
- **prevents** malfunctions due to improper handling, and
- **increases** the service life of your device

Always keep these instructions close to hand.

Only operate this device with exact knowledge of it and comply with the instructions.
PROXXON will not be liable for the safe function of the device for:

- handling that does not comply with the usual intended use,
- other application uses that are not stated in the instructions,
- disregard of the safety regulations.

You will not have any warranty claims for:

- operating errors
- lack of maintenance
- use of non-PROXXON spare parts

For your safety, please comply with the safety regulations without fail. All rights reserved for further developments within the meaning of technical progress. We wish you much success with the device.

2 Description of the machine

2.1 Construction

The FF 500/BL is a solidly constructed and carefully manufactured upright vertical milling machine. The equipment compiled in a user-friendly manner and the extraordinary quality of the design make the milling cutter a reliable partner for an entire series of activities from the machining sector.

A heavy, rugged machine base ensures excellent stability and accommodates the cross table, traversable in two directions (diagonal (X axis) approx. 300 m, deep (Y axis) 100 mm) by way of handwheels as well as the sturdy and generously dimensioned column made of high-strength aluminium continuous casting profile. Just like the cross table it is equipped with a dovetail guide which supports the carriage for accommodating the milling head (traverse path vertical (Z axis) approx. 220 mm). The milling head itself consists of the motor, the gearbox and the spindle unit. If required, it can also be turned by 90° on each side and conveniently clamped in any position with the toggle screw. Together with the drilling feed, this makes slanted drilling possible, for example. The tool is held in one of the four supplied collects chucks.

In addition, the milling head is equipped with a drill feed, which means that your milling cutter can also be used for drilling work or for countersinking, for example. The processing height is adjusted by handwheel above the column (all of the handwheels are equipped with adjustable scale rings, by the way).

The spindle is driven directly by an ultra-modern brushless direct current motor. This technology with integrated rotor position recognition and speed sensor enables an extremely high and very consistent torque across the entire operating speed range. As a result, large-diameter milling cutters can be used even at slower speeds. In comparison, speeds up to 4000 rev/min allow the use of milling cutters with relatively small diameters. The wide range of different milling cutter types and the ability to adjust the speed to the type of material means there are practically no limits to its use.
Thanks to the direct drive and the motor construction without brushes, the drive is virtually wear-free and extraordinarily smooth-running.

The high-precision dovetail guides are adjustable for all axes to eliminate possible play due to wear. You will find a dimensioned sketch of the machine dimensions and the slot cross-sections (Fig. 2 and 3) on the graphics fold-out pages of these instructions.

A comprehensive range of accessories is available in our assortment.

2.2 Scope of delivery

- FF 500/BL vertical miller
- Operating and safety instructions
- ER 20 collets Ø 6, 8, 10 and 12 mm incl. sleeve nut
- Operating tools

2.3 General view of FF 500/BL milling cutter (Fig. 1)

1. Milling head with motor and electronics
2. On/Off switch
3. Motor switch
4. Rotational speed adjusting knob
5. Speed display
6. Table
7. Sleeve nut for collet
8. Clamping screw for quill

9. Adjustable scale for depth adjustment
10. Adjustable scale for lateral traverse path
11. Scale for angle adjustment
12. Drilling lever
13. Column
14. Z carriage/milling head fixture
15. Handwheel for X direction
16. Handwheel for Y direction
17. Handwheel for Z direction
18. Clamping screw for height adjustment
19. Work table (400 mm x 125 mm)
20. Screw holes for fastening
21. Base
22. Support
23. Adjusting screws for X guide
24. Adjusting screws for Y guide
25. Adjusting screws for Z guide
26. Mains unit

2.4 Technical data and equipment features of the FF 500/BL in overview

- Voltage: 230 volt, 50/60 Hz
- Power: 400 watt
- Speed range 200-4000 rpm
- Basic dimensions, see Fig. 2
- Quill feed (30 mm) using drilling lever with scale ring (1 graduation line = 1 mm)
- Solid, surface-milled cross table with 3 continuous T-slots for size 8 standard bricks, slot clearance: 45 mm, slot cross-section, see Fig. 3
- Table size 400 x 125 mm
- Traverse path
  Vertical: (Z axis) approx. 220 mm
  Lengthwise: (X axis) approx. 300 mm
  Deep: (Y axis) approx. 100 mm.
- Adjustment by handwheels with moveable scale ring (1 revolution makes for 2 mm feed)
- Tool holder using 6, 8, 10 and 12 mm collet (included in delivery)
- Milling head can be pivoted to the left and right by 90° (with degree graduation)
- Throat (column outside to centre of tool) approx. 125 mm
- Column of high-strength aluminium continuous casting, extensively ribbed to achieve optimal strength
- Noise generation ≤ 70 dB(A)
- Vibration ≤ 2,5 m/s2
- Weight approx. 47 kg

Only to be operated in closed rooms!

Please do not dispose of with household rubbish!

Only work with safety glasses!

3 Setting up the milling cutter (Fig. 4)

Caution!

Do not insert the mains plug before completing the assembly work as the machine could be switched on unintentionally. Risk of injuries!

For safe and precise work, it is mandatory to fasten the machine onto a sturdy workbench or similar working support. There are two drills holes 2 for two M8 Allen screws on the right and left in the machine base 1 for this purpose.

4 Working with the milling cutter

Caution!

Disconnect the mains plug before you do any adjustments or when exchanging tools!

Caution!

Please note:
There is always a potential risk of injuries emanating from all motor-driven or manually driven parts from machine tools. Therefore, please ensure you always keep sufficient distance and never reach into moving tools! Never hold the tools with your hand - always tighten them properly!

Note!

The milling cutter is equipped with a so-called restart protection: In case of brief voltage interruptions during operation, the milling cutter will not restart for safety reasons. After the correct voltage is present again, the milling cutter can be started normally with the ON button.

4.1 Height adjustment of the spindle and/or the Z carriage (Fig. 5)

The milling spindle, or the Z carriage, of the FF 550 can be adjusted in height in two ways:

1. With handwheel 1
2. With drilling lever 2

4.1.1 Height adjustment with the handwheel

Here you have an available 220 mm traverse path from the topmost to the bottommost position. The spindle nut is at the bottommost position for collect chuck clamping approx. 25 mm above the cross table surface.

1. Please note that the Allen screw 3 must be released before the adjusting procedure!
2. Adjust the desired height with the handwheel 1 (1 revolution corresponds to 2 mm feed).

If not working with the vertical (Z) adjustment during the working process, we recommend tightening the Allen screw 3.

4.1.2 Feed using drilling lever

1. Release toggle screw 4
2. Release Allen screw 5 at scale ring 6 and set scale to zero.
3. Re-tighten screw 5.
4. Set the desired height with drilling lever 7.
5. Re-tighten toggle screw 4.

Note:

When drilling with the drilling lever, basically proceed just as described above. However, naturally Screw 4 may not be re-tightened during the working process! The possible traverse path here is 30 mm.

4.2 Swivelling the milling head by the (Fig. 6):

To swivel the milling head by the Y axis, simply release Allen screw 1 and swivel the milling head to the desired position. Set the desired graduated number on scale 2 and re-tighten screw 1. The milling head can be swivelled to every side by 90°.

4.3 Assembling the collet chucks (Fig. 7 and 8):

Caution!

You must disconnect the plug from the power socket to prevent unintentional start-up! Risk of injuries!

Caution!

- Never insert the collet chuck singly into the spindle receiver!
- Always engage the collet chuck in the swivel nut first!
- Always make sure that the collet chuck and the milling shaft have the matching diameter!

Please note: In addition to the supplied collet chucks, we have further sizes available in our accessories range. Please contact our Customer Service should you have any further questions. You will find the postal address at the back of these instructions, or simply write us an email to technik@proxxon.com.

1. Release sleeve nut 4 (Fig. 7) at the milling spindle.
2. Place required collet 5 by hand in the sleeve nut 4 and let snap into place by exerting slight axial pressure at the continuous groove. Caution: The thinner end of the collet must point up, as shown in the figure.
3. Insert sleeve nut 2 with the collet in spindle 1 (Fig. 7, see small illustration) and tighten lightly by hand.
4. Insert shaft of tool 3 in the collet.
5. Use the supplied wrench to tighten the sleeve nut, as shown in Fig. 7.
6. To remove the collet, release sleeve nut 4 and pull out tool 3.
7. Now remove the complete sleeve nut with collet out of the milling spindle.
8. Apply slight side pressure to disengage and remove the collet.

4.4 Switching on the milling motor (Fig. 1)

Caution!

Pressing the On/Off button at the top of the housing establishes operational readiness. Please ensure the motor switch at the front side of the milling head is positioned at "0", otherwise the spindle will start up after the On/Off button is pressed!

1. Press the On/Off switch 2. The operational readiness of the device is signalled by the lit up speed display.
2. Press the motor switch 3 to switch on the drive
3. Select the correct speed with rotational speed adjusting knob
4. The current rotational speed will be displayed in the digital speed display 5.

4.5 Changing the spindle speed

Setting the spindle speed is necessary to adapt the cutting speed of the tool to the characteristics of the material to be machined and to the tool geometry.
Large tool diameters at equal rotational speed also mean a large circumferential speed and thus potentially a large cutting speed. Conversely, the same is also true for small tool diameters. The speed can be adjusted with the rotational speed adjusting knob and the current value is shown on the digital display.

5 Milling

Caution!

Always wear protective goggles during milling. Comply with the safety regulations without fail!

The work piece to be processed must always be securely fastened to the cross table! There are various possibilities available to you: Clamping jaws (e.g. 24 257 from PROXXON), vices (e.g. 24 255 from PROXXON) are very well suited. If divisions are to be manufactured, it is possible to work with dividers or feed receivers, for example. You will find examples for clamping devices and accessories in our equipment brochure, on the internet at www.proxxon.com, also together with other valuable notes, in our "Manual for the Creative Modeller" (Art. No. 28 996).

5.1 Setting the milling depth and milling procedure

Please observe the section "Height adjustment of the spindle". This explains the methods used to set the height of the milling spindle for the various application ranges.
In practise, after first tightening the work piece and then roughly clamping the milling cutter (approx. 2 mm above the work piece), adjust the spindle and then adjust the milling depth while you work.
You can work with either the handwheel or the drilling feed.

If the infeed (the dimension by which the milling cutter dips into the work piece) should have a certain amount on the other hand, then this can be achieved by using the scale ring of the handwheel as well as the drilling feed.
Both can be "zeroised". To do so, for example and before (!) you switch on the machine, position the milling cutter lightly on the work piece (but without touching it!) and then adjust the respective scale ring to zero. Please remember to release the screw for the scale ring of the drilling feed as described in "Height adjustment of the spindle". The scale ring of the handwheel is simply turned; so remember: the Z carriage traverses by 2 mm per revolution.

This is how to proceed:

1. Securely fasten the work piece with clamping jaws, vice or chuck.
2. Roughly adjust the desired spindle height by handwheel 1 (Fig. 5). To do so, Allen screw 3 must be open, but toggle screw 4 but must tightened! If necessary, "zeroise" the scale rings as described in the text above.
3. Make sure that the milling cutter does not touch the work piece.
4. Make sure that the correct spindle speed is set.
5. Select direction of rotation! (See below at "Feed").
6. If the milling depth will be varied during milling, then this works best by using the handwheel 1 (Fig. 5). Here, Allen screw 3 is open, toggle screw 4 is closed. If the milling depth will not be changed after the adjustment (e.g. while face milling a work piece), we re commend keeping both screws 3 and 4 closed.
7. Alternatively, you can regulate the milling depth with the drilling lever 2 (Fig. 5). To do so, tighten Allen screw 3 when the carriage is in the desired position. After actuating the drilling lever 2 to the desired depth, the achieved position is locked by tightening toggle screw 4 to clamp the quill. Drilling or counterboring work can be carried out with this function.
8. Press the On/Off switch 2 (Fig. 1). The operational readiness of the device is signalled by the lit up speed display. Press the motor switch 3 to switch on the drive. Select the correct speed with the rotational speed adjusting knob 4. The current rotational speed will be displayed in the digital speed display 5.
9. Work with the adjusted feed

5.2 Feed:

During milling, make sure that the feed always occurs against the cutting direction of the milling cutter (Fig. 9).

6 Accessories

Commercially availabe milling cutters with a maximum shaft diameter of 12 mm and a tool diameter of approx. 40 mm can be used. For an optimal working result, it is necessary to adapt the milling cutter as well as the milling parameters (feed, milling depth, rotational speed) to the working conditions and to make a choice from these. We recommend the milling inserts from our accessories program, such as the end mill cutter set (2-5 mm) 24610 or - for larger work - the end mill cutter set (6-10 mm), article no. 24620. You will find further suitable milling and drilling tools in PROXXON quality from our comprehensive program in specialist shops or at www.proxxon.com. They will be able to recommend a suitable PROXXON product for your special application case.

A useful accessory for precisely adjusting the height of the spindle is the easy to retrofit fine feed (Art. No.: 24 254). A particularly fine processing depth can be adjusted here optionally by handwheel (graduation 1 graduation line = 0.025 mm).

7 Repair and Maintenance

Caution!

Disconnect the mains plug before all repair and maintenance work!

7.1 Adjusting the play of the cross table or Z carriage guides

If the guide of a cross table or Z carriage axis develops too much play after some time, you can readjust the play using the adjusting screw 2 (Fig. 10). To do so, release the counter nuts 1 and evenly turn in all adjusting screws until the play is eliminated. Then retighten the counter nuts.

7.2 Lubricating the machine

After use, clean the cross table and milling cutter with a soft cloth or brush. Then lightly oil the guides and distribute the oil by traversing the table.
Never clean the cross table with compressed air as the guides would be destroyed by the entering swarf.

To guarantee the long service life of the milling cutter, please comply with the lubrication schedule in Fig. 11 (A: Oil before beginning any work / B: Oil monthly). Only use acid-free machine oil from specialist shops!

7.3 Cleaning and care

Caution!

Always disconnect the mains plug before any cleaning, adjusting, maintenance or repair! Risk of injuries!

Note:

The machine is primarily maintenance free. For a long service life, clean the device after every use with a soft cloth, hand brush or brush. A vacuum cleaner can also be recommended.

8 Disposal

Do not dispose of the device in the household waste! The device contains valuable substances which could be recycled. If you have questions concerning this topic, please address your municipal disposal company or other appropriate municipal institutions.

9 EC Declaration of Conformity

Name and address of the manufacturer:
PROXXON S.A.
6-10, Härebierg
L-6868 Wecker

Product designation:	FF 500/BL
Article No.:	24350

In sole responsibility, we declare that this product conforms to the following directives and normative documents:

EU EMC Directive 2014/30/EC
DIN EN 55014-1 / 05.2012
DIN EN 55014-2 / 01.2016
DIN EN 61000-3-2 / 03.2015
DIN EN 61000-3-3 / 03.2014

EU Machinery Directive 2006/42/EC
DIN EN 61029-1 / 01/2010

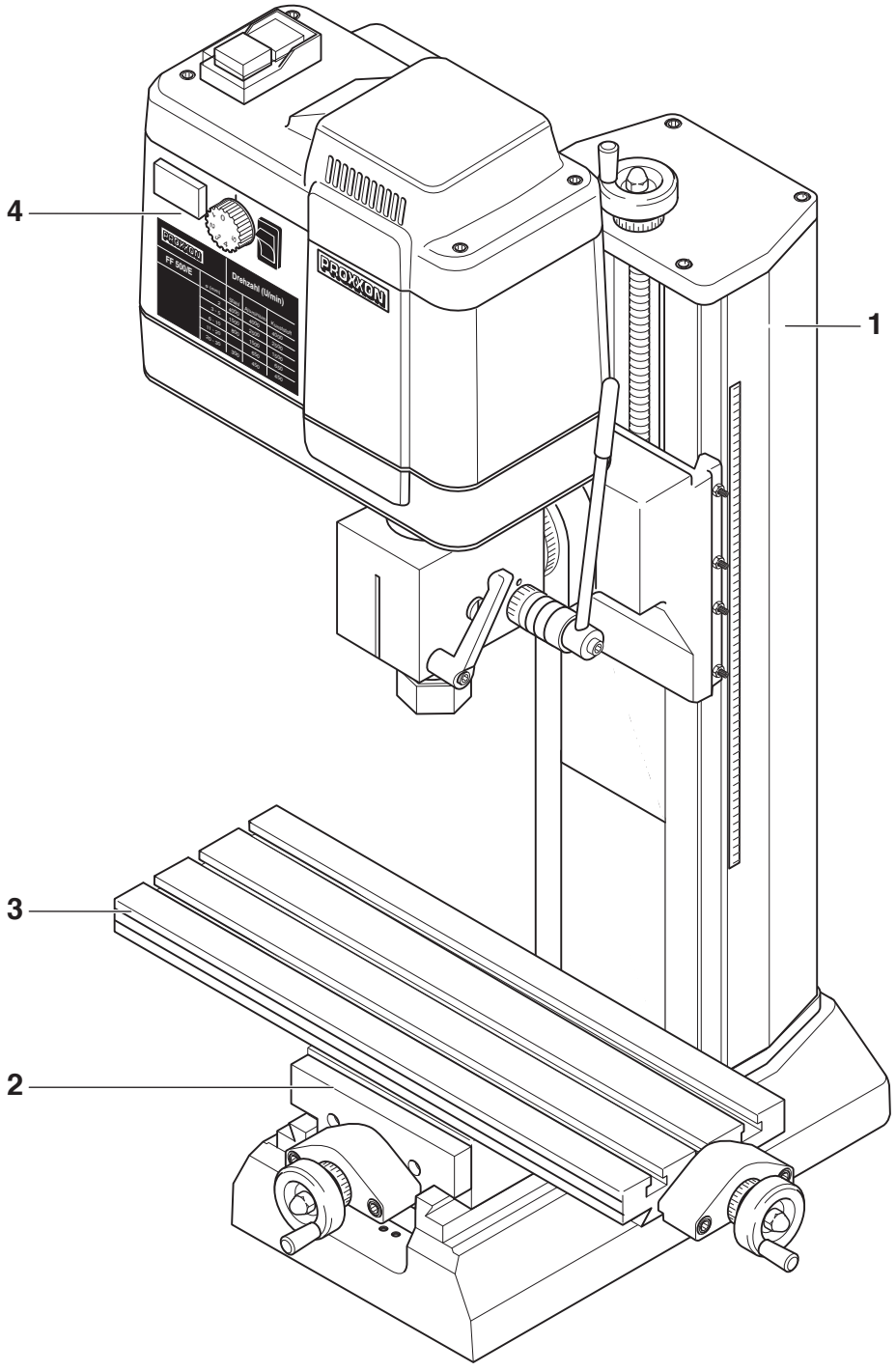
Date: 18.05.2016

Dipl.-Ing. Jörg Wagner
PROXXON S.A.
Machine Safety Department

The CE document authorized agent is identical with the signatory.

PROXXON FF 500/BL

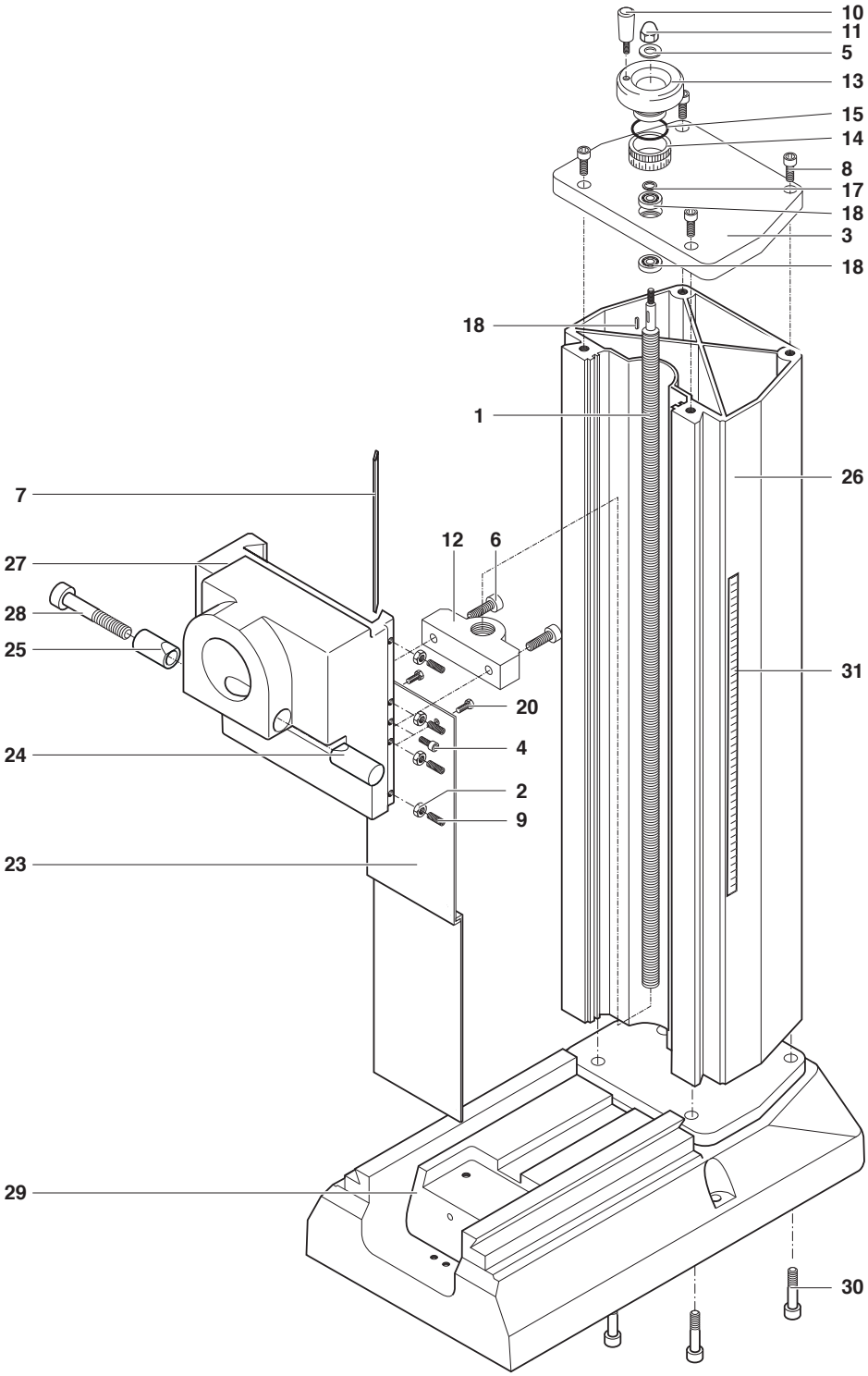
ET - Nr.:	Description:
24350-01	Assembly Z axis
24350-02	Assembly Y axis
24350-03	Assembly X axis
24350-04	Milling head



PROXXON FF 500/BL

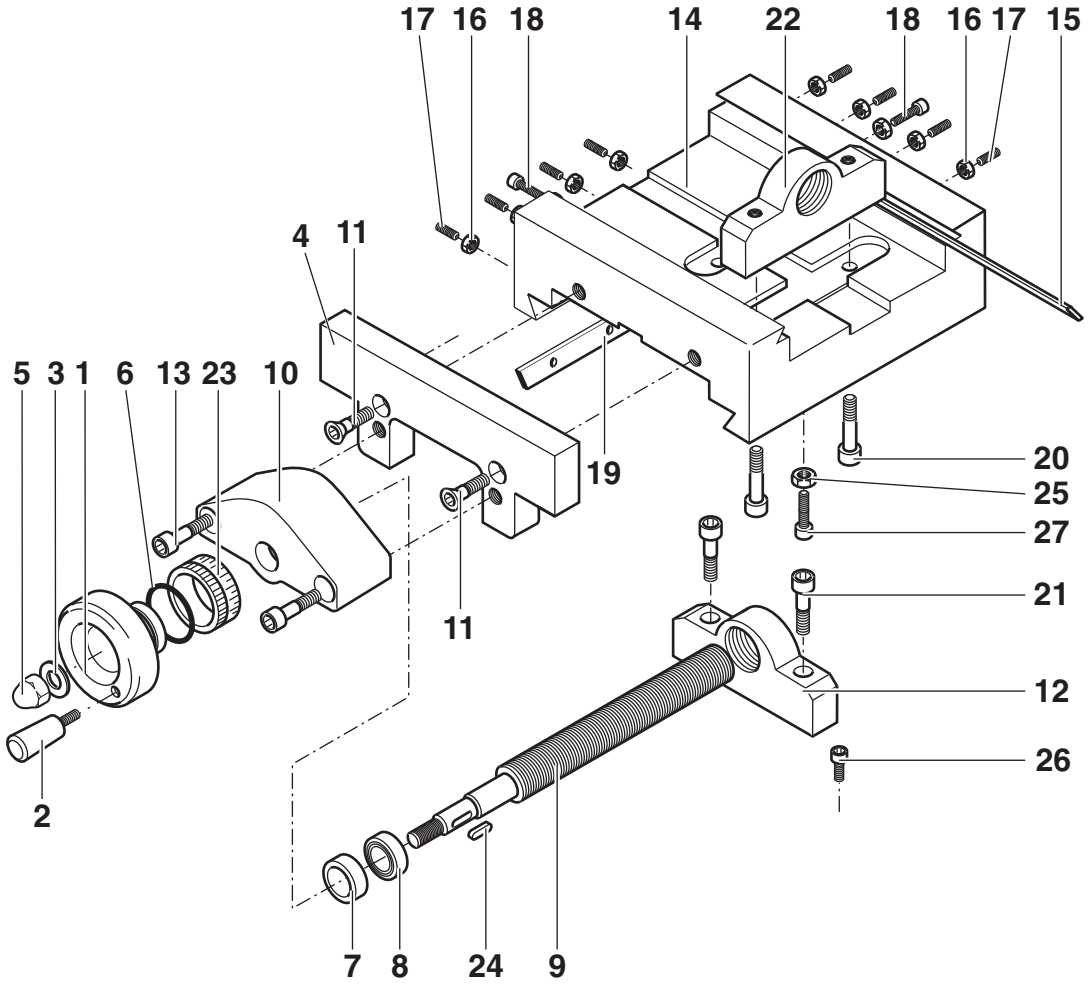
ET - Nr.:	Description:
24350-01-01	Z threaded spindle
24350-01-02	Nut
24350-01-03	Cover for column
24350-01-04	Screw
24350-01-05	Washer
24350-01-06	Screw
24350-01-07	Adjusting plate
24350-01-08	Screw
24350-01-09	Set screw
24350-01-10	Pin
24350-01-11	Cap nut
24350-01-12	Spindle nut
24350-01-13	Handwheel
24350-01-14	Scale ring
24350-01-15	O-ring
24350-01-16	Fitted key
24350-01-17	Spacer ring
24350-01-18	Ball bearing
24350-01-20	Screw
24350-01-21	Z carriage
24350-01-23	Guard plates
24350-01-24	Wedge shaped piece thread
24350-01-25	Wedge shaped piece hole
24350-01-26	Column

ET - Nr.:	Description:
24350-01-27	Z-Slide
24350-01-28	Screw
24350-01-29	Base
24350-01-30	Screw
24350-01-31	Ruler



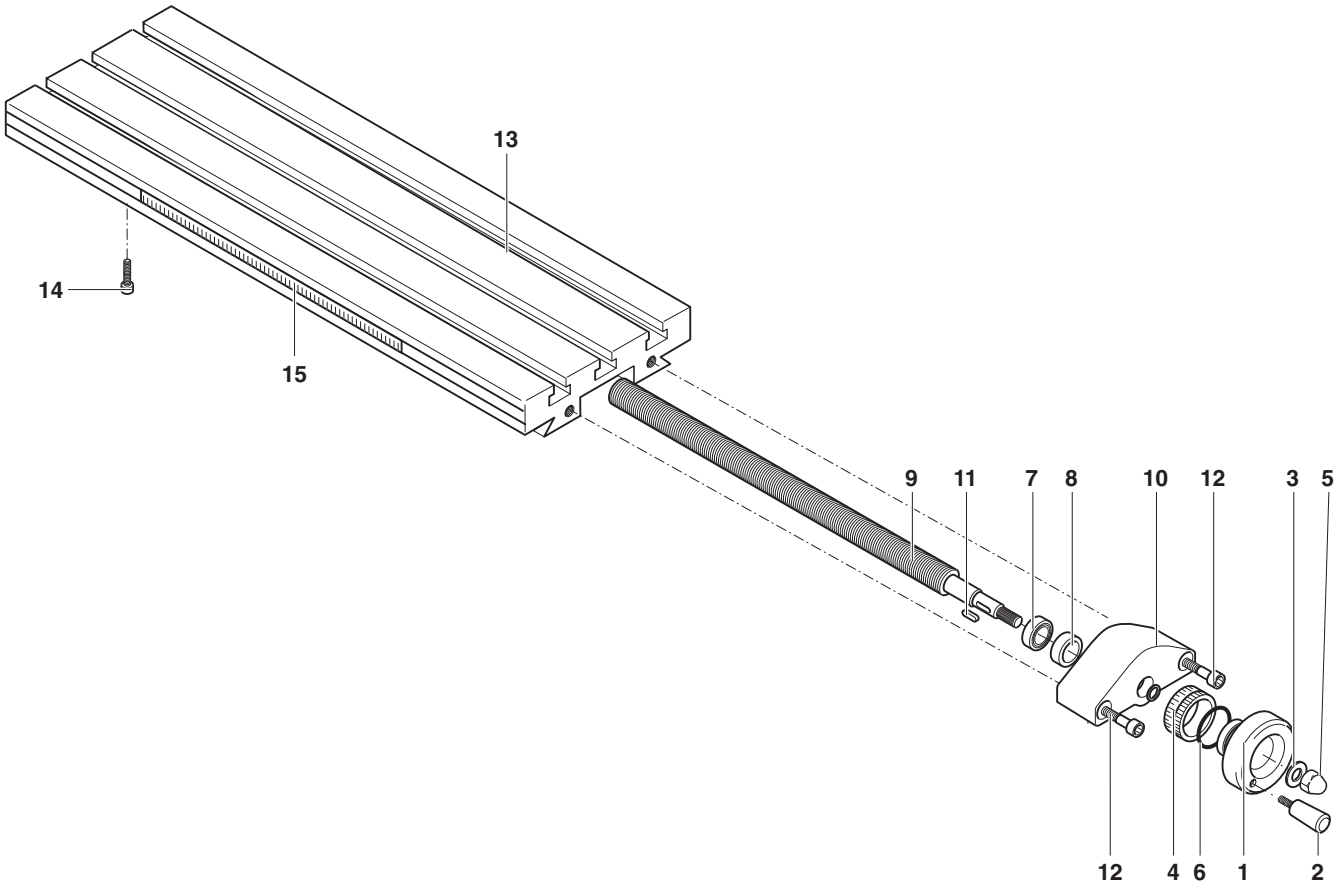
PROXXON FF 500/BL

ET - Nr.:	Description:
24350-02-01	Handwheel
24350-02-02	Pin
24350-02-03	Disc
24350-02-04	Distance plate
24350-02-05	Cap nut
24350-02-06	O-ring
24350-02-07	Bushing
24350-02-08	Ball bearing
24350-02-09	Y axis spindle
24350-02-10	Pillow block
24350-02-11	Set screw
24350-02-12	Spindle nut (Y)
24350-02-13	Screw
24350-02-14	Carriage
24350-02-15	Adjusting plate
24350-02-16	Nut
24350-02-17	Set screw
24350-02-18	Screw
24350-02-19	Adjusting plate
24350-02-20	Screw
24350-02-21	Screw
24350-02-22	Spindle nut (X)
24350-02-23	Scale ring
24350-02-24	Fitted key
24350-02-25	Nut
24350-02-26	Screw
24350-02-27	Screw



PROXXON FF 500/BL

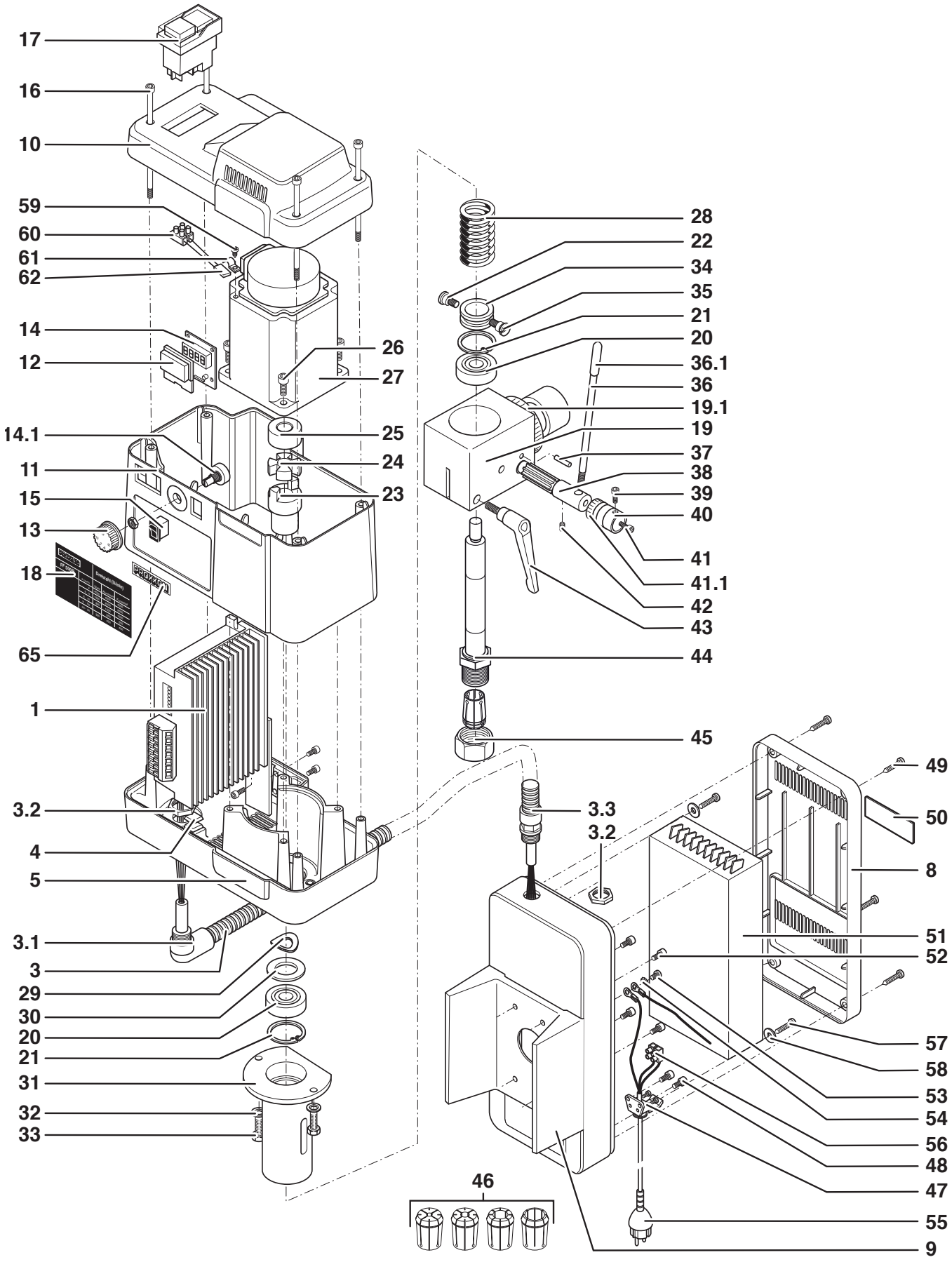
ET - Nr.:	Description:
24350-03-01	Handwheel
24350-03-02	Pin
24350-03-03	Disc
24350-03-04	Scale ring
24350-03-05	Cap nut
24350-03-06	O-ring
24350-03-07	Ball bearing
24350-03-08	Sleeve
24350-03-09	Spindle X axis
24350-03-10	Pillow block
24350-03-11	Fitted key
24350-03-12	Screw
24350-03-13	Milling table
24350-03-14	Screw
24350-03-15	Ruler



PROXXON FF 500/BL

ET - Nr.:	Description:
24350-04-01	Controller
24350-04-02	Cable harness
24351-05-03.1	Fitting, angular
24352-06-03.2	Nut
24353-07-03.3	Fitting, straight
24350-04-04	Rubber pad
24350-04-05	Casing, downer part
24350-04-08	Cover
24350-04-09	Casing column
24350-04-10	Cover
24350-04-11	Casing
24350-04-12	Cover fort Display
24350-04-13	Knob
24350-04-14	Speed display
24350-04-14.1	Potentiometer
24350-04-15	Motor switch
24350-04-16	Casing screw
24350-04-17	On-Off-switch
24350-04-18	Speed table sticker
24350-04-19	Quill guidance
24350-04-19.1	Angle label
24350-04-20	Roller bearing
24350-04-21	Circlip
24350-04-22	Pin with thread
24350-04-23	Downer coupling part
24350-04-24	Elastomer cross
24350-04-25	Upper coupling part
24350-04-26	Allen screw
24350-04-27	Motor
24350-04-28	Spring
24350-04-29	Spring washer
24350-04-30	Washer
24350-04-31	Quill
24350-04-32	Washer spring
24351-04-33	Screw
24350-04-34	Ring
24350-04-35	Pin with slit
24350-04-36	Lever
24350-04-36.1	Grip
24350-04-37	Pin
24350-04-38	Toothed shaft
24350-04-39	Allen screw
24350-04-40	Scale ring
24350-04-40.1	Scale label
24350-04-41	Allen screw
24350-04-42	Set screw
24350-04-43	Toggle screw
24351-04-44	Spindle
24350-04-45	Swivel nut for spindle
24350-04-46	ER-Collet chuck, set complete
24350-04-46.1	ER-Collet chuck 6 mm
24350-04-46.2	ER-Collet chuck 8 mm
24351-04-46.3	ER- Collet chuck 10 mm
24350-04-46.4	ER-Collet chuck 12 mm
24350-04-47	Strain relief
24350-04-47.1	Clamp
24350-04-47.2	Allen screw
24350-04-48	Allen screw

ET - Nr.:	Description:
24350-04-49	Casing screw
24350-04-50	Label
24350-04-51	Switching power display
24350-04-52	Allen screw
24350-04-53	Ground screw
24350-04-54	Toothed washer
24350-04-55	Lever
24350-04-56	Luster terminal
24350-04-57	Screw
24350-04-58	Washer
24350-04-59	Screw
24350-04-60	Luster terminal
24350-04-61	Fastener
24350-04-62	Thermal element
24350-04-65	Proxxon-Logo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PROXXON

GB Service note

All PROXXON products are thoroughly inspected after production. Should a defect occur nevertheless, please contact the dealer from whom you purchased the product. Only the dealer is responsible for handling all legal warranty claims which refer exclusively to material and manufacturer error. Improper use, such as capacity overload, damage due to outside influences and normal wear are excluded from the warranty.
You will find further notes regarding „Service and Spare Parts Management“ at www.proxxon.com.

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