

Operating Instruction Manual Tool Sets



This operating instruction manual is determined for all persons who carry-out work with this tool. It must be read before using the tool and it must be easily accessible to all persons.



OERTLI 

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1. Description

A tool set consists of one individual cutter or several cutters which are assembled on a holder device with spacers and clamping components.

Various clamping systems are used for individual cutters which are described in separate operating manuals.

1.1. Appropriate Application

Tools sets with clamping systems are exclusively for wood-cutting and thereby for machining of profiles under consideration of suitable operating conditions.

Materials to be cut are:

- Softwoods
- Hardwoods
- Exotic woods
- Particle boards
- MDF (medium density fibreboard)
- Laminated pressed woods
- Composite materials (wood and plastic)

Place and mode of application:

- Woodworking machinery
- Feed systems: Manual feed or Mechanical feed, according to tool inscription
- Speed range (RPM), respectively max. speed according to tool inscription

1.2. Design variants

Various types of clamping bushes or clamping shafts are available. They are designed for woodworking machines where the tools are in use. The assembly drawing (Fig. 1) shows which holding element is used and which spacers are inserted between the individual cutters. The assembly drawing is essential and is included in all tool kits.

Taking out or inserting spacers allows the tool set to be adjusted for varying wood thicknesses, respectively allows precise micro-adjustments to be made. If a tool set is used

for several wood thicknesses, it is shown as such on the assembly drawing.

2. Security Advice

The following remarks refer to the different levels of danger:

DANGER

DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION

CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Our clamping adaptors and tools have been manufactured in compliance to the European Standards EN 847-1 and following.

For safe use of the clamping adaptor, respectively of the tool, instructions of the machine manufacturer must be adhered to. The applicable information has to be taken from the instruction manual of the woodworking machine in use.

All workmanship is to be done only by qualified personal who has the know-how to work with woodworking machines and wood-

working tools as well as with its clamping adaptors.

Operate this tool, respectively this clamping adaptor only under the in "Determined use" described application as well as under consideration of the following safety directions.

3. Start Up

3.1. Unpacking/Transportation

CAUTION



Danger of getting hurt by very sharp cutting edges exist, when touching the tool.

Be cautious when unpacking or packing as well as when handling.

Do not touch tools at the cutting edges.

Wear safety gloves.

CAUTION

Damage to the clamping adaptor and to the tool due to strike against foreign material.

Be cautious when unpacking or packing as well as when handling.

Always put tools on soft supports.

Transport clamping adaptors and tools only in a suitable packing.

Always use the original packing for transport.

3.2. Installation/Assembly

CAUTION

Clamping adaptors with steep cone shank require a holding bolt. Without it, the tool is not held in the spindle.

Damage to the clamping adaptor and the tool due to not mounting a holding bolt.

Mount the corresponding holding bolt into the steep cone shank before the tool is put onto the machine.

CAUTION

Damage to the tool, to the cutting edges and to the knife clamping systems as well as to the clamping adaptors due to loss of clamping forces.

All clamping surfaces must be free from dirt, oil, grease and water.

Do not use fibre materials, such as cotton waste for cleaning.

WARNING



Danger of getting cut or crushed by unexpected start-up of the machine during tool change or knife change.

Interrupt the power to the machine.

Mount and secure the clamping adaptors and the tools according to instructions of the machine manufacturer! Consider necessary information from the instruction manual of the woodworking machine in use.

4. Attendance/Operation

WARNING



Danger of injuries or danger of crushing by the rotating tool.

Do not touch the rotating tool.

Do not slow down the tool by lateral pressure against the tool body.

Do not work without necessary safety guard.

4.1. Prior to operation

Check the clamping adaptors and the tools for damage and check the seats of the clamping elements as well as the condition of the cutting edges.

For maintenance work on damaged or dull cutting edges refer to chapter "Maintenance/ Cleaning" of the corresponding wood working tool.

For proceeding with respect to preservation and storage, refer to chapter "Preservation/ Storage" in this maintenance manual.

WARNING



Tool breakage or cutting edge breakage by overload.
Cutting injuries, crushing injuries or danger of life due to fly-away parts.

Do not re-install neither damaged or modified clamping adaptors and tools nor clamping adaptors and tools with corroded screw connections.

Maintenance work on damaged clamping adaptors and tools to be carried-out only by the manufacturer of clamping adaptors and tools.

Applicable machine parameters such as speed, direction of rotation and feed to be checked and verified with the parameters of the clamping adaptor and tool.

For compound tools (tipped tools), the rest height or rest thickness of the attached cutting plate is not to be less than 1 mm.

Check screw connections for corrosion after transport or after a longer storage time, respectively a longer unused time. Corroded screws must be replaced. Threaded holes must be checked for correct tolerances and strength.

WARNING

Due to transport, strong working vibrations or long storage times, alternatively parts not being used for a long time, so called resting-effects may occur due to vibrations and temperature differences on screw connections. As a result, screw clamping forces are considerably lost.

Danger of cutting injuries, crushing injuries or danger of life due to fly-away parts.

Tighten all screws to the required torque before each use.

Protect clamping adaptors and tools with screw connections from vibrations.

Store clamping adaptors and tools at mostly constant temperatures.

4.2. Possible Feed Systems

Single-part tools may be assembled to a tool set or to a tool combination. Tools from such sets or combinations which are not suitable for hand feed will be equipped with a pin in the hub area to avoid using them as single-part tool.

WARNING



For manual feed exists danger of injuries, danger of crushing or danger of life by tool kick-back.

Manual feed requires working only against the feed.

Do not use individual -with pins secured- tools for manual feed.

The tool inscription indicates whether your tool is suitable for manual feed or for mechanical feed:

Inscription MAN:
Suitable for manual feed.
Operation: Only against the feed.

Inscription MEC:
Suitable for mechanical feed
Operation: Against the feed or with the feed.

4.3. Allowable range of spindle RPM

WARNING

Tool breakage due to overload.
Cutting injuries, crushing injuries or danger of life by fly-away parts.

Some clamping adaptors are allowed to be used only for one direction of rotation. Check a possibly pretended direction of rotation of the clamping adaptor with that of the tool as well as with that of the machine.

For shank type tools and tools with bore, for example on clamping bushes:

Check the maximum permissible speed of the clamping adaptor with that of the used tools. The respective **smallest value** is the maximum admissible speed of the corresponding tool combination. Do not exceed the **smallest maximum speed** of all participating clamping adaptors and tools.

For tools with bore, for example on CNC-clamping shafts:

Tools with bore on CNC-clamping shafts with for example HSK- or Steep Taper Cones are not allowed to be operated without checking the strength.

The operating speed must be checked separately for each tool combination. Whether the calculation for the corresponding tool combination has been made, can be seen on the customer drawing. If no customer drawing is available for a tool combination, the operational stability has to be checked.

WARNING



For manual feed exists danger of injuries, danger of crushing or danger of life by kick-back of the workpiece, if the allowed range of speed falls short of.

Do not fall short of the allowed range of speed for manual feed.

4.4. Application parameters

WARNING

Tool breakage due to overload.
Cutting injuries, crushing injuries or danger of life by fly-away parts.

Make sure that operating vibrations are as small as possible.

As required, adjust feed rate, speed and cutting depth.

Improve clamping stability of the work-piece.

4.5. Reasons for a possible knife -, resp. tool rupture

The following reasons may lead to a knife rupture:

- Grinding cracks or change of the cutting geometry due to improper sharpening
- Jerking movements of the work-piece
- Jam of the tool by a waste piece (especially by cut-out work)
- Overheating by friction due to too small

feed rate or too small cutting depth as well as due to dull cutting edges

- Too high feed rate
- Too large cutting depth
- Insufficient clamping of the tool
- Vibrations of the machine

5. Maintenance/Cleaning

Clamping adaptor quality and tool quality as well as work safety are only guaranteed, if the clamping adaptor and the tool is checked and cleaned before used.

Required tightening torques to be exactly maintained when screws are tightened (use proper torque wrench). Only by this manner sufficient clamping is guaranteed.

WARNING

Tool- or knife rupture due to imbalance of not mounted reversible- or inserted knives.

Cutting injuries, crushing injuries or danger of life by fly-away parts.

Do not mount unsymmetrically reversible knives and inserted knives.

Always use the same screws and clamping parts per cutting system.

WARNING

Tool- or knife rupture due to corroded screw connections.
Cutting injuries, crushing injuries or danger of life by fly-away parts.

Damaged or corroded screws and clamping parts must be replaced. In addition corresponding threaded holes must be checked for accuracy and strength.

CAUTION

Tool- or knife rupture due to overload from worn -or damaged knife cutting edges.

For reversible knives or inserted knives:

- Do not re-sharpen, but replace in time
- Do consider thereby the instruction manual for changing knives for the corresponding knife system

For compound tools and single-part tools such as saw blades, diamond tipped cutters or tungsten carbide tipped cutters, solid tungsten carbide spiral cutters:

- Re-sharpen or replace
- Do consider thereby the corresponding information in chapter "Maintenance work"

Use only original spare parts from OERTLI Tooling Inc.

Dull or damaged cutting edges must be sharpened or replaced, if:

- the wear-out part of the cutting edges are greater than 0.2 mm (consider especially the main wear-out parts!)
- Break-outs on the cutting edge are visible
- Burns on the wood are visible
- the surface on the work piece does not comply anymore with the desired requirements
- the power requirement of the machine increases considerably (more than 10%)

5.1. Maintenance Work

5.1.1. Disassembly and assembly of a tool set on a clamping sleeve

(see Fig. 1 and Fig. 2)

As an example is thereafter the disassembly and assembly for a clamping sleeve described. The same procedure applies basically also for clamping shafts (see Operating Instruction Manual "Clamping Shafts"):

1. Lay-out the assembly drawing included with the tool kit. Identification is with the drawing number which is found in the bottom right-hand corner. Fig. 1 shows a drawing with the identification number 4 97 1234 100 A. The tool set is identified with the drawing number. However, the prefix indicating the drawing format and the last letter indicating the drawing's index are left-off. For example, in Fig. 1, the tool set is identified with the numbers 97 12345 100.
2. Carefully and thoroughly clean the tool set. Place the cleaned set on the sleeve collar or in a special holding device.
3. Loosen the screws (1) with the Allen key and remove them completely.
4. Now all the spacer components (3, 4) and all cutters (5) can be taken-off from the clamping sleeve (2).
5. Be very careful not to loose any parts or mix with parts from other tool sets.
6. Before assembly of the tool set, carefully clean all components. Make certain that all clamping and support surfaces are free from dirt, oil, grease and water.
7. Mount spacers and cutters, as shown on the assembly drawing, on the corresponding clamping sleeve (2). The part number "N2", identifying the clamping sleeve, is engraved on it. During assembly, take special care to align mounting holes in the cutters to mounting holes in spacers and shims (Fig. 2). The positioning pin securely fixed in the clamping bush, must engage in the hole (A) of spacers or cutters.
8. The individual cutters are marked by identification numbers. The cutter (5), shown in the assembly drawing belongs the part number "N5." This number is engraved on the cutter and is referred to in the drawing. The spacer components have their thickness engraved in millimetres. The thickness of them (B3, B4) is specified on the drawing and refer to the spacers (3), respectively shims (4).
9. After all the cutters and spacer components are mounted (compare to the drawing), carefully and precisely insert the screws and tighten them at the specified torque of 10 Nm.

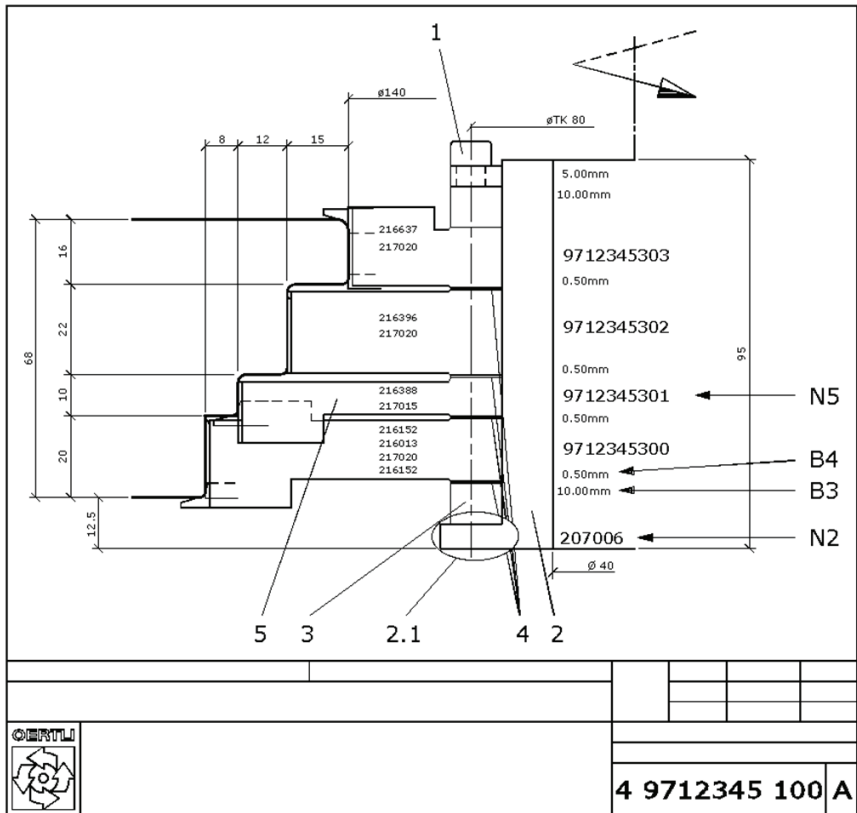


Fig.1

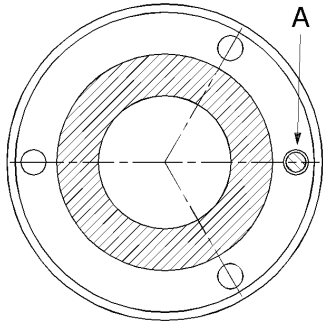


Fig.2

5.1.2. Tightening torques

CAUTION

Insufficient clamping or rupture of screw due to overload.

Use kick-back free torque wrench.

Do not mount tools and clamping adaptors in heated-up or under-cooled conditions.

If more than two screws per clamping unit are used, the clamping screws must be tightened with the required torque in the sequence from center to outside.

For clamping sleeves:

Screws M6 with hexagon socket head
5 mm = 10 Nm

Screws M8 with hexagon socket head
6 mm = 10 Nm

5.1.3. Behaviour after a tool collision

! DANGER



After a tool collision or after high working vibrations, the strength of the brittle cutting edge material and the hardened clamping adaptor is not guaranteed anymore. High vibrations or a collision of the tool act like blows on the cutting edges. For very high loads due to high cutting speeds in woodworking, such pre-damaged tools and clamping adaptors may lead to tool rupture. Ruptured tool parts act like bullets at high working speeds! Danger of cutting injuries, danger of crushing or danger of life due to fly-away ruptured tool parts!

Do not re-use damaged tools or deformed tools and clamping adaptors.

Repair work and maintenance work on tools and clamping adaptors to be carried-out only by the tool manufacturer.

Tool and clamping adaptor to be checked for micro-damages. In addition, verify the tool connection of the machine.

5.1.4. Cleaning

CAUTION

To achieve highest precision and best performance, it is important to clean tools and clamping adaptors regularly as required according to application.

Damage of the tool, the cutting edge and the knife clamping system as well as the clamping adaptor due to loss of the clamping force.

All surfaces used for clamping must be free from dirt, oil, grease and water.

Rinse and dry tools after cleaning with a solvent.

Do not use fibrous materials, such as cotton waste, for cleaning.

CAUTION



Danger of corrosion by use of an unsuitable cleanser for tool bodies in aluminium.

For aluminium use only a suitable, water soluble special cleansing agent.

Tools with body in aluminium to be cleaned mechanically.

CAUTION

Danger of rupture of knives.

Do not clean mechanically knives of diamond.

5.1.5. Measurement

CAUTION

Danger of rupture of knives.

Knives of diamond to be measured only optical.

6. Preservation/Storage

If the tool or clamping adaptor is not being used for a longer period of time (> 6 months), it should be prepared for storage as follow:

- With the exception of fix screwed Hydro-clamping components, tool sets or tool combinations must be first dismantled into single tools.
- Clean well the single tools and clamping adaptors such as for example bushes,

shafts, collets and chucks. For details, please refer to chapter "Cleaning" of the corresponding maintenance manual.

- For tools with inserted knives or reversible knives, all knife clamping systems must be dismantled and cleaned. Please refer to chapter "Cleaning" of the corresponding maintenance manual.
- Make sure that all clamping- and contact surfaces are free from dirt, oil, grease and water.
- For tools with inserted knives or reversible knives, the knives can now be re-mounted. Please refer therefore to chapter "Maintenance work" in the corresponding operating manual.
- Treat the dried single tools and clamping adaptors with a customary available preservation oil.
- Single tools and clamping adaptors may now be re-assembled.
- Store the conserved tools and clamping adaptors in a room, which is not exposed to large temperature fluctuations (20°C +/- 10°C).

CAUTION



Danger of corrosion by storing unconserved tools and clamping adaptors.

Always conserve tools and clamping adaptors, if not in use.

Do not put into operation tools and clamping adaptors with corroded screw connections. Corroded screws must be replaced.

Threaded holes must be checked for accuracy as well as for strength.

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