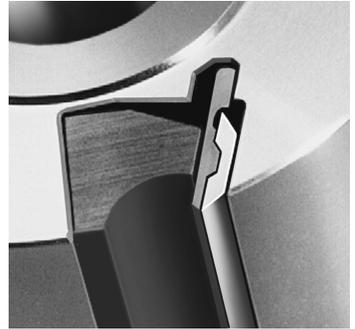


# Operating Instruction Manual SINUS Cutterheads



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

The SINUS Cutterheads have a knife clamping system which firmly tightens knives and clamping elements by centrifugal forces. The use of additional knives on the SINUS Cutterheads allows to simultaneously plane, chamfer, and round-off the edges of the workpiece. SINUS Cutterheads are designed in a close-round shape and have a smooth kickback-free performance.

### 1.1. Appropriate Application

Tools with the SINUS Knife System should be used exclusively for wood-cutting applications such as planing of squared timber and beams with small to medium chip removal under consideration of suitable operating conditions.

Materials to be cut are:

- Softwoods
- Hardwoods
- Exotic woods

Place and mode of application:

- Woodworking machinery
- primarily for planing surfaces with small chip removal
- 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

### 1.2.1. Quality of material of tool bodies

The tool bodies are made in steel or high strength aluminium alloy. For tool bodies in aluminium Helicoil-threaded inserts are used. Please consider the special cleaning instructions for tool bodies in aluminium.

### 1.2.2. Quality of materials

SINUS knives are basically available in two qualities, depending on the application they are used-on:

- Tungsten carbide (HW)
- High-speed steel in Trimetal (HS-TRI)

### 1.2.3. Knife widths

Knife widths [mm]	Quality of material	Knife widths [mm]	Quality of material
60	HS	240	HS, HW
80	HS, HW	250	HW
100	HS, HW	260	HS, HW
120	HS, HW	300	HW
130	HS, HW	310	HS
136	HS	400	HS
140	HS, HW	410	HS
150	HS, HW	430	HS
160	HS, HW	500	HS
180	HS, HW	510	HS
186	HS	610	HS, HW
190	HS	630	HS
200	HS, HW	640	HS
210	HS, HW	710	HS
220	HW	1350	HS
230	HS, HW	--	--

### 1.2.4. Ranges of cutting diameters

Standard designs [mm]	Custom designs
100	all diameters which lie in between the standard diameters
105	"
120	"
125	"
140	"
160	"

### 1.2.5. Additional knives

In order squared timber and beams be simultaneously planed and rounded or bevelled on the edges, additional knives may be inserted. The additional knives are either reversible knives or tipped knives. The tungsten carbide reversible knives are fastened on separate knife holders, which are mounted into the existing SINUS knife grooves. The tungsten carbide tipped knives are mounted into separately made dovetail grooves.

## 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 woodworking 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 on the SINUS Clamping System

New SINUS-knives have a width B of:

- Knife quality HW = 16.2 mm
- Knife quality HS-TRI = 16.0 mm

Before sharpening, the cutting edges are checked. Depending on the degree of wear and knife quality, a new knife width is determined. The grinding grade is marked on the knife by a notch. The actual knife width is recognized by the number of notches.

Knife quality Tungsten Carbide HW  
(3 x grindable, i.e.3 grinding grades)

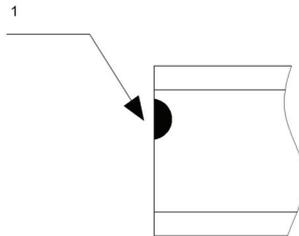
- 1 notch: B = 16.0 mm
- 2 notches: B = 15.7 mm
- 3 notches: B = 15.4 mm

Knife quality High Speed Steel HS-TRI  
(1 x grindable, i.e.1 grinding grade)

- 1 notch: B = 15.5 mm



B = Width



1 = Notch

### 5.1.1. Instructions for changing knives

#### **⚠ WARNING**

Tool- or knife rupture due to imbalance or overload.  
Cutting injuries, crushing injuries or danger of life due to fly-away parts.

Insert SINUS knives only in pairs with identical grinding grade, respectively identical number of notches.

Do not use simultaneously HW- and HS-TRI knives in the same cutter head.

The allowable weight difference of the two opposite installed knives should be a max. of 0.5 grams.

Knives and centrifugal wedges installed in opposite knife grooves are not allowed to be displaced laterally more than 1 mm.

The length of the SINUS-knives must correspond to the length of the SINUS-cutterhead.

#### **CAUTION**

Damage of the knife seat surface due to not mounting of the SINUS-knives.

Do not put SINUS-cutterheads without knives into operation.

(See Fig. 1 through 3)

1. Clean the tool first.
2. Place the SINUS cutterhead in a position, in order the centrifugal wedge (3) can be loosened by the knife changer (7) according to Fig. 2.
3. Loosen the centrifugal wedge with a strike on the knife changer (see Fig. 2).
4. Do not remove the set pin (6) when changing the knife (see Fig. 1).

5. Pull-out the knife (2) laterally with the knife changer (see Fig. 3).
6. Clean the knife seat and all of the components that go with it. Be sure all clamping surfaces are free from dirt, oil, grease and water.
7. Carefully insert the reversed or new knife laterally. Be certain the knife carrier's (1) cam engages completely in the knife's groove, in order the correct radial position is obtained (see Fig. 1).
8. Make sure the knife **doesn't** project laterally from the tool body. Should a positioning of the knife without lateral projection not be possible, then you have installed the wrong SINUS-knife. Do not run, under any circumstances, a cutter-head with wrong knives!
9. When all the knives have been properly re-installed, start-up the machine and let the cutterhead run at the maximum working speed for at least 15 seconds without machining. The centrifugal force will tighten the knives.

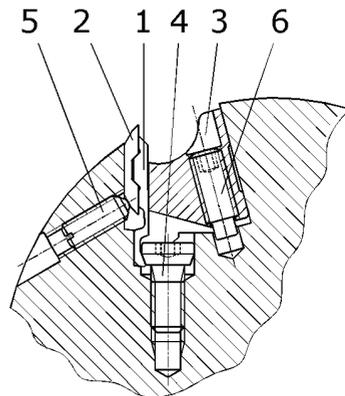


Fig.1

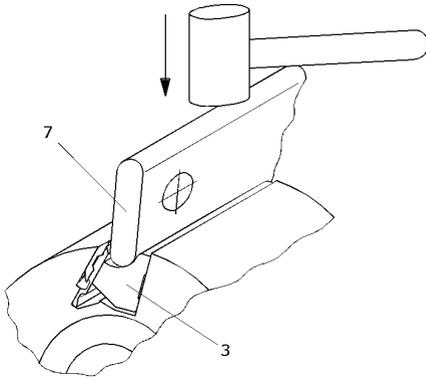


Fig.2

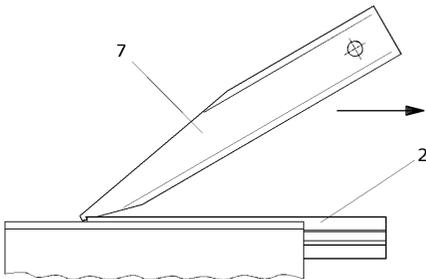


Fig.3

### 5.1.2. Instructions to disassemble the SINUS clamping system

(See Fig. 1 through 3)

It is not necessary to dismantle the SINUS clamping system for changing knives or cleaning. The SINUS clamping system must be dismantled only when inserting additional knives in the SINUS-cutterhead. Additional knives can only be inserted in a SINUS-cutterhead with 4 knife grooves. In order to carry-out a correct disassembly, comply with the following steps:

1. Clean the tool first.
2. Place the cutterhead in a position, in order the centrifugal wedge (3) can be loosened by the knife changer (7) according to Fig. 2.

3. Loosen the centrifugal wedge with a strike on the knife changer (see Fig. 2).
4. Pull-out the knife (2) laterally with the knife changer (see Fig. 3).
5. Loosen the set pin (6) -secured with e.g. LOCTITE- and remove it completely from the centrifugal wedge.
6. Remove the centrifugal wedge laterally from the knife seat.
7. Loosen the screws (4) with the Torx key and remove it completely from the knife seat.
8. Remove the knife carrier (1) from the knife seat.
9. Loosen the spring-loaded ball screw (5) - secured with e.g. LOCTITE- and remove it completely from the tool body.
10. Clean the knife seat and all of the components that go with it. Be sure all clamping surfaces are free from dirt, oil, grease and water.

### 5.1.3. Instructions to assemble the SINUS clamping system

#### CAUTION

Tool- or knife rupture due to imbalance or overload.

Pay attention to markings when mounting the centrifugal wedges.

Mount all centrifugal wedges into the corresponding marked knife grooves.

Do not put SINUS-cutterheads with incorrect mounted centrifugal wedges into operation.

#### CAUTION

Damage of the knife seat surface due to not mounting of the SINUS-knives.

Do not put SINUS-cutterheads without knives into operation.

(See Fig. 1 and 4)

Assembly of the SINUS clamping system is complicated and should be done only by qualified and trained persons. We strongly recommend that this maintenance work to be done only by OERTLI Tooling Inc. or by an authorized OERTLI Service Center.

1. Clean the knife seat and all of the components that go with it. Be sure all clamping surfaces are free from dirt, oil, grease and water.
2. Clean the set screw (6) and threaded hole in the centrifugal wedge (3), as well as the spring-loaded ball screws (5) and threaded holes in the tool body completely from glue residues using a solvent.
3. Treat the spring-loaded ball screws (5) with screw securing paste (e.g. LOCTITE) and screw them into the provided threaded holes of the tool body. The spring-loaded ball screws must project approx. 1.1 mm over the knife seat's surface (see Fig. 4).
4. Turn the screws (4) with the Torx key into the tool body's corresponding threaded holes until the knife carrier (1) can be laterally pushed-in.
5. Slide-in the knife carrier laterally. Be careful that the knife carrier **does not** project laterally from the tool body.
6. Turn the screws (4) at the specified torque of 5 Nm with the corresponding torque wrench.
7. Slide the centrifugal wedge laterally into the correct knife seat. Note that the centrifugal wedge and the knife seat are both marked. There are numbers marked on both pieces. The centrifugal wedge, marked with "1" belongs to the knife seat marked "1." This is analogously true for the remaining centrifugal wedges and knife seats. Make sure that the centrifugal wedges do not project laterally over the tool body.
8. Treat the set screw (6) with screw securing paste (e.g. LOCTITE) and screw it into the centrifugal wedge's threaded hole. Make sure that the set screw's non-threaded cylindrical end part engages in the knife seat's respective hole. Turn the

set screw only until its upper edge is flush with the threaded hole (see Fig. 1).

9. Slide reversed or new knife laterally into the knife seat. Make sure that the knife carrier (1) cam engages completely into the knife's groove, in order to guarantee the proper radial position (see Fig. 1).
10. Make sure the knife **doesn't** project laterally over the tool body. Should a positioning of the knife without lateral projection not be possible, then you have inserted the wrong SINUS-knife. Cutter-head with wrong knives should under no circumstances be taken into operation!
11. After assembling the SINUS clamping system, please wait for about 45 minutes, so that the screw securing paste (e.g. LOCTITE) can "lock" into its fastening state. Please follow the instructions enclosed with the screw securing paste (e.g. LOCTITE)!
12. When all the knives have been properly re-installed, start-up the machine with the SINUS-cutterhead and let it run at the maximum allowed spindle speed for at least 15 seconds without machining. The centrifugal force will tighten the knives.

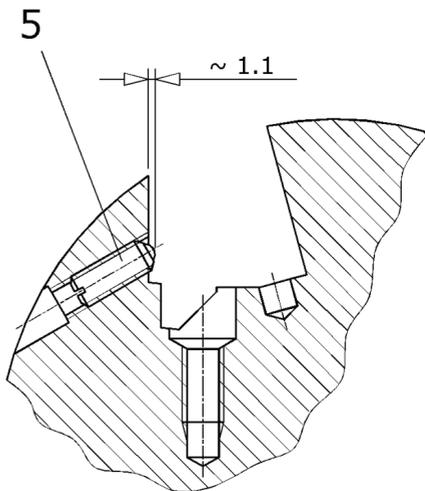


Fig.4

## 5.2. Maintenance work on Additional Knife Holders

### 5.2.1. Instructions to mount additional knife holders

#### **⚠ WARNING**

Tool- or knife rupture due to imbalance or overload.  
Cutting injuries, crushing injuries or danger of life due to fly-away parts.

Additional SINUS-knives to be mounted only in pairs into opposite grooves.

The weight difference of the opposite mounted SINUS-knives should only be a max. of 0.5 grams.

The additional SINUS-knives should laterally not be displaced to each other more than 0.1 mm.

(See Fig. 1 and 5)

All SINUS-cutterheads with 4 knife grooves can be subsequently equipped with additional knives for rounding or bevelling. Knife holders are thereby mounted in pairs into opposite knife grooves; whereas in the other grooves knives are mounted.

1. Make absolutely certain that all individual components of the SINUS clamping system have been completely removed from both the opposing knife grooves in which the addition knife holders will be placed (see Fig. 1, pos. 1 to 6). If this is not the case, remove all individual components according to "Instructions for dismantling the SINUS clamping system".
2. Clean the tool and all of the components that go with it. Be sure all clamping surfaces are free from dirt, oil, grease and water.
3. Loosen the set screw (8) with an Allen key until the pressure pin (10) no longer projects laterally against the additional knife holder (11). Should the set screw inadvertently comes-out completely, the ball (9) and the pressure pin (10) may fall-

out from the knife holder. Figure 5 shows how the parts fit together again. To test if the parts were assembled correctly, turn the set screw as much as possible in the threaded hole. If the pressure pin projects 1 mm laterally against the knife holder, then the individual components were assembled correctly.

4. Slide the additional knife holder laterally in the SINUS knife groove and place it in the desired position. Make certain that the additional knife holders do not project laterally from the tool body.
5. Tighten the set screw with the corresponding torque wrench at the specified torque of 8 Nm.

### 5.2.2. Instructions to disassemble additional knife holders

(See Fig. 5)

1. Clean the tool first.
2. Loosen the set screw (8) only so far until the additional knife holder (11) can be moved in the SINUS-Knife groove.
3. Slide the additional knife holder laterally out of the SINUS knife groove.
4. Clean the SINUS knife groove and additional knife holder. Be sure all clamping surfaces are free from dirt, oil, grease and water.
5. In order to mount the SINUS clamping system in the two knife grooves, follow the instruction in chapter "Instructions for mounting the SINUS-Clamping system".

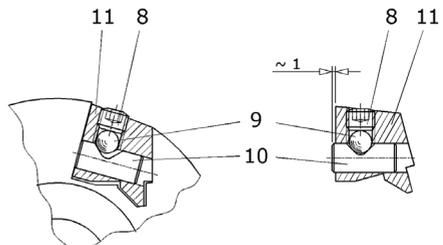


Fig.5

### 5.2.3. Instructions for knife change of the additional knife

(See Fig. 6)

1. Clean the tool first.
2. Remove the additional knife holder in order to prevent being cut or injured.
3. Loosen the screw (12) with the Torx key and remove it completely from the knife seat.
4. Remove the four-corner knife (13) from the knife seat (14).
5. Clean the knife seat and all of the components that go with it. Be sure all clamping surfaces are free from dirt, oil, grease and water.
6. Carefully insert the reversed or new four-corner knife.
7. Put the screw back. Be sure that the screw engages in the positioning groove of the four-corner knife when assembled.
8. Tighten with the corresponding torque wrench at the specified torque of 4 Nm.
9. If necessary, re-install the additional knife holder.

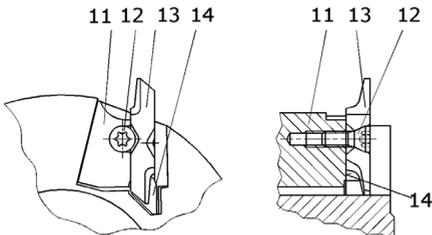


Fig.6

### 5.3. Maintenance work on Tungsten Carbide Tipped Additional Knives

#### 5.3.1. Instructions to mount and remove additional tipped knives

#### **⚠ WARNING**

Tool- or knife rupture due to imbalance or overload.  
Cutting injuries, crushing injuries or danger of life due to fly-away parts.

Mount SINUS-knives only in pairs into opposite knife grooves.

The weight difference of the opposite mounted additional SINUS-knives should be a max. of 0.5 grams.

The additional SINUS-knives should laterally not be displaced to each other more than 0.1 mm.

(See Fig. 7)

Additional tungsten carbide-tipped knives may be mounted into all SINUS cutterheads that have milled dovetail grooves. Knife holder are mounted in pairs in the dovetail grooves, located opposite to each other; whereas SINUS-knives are mounted into the SINUS knife grooves.

1. Clean the tool first.
2. Loosen the set screw (15) with the Allen key only so far until the tipped additional knife (16) can be moved in the dovetail groove.
3. Slide the additional knife laterally out of the groove.
4. Clean the dovetail groove and the tipped additional knife. Be sure all clamping surfaces are free from dirt, oil, grease and water.
5. Slide the re-sharpened or new additional knife laterally into the dovetail groove and position it as required. Make sure that the additional knife does not project laterally over the tool body.
6. Tighten the set screw with the corresponding torque wrench at the specified torque of 8 Nm.

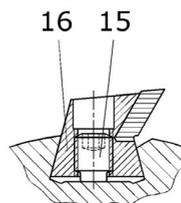


Fig.7

## 5.4. Maintenance Work

### 5.4.1. Re-sharpening of cutting edges

An unqualified re-sharpening of a tool may lead to break-outs on cutting edges or even to rupture of the tool! Therefore we basically recommend to carry-out all sharpening work by OERTLI Tooling Inc. or by an authorized service station.

### 5.4.2. Sharpening instructions

Only qualified personal is allowed to carry-out sharpening work. After sharpening, the tool must comply to all valid regulations and standards.

This is especially true for:

- Projection of knives
- Rest thickness of knives
- Chip gullet width
- Rest imbalance
- Tool inscription

Inform yourself by the tool manufacturer about sharpening services in your neighbourhood.

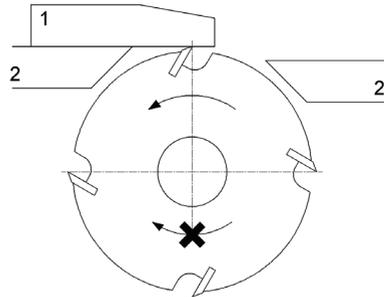
### 5.4.3. Setting of planing cutterheads

#### CAUTION

Damage to knives due to improper knife adjustment.

Use only guide bars made of aluminium or plastic for knife adjustment.

Turn planing cutterheads always backwards when touching with guide bars.



1 = Guide bar, 2 = Machine table

### 5.4.4. 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.

**SINUS-Clamping system:**

Part no. 851.449:

Socket head cap screw M6 x 16 with Torx T25 = 5 Nm

Part no. 851.583:

Ball pressure screw M5 x 12; to be secured with e.g. LOCTITE

Part no. 851.495:

Set screw M6 x 16 with hexagon socket head 3 mm; to be secured with e.g. LOCTITE

Additional knife holder:

Part no. 851.075:

Socket head cap screw M4 x 12 with Torx T20 = 4 Nm

Part no. 851.616:

Set screw M8 x 6 with Hexagon socket head 4 mm = 8 Nm

Tipped additional knife:

Part no. 851.090:

Set screw M8 x 10 with Hexagon socket head 4 mm = 8 Nm

#### 5.4.5. 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.

#### 5.4.6. 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.

#### 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 connentions. Corroded screws must be replaced.

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

## 7. Accessories

Knife changer for the SINUS cutterhead has the article no. 469.100

## 8. Contacts/Addresses

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