Translation
ORIGINAL MANUAL

Angle head

Table of content

1 General

1.1 About the operation manual

1.1.1 Release

Status of the manual: 06.10.2022
Revision index: 10

1.1.2 Requirement

We require that the operator is trained in the safe operation of the angle heads and has read and understood this operating instruction.

1.1.3 Availability

Always keep the manual available to all persons who work with or on the angle heads.

1.2 Used description in this operating manual

1.2.1 Procedure of action

Procedures of action are marked as triangles in sequence of execution. The results of procedure are marked with a check mark. Example:

▶ Loosen cylindrical screw M5 (2).
✓ Arrestor bolt slides into the driving groove of the machine.

1.2.2 Illustration of safety indications

Safety indications are always marked with a signal word and sometimes additional marked with a danger specific symbol (see Chapter 1.2.3):

⚠ DANGER!
Direct danger! Ignoring this indication severe injuries or death is the consequence!

⚠ WARNING!
Possibly danger situations! Ignoring this indication result in severe injuries or death!

⚠ ATTENTION!
Possibly danger situations! Ignoring this indication cause medium or light injuries!

CAUTION!
Possibly danger situation! Ignoring this indication cause damage to property or pollution!

1.2.3 Applied symbols

The followed symbols are used in this manual and on the angle heads:

Warning symbol

	Warning of hot surface!
	Environmentally hazardous substance!

Tab 1: Warning symbol

1.2.4 Indication

☞	Indication: Describes general information and recommendation.

1.3 Guarantee and liability

Basically, the „General conditions of sale and delivery“ apply to ATEMAG.

1.4 Information about manufacturer

Address	ATEMAG **A**ggregate**Te**chnologie und **M**anufaktur **AG** Mühlenmatten 2 D-77716 Hofstetten, Germany
Phone	+49 (0) 78 32/ 99 97 - 0
Fax	+49 (0) 78 32/ 99 97 - 12
E-Mail	info@atemag.de
Internet	www.atemag.de

Tab 2: Information about manufacturer

1.5 Product observation

Informing the manufacturer on accidents, potential hazards on the angle heads and obscurities in this manual.

1.6 Content of delivery

The content of delivery includes: angle head, manual, drawings, tools (optional).

2 General Safety Instruction

2.1 Appropriate Application

The angle head may only be used in machines for cutting operations like: drilling, milling, sawing, planning and grinding of pieces made out of particle board, solid wood, other wood based material, plastic, aluminum.
The angle head must be used within the specific performance limits (see chapter 4) and in industrial environments. Following the manual and compliance with the maintenance and repair requirements are a prerequisite for the appropriate use of the angle head. Any other use of the angle head is not appropriate. The manufacturer is not liable for any damages resulting of inappropriate application.

2.2 Foreseeable misuse

The angle head must not be operated in the food industry and in potentially explosive atmosphere.

2.3 Modifications and changes

Modifications and changes at the angle head are not allowed!
The manufacturer is not liable for changes or improper assembly, installation, commissioning, operation, maintenance and repair.
As spare parts and accessories only original parts from the manufacturer are permitted. The manufacturer is not liable for any damages resulting by using spare parts and accessories which are unlicensed.

2.4 Remaining risk

In normal operation there are no remaining risks. Against risks that may arise during maintenance and repair, is warned in the respective chapters.

2.5 Personnel requirements

Only authorized personnel are allowed to work on the angle heads! They must be familiar with the safety devices and instructions before they start work.
Authorized personnel are:

Operation	Qualification
Normal operation	Authorized personnel
Service	Trained personnel of the operator or manufacturer
Maintenance	Trained personnel of the manufacturer

Tab 3: Personnel requirements

2.6 Personal protective equipment

Operating phase	Personal protective equipment
Normal operation	Safety glasses, protection gloves, safety shoes, ear protector
Service and maintenance	Safety glasses, protection gloves, safety shoes

Tab 4: Personnel protective equipment

2.7 Angle Head Heating

⚠ WARNING!

Angle Head Heating!
During operation the angle head can heat up to 85° C / 185° F.
▶ Wear protection gloves!
▶ Ensure safe distance from heat-sensitive, inflammable and explosive materials!

3 Explanation of the angle head

3.1 Main components of the angle head

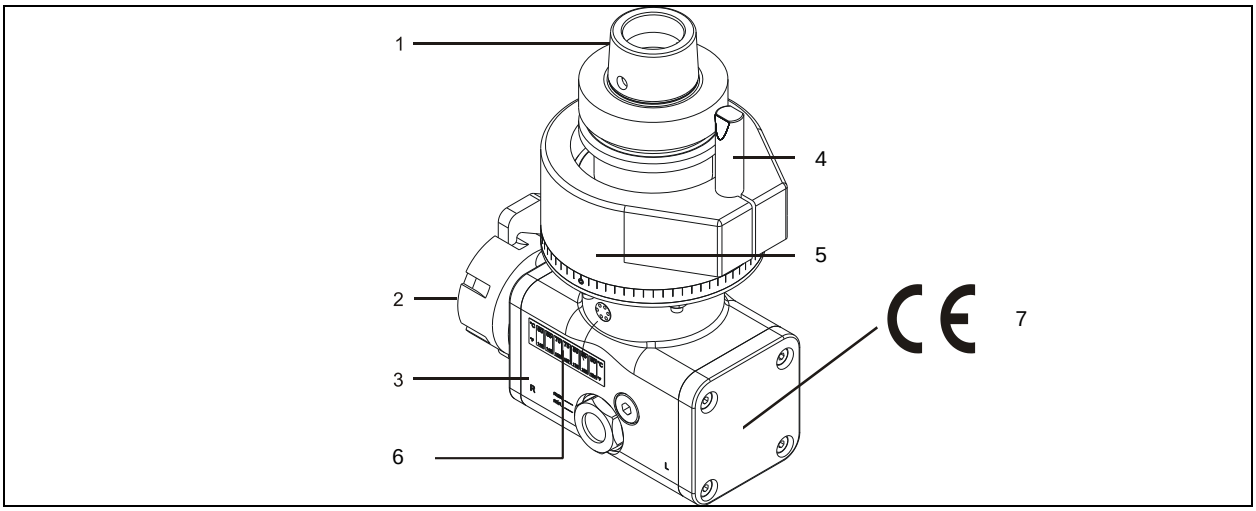


Fig. 1. *Main components and labeling of the angle head (Example: Mono Ultra Line)*

Pos.	Components/Handling parts	Function
1	Center drive	Connection machine → angle head
2	Tool spindle	Tool clamping
3	Housing	
4	Arrestor bolt	Fixation angle head into the machine
5	Torque arm	

Tab 5: Main components of the angle head

Pos.	Components/Handling parts	Function
6	Temperature label	Display the housing temperature
7	Label with CE-labeling	Data of the angle head

Tab 6: Labeling of the angle head

4 Technical Data

Mechanical Data	
Dimensions (L x B x H)	see drawings
weight	see chapter 4.1
Pneumatically Data	
Compressed air connection	6 bar (optional)
Material	
Housing	Aluminum alloy
Tool spindle, gears, bearings, center drive	Hardened steel
Emissionen	
Sound pressure	80 dB(A) (Vario 85 dB(A))

Tab 7: Technical Data

4.1 Weights of angle heads

The weights of the angle heads can be found in the delivery note (angle head without accessory).

5 Delivery, place of installation and storage

5.1 Delivery

5.1.1 Delivery status

The angle head is fully assembled functionally tested and delivered ready for connection.

5.1.2 Scope of delivery

Scope of delivery you find in the contract documentation.

5.2 Requirements to the place of installation

5.2.1 Environmental conditions

Environmental temperature	0 – 40 °C (32 – 104 °F)
Installation conditions	dry, frost-free, vibration-free
Atmosphere	Non-corrosive, non- explosiv

Tab 8: Environmental conditions

5.2.2 Safety devices provided by the operator

Possible safety installations/sanction:
Personal safety equipment according accident prevention regulation; (movable) protection device, according to the risk assessment of the machine into the angle head is installed.

5.3 Storing

- ▶ Store the angle head in a dry, frost-free room in non-corrosive atmosphere.
- ▶ Store angle head only in original packaging.
- ▶ Cover all parts with protecting foil and oil them slightly.

6 Mounting and connection

CAUTION!

Damages of the angle head!
Before installation check the angle head due to transport damages.
- ▶ Do not install damaged angle head!
- ▶ Contact ATEMAG if the angle head is damaged!

6.1 Adjustment of the arrestor bolt without/with nut (optional)

☞	The arrestor bolt should be set before each first commissioning and re-commissioning (e.g. after repairs) of the angle head.

☞	Check backlash of the arrestor bolt at regular intervals.

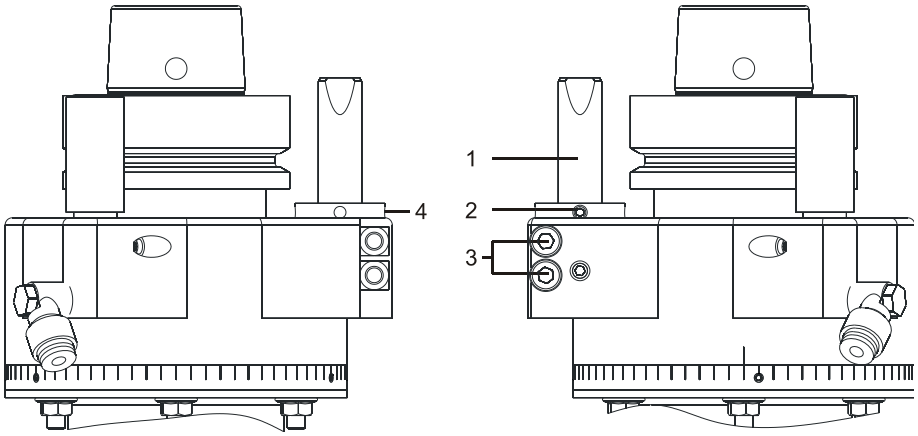


Fig. 2. *Adjustment arrestor bolt*

- ▶ Release cylindrical screws M5 (3).
- ▶ Release socket set screw (2) (optional).
- ▶ Release nut (4) (optional).
- ▶ Press arrestor bolt (1) downwards.
- ▶ Tighten cylindrical screws (3) again.
- ▶ Insert the angle head into the machine.
- ▶ Make sure, that the arrestor bolt (1) is under the corresponding nut in motorspindle or c-axis.
- ▶ Release cylindrical screw M5 (3).
- ✓ Arrestor bolt slides into the corresponding nut.
- ▶ Make sure, that the arrestor bolt (1) engage the nut absolutely playfree.
- ▶ Tighten cylindrical screws M5 (3) with a torque of 5Nm.
- ▶ Apply nut (4) to the surface of the torque arm and secure with socket set screw (2) against twisting (optional).

7 Operation

⚠ WARNING!

Risk of injury from lack of protective device!
- ▶ The angle head and the machine may only be operated, if it is ensured, that the machine, in which the angle head is installed, has suitable protective equipment and the provision of the “Machinery” directive (2006/42/EC).

⚠ WARNING!

Risk of injury due to high weights!

▶ Make sure that no excessive efforts are necessary at the installation of the angle head into the machine.

CAUTION!

Damage the angle head by collision!

Check that the following activities were carried out before use:

▶ A complete and exact collision check has to be executed before first use, after services or
▶ changes on the angle head!
▶ Collision check in tool changer magazine
▶ Collision check with automatic tool change
▶ Collision check with devices and work pieces
▶ Exact check of all machine connection dimensions
▶ Do all checks with inserted tools

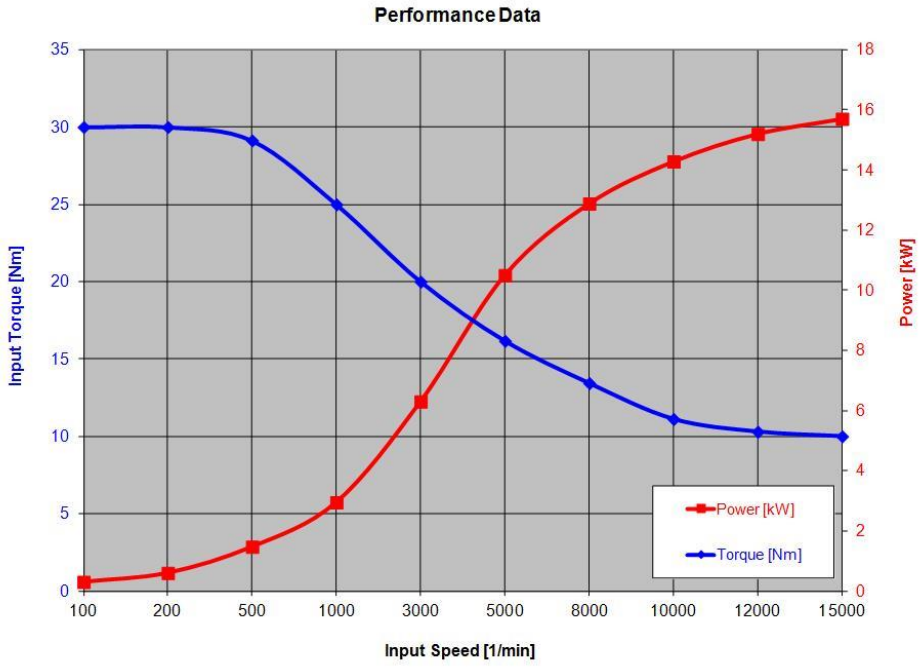
☞	Based on the attached drawings and data sheets, check the following points on correctness of the requirement profile of the machine: Machine connection, total dimensions and interference contour, needed place in tool magazine, permissible total weight, permissible weight of tool change

☞	Do observe during operation: Gear ratio, maximum permissible speed, turning direction of tool spindle, cutting parameters, obtainable system-related precision, measured values of the measurement protocol (offset)

Before operation:

▶ Clean angle head
▶ Check free movement of spindles

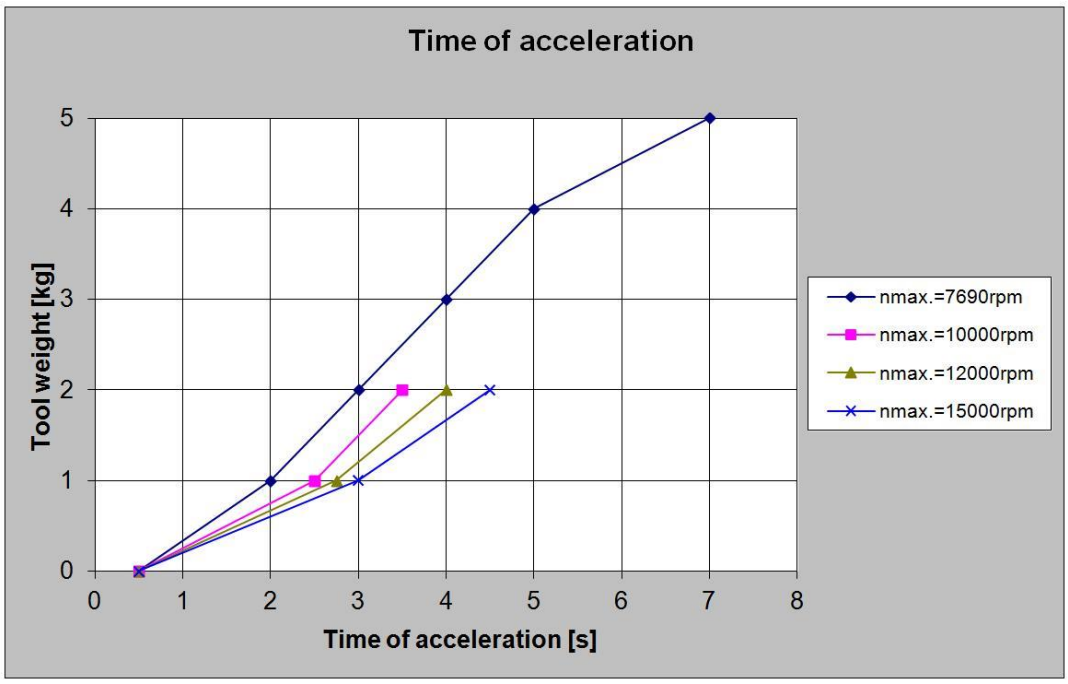
7.1 Performance Data



ATEMAG allows the continuous operation of the aggregate without taking cycle times into consideration (exceptions refer to the technical data on the drawing).

▶ Permitted parameter (e.g. speed and torque) does not exceed.

7.2 Time of acceleration



- For not listed values use closest curve.
- Depending on tool weight, an acceleration ramp has to be respected.
- Kind and condition of the tool used, material and feed speed are influenced significantly the heat of the aggregate.
- Temperature labels display the current temperature by changing colours
- The actual temperature is shown in green.
- At temperature higher than 85 °C / 185° F shut down angle head and let it cool down.

7.3 Torque arm adjustment

7.3.1 Smart Line (360° adjustment)

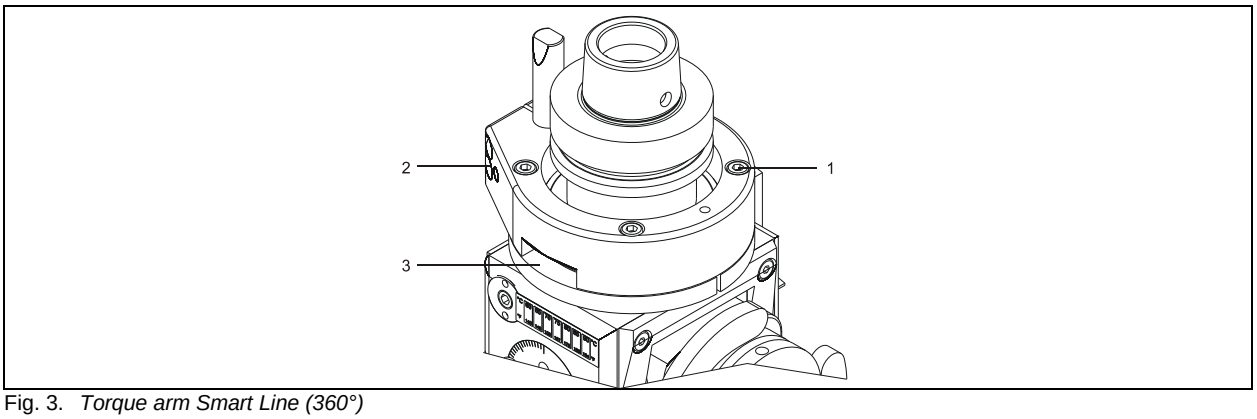


Fig. 3. *Torque arm Smart Line (360°)*

- Loosen cylindrical screws (1) (at spring-loaded arrestor bolts cylindrical screws (2), if applicable)
- Adjust angle head on scale (3) to the desired angle.
- Tighten cylindrical screws (1) (cylindrical screws (2), if applicable) with a torque of 5Nm.
- Arrestor bolt has to be readjusted, if applicable (see chapter 6.1).
- Check angle on a coordinate metering machine.

7.3.2 Function Line / Ultra Line (4x90° adjustment)

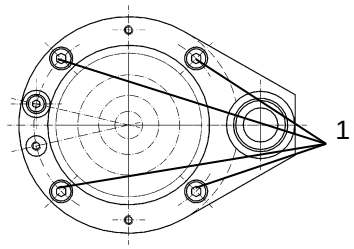


Fig. 4. *Torque arm Function Line (4x90°)*

- ▶ Loosen and remove the four cylindrical screws (1).
- ▶ Turn angle head into desired working angle (respectively 90°).
- ▶ Insert the cylindrical screws and tighten them with a torque of 5Nm.
- ▶ Check angle on a coordinate metering machine.

7.3.3 Function Line / Ultra Line (360° adjustment)

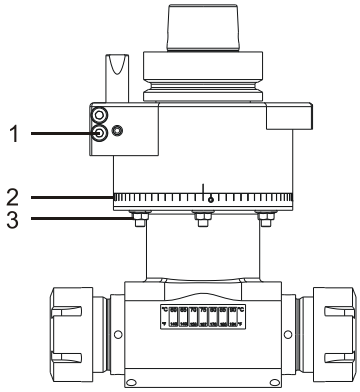


Fig. 5. *Torque arm Function Line / Ultra Line (360°)*

- ▶ Loosen the hexagon nuts (3) (at spring-loaded arrestor bolts cylindrical screws (1), if applicable)
- ▶ Adjust angle head on scale (2) to the desired angle.
- ▶ Tighten hexagon nuts (3) (cylindrical screws (1), if applicable) with a torque of 5Nm
- ▶ Arrestor bolt has to be readjusted, if applicable (see chapter 6.1).
- ▶ Check angle on a coordinate metering machine.

7.4 Angle adjustment spindle output Vario/Vario Viso

☞	Damaged tin cover sheet (Smart/ Function Line) has to be replaced by ATEMAG.

☞	Angle adjustment cannot be moved, contact ATEMAG customer service.

7.4.1 Smart Line Vario (0° - 100°)

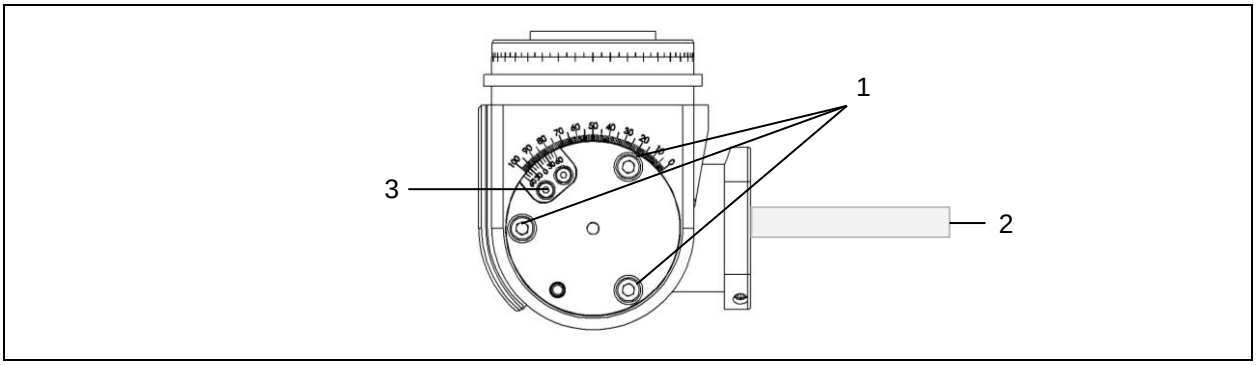


Fig. 6. *Angle adjustment spindle output Smart Line Vario*

- ▶ Loose clamping screw (1).
- ▶ Insert handle (2) into the cylindrical bore of spindle or collet.
- ▶ Adjust slowly spindle to the required position.
- ▶ Check, that the tin cover sheet is sitting tightly at the adjusting housing and it is not bent.
- ▶ Desired angle is set on the nonius (3).
- ▶ Tighten clamping screw (1) with a torque of 6Nm.

7.4.2 Smart/ Function Line Vario Viso (0° - 100°)

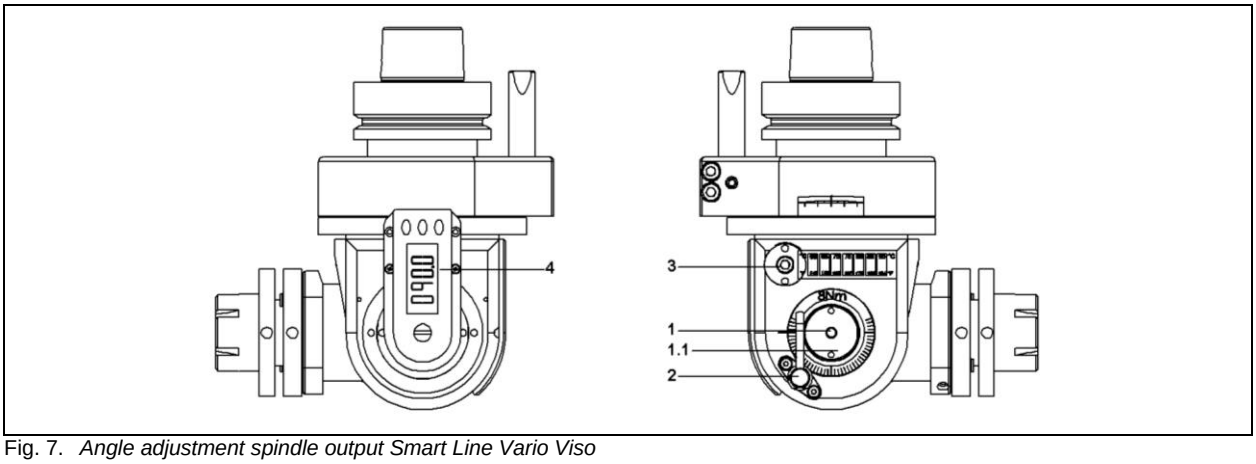


Fig. 7. *Angle adjustment spindle output Smart Line Vario Viso*

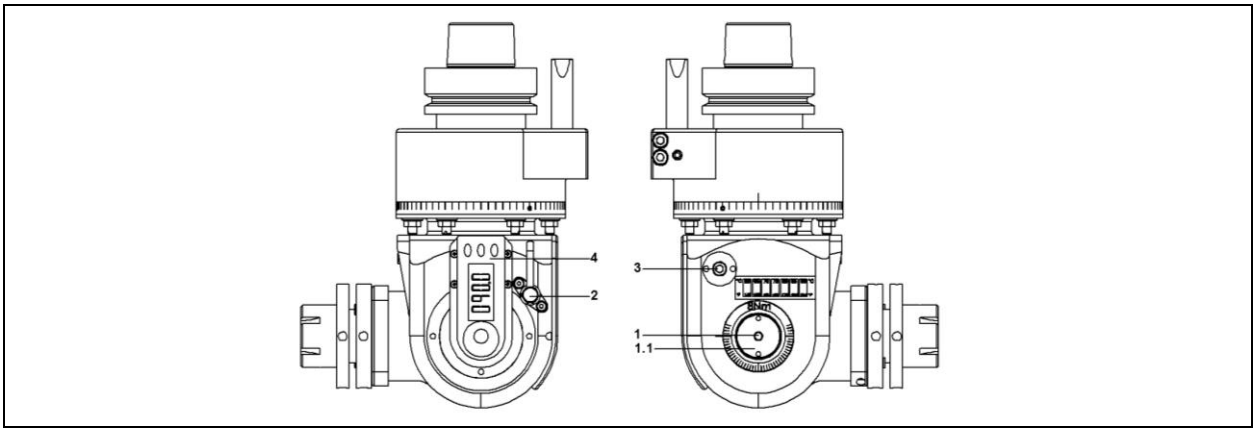


Fig. 8. *Angle adjustment spindle output Function Line Vario Viso*

- ▶ Lift the cover plate (1.1) with clamping screw (1) (>1mm).
- ▶ Remove the index pin out of its seat by turning the crank (2).
- ▶ For adjustment turn the gear with a hexagon key (3). Check that the tin cover sheet is sitting tightly at the adjusting housing and that it is not bended.
- ▶ The LCD display (4) shows the angle and supports the adjustment (4) (see chapter 7.4.4). Only the positions 0°, 45° and 90° can be fixed through the indexation (Function Line)
- ▶ Only the positions 0° and 90° can be fixed through the indexation (Smart Line)
- ▶ Tighten the clamping screw (1) with a maximum torque of 8Nm.

7.4.3 Ultra Line Vario Viso(± 100°)

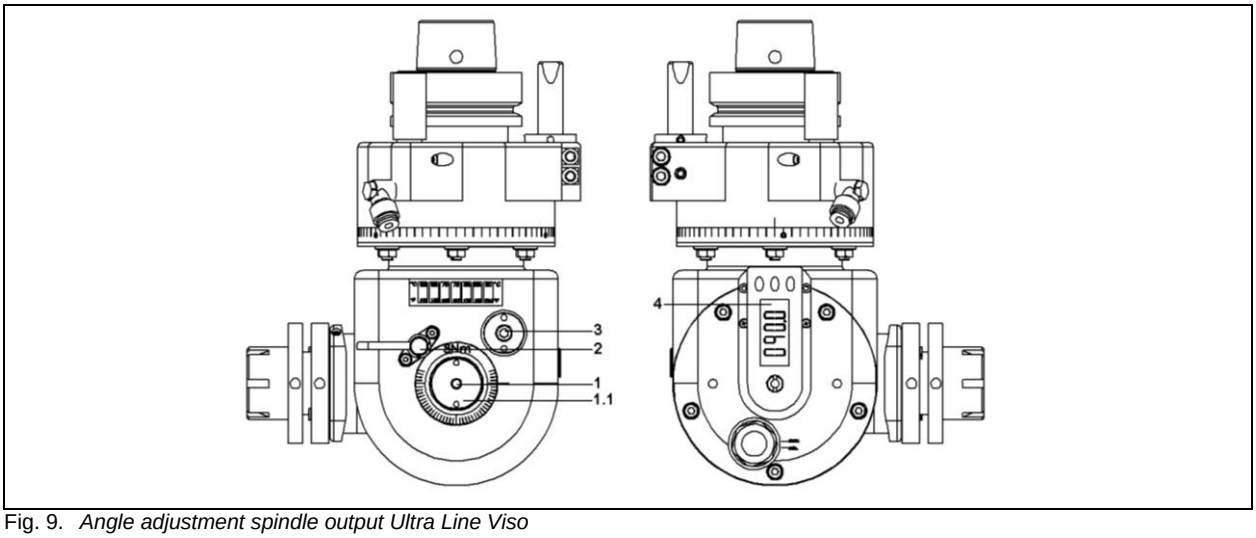


Fig. 9. *Angle adjustment spindle output Ultra Line Viso*

- ▶ Lift the cover plate (1.1) with clamping screw (1) (>1mm).
- ▶ Remove the index pin out of its seat by turning the crank (2).
- ▶ For adjustment turn the gear with a hexagon key (3).
- ▶ The LCD display (4) shows the angle and supports the adjustment (4) (see chapter 7.4.4). Only the positions 45° and 90° can be fixed through the indexation
- ▶ Tighten the clamping screw (1) with a maximum torque of 8Nm.

7.4.4 LCD- display

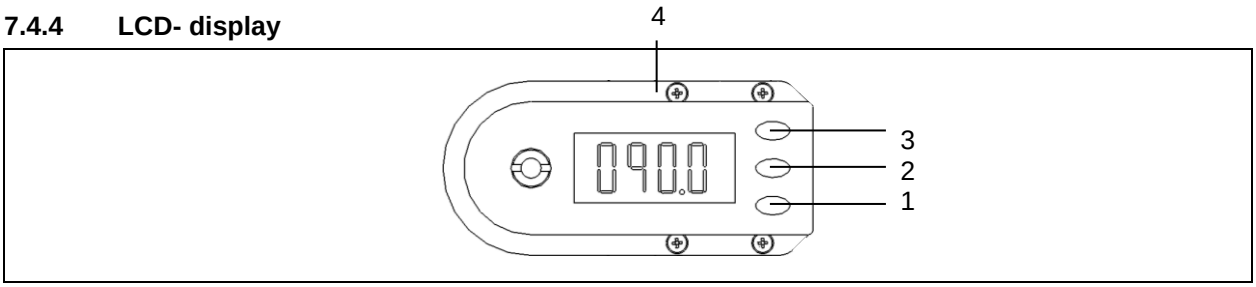


Fig. 10. *LCD- display*

Turn ON/OFF

- ▶ Press ON/OFF-button (1).
- ✓ LCD-display is turned on.
- ▶ Press ON/OFF button (1) again.
- ✓ LCD-display is turned off.

ZERO-setting

- ▶ To set the display to Zero press ZERO-button (2).
- ✓ LCD-display is turned to Zero.

Display reverse value

- ▶ Press HOLD/Rev (3) for 3 seconds.
- ✓ Displayed value is converted to reverse value.
- ▶ Press Rev (3) again.
- ✓ Original value will be displayed

HOLD value

- ▶ Press HOLD/Rev (3).
- ✓ Displayed value is Hold.
- ✓ H" appears on the upper left corner of the display".
- ▶ Press HOLD/Rev (3) again.
- ✓ Returned to measure mode.

Battery change

☞	Battery type: 3V CR2032

- ▶ Open battery compartment (4).
- ▶ Insert a new battery.
- ▶ The negative pole faces upwards.
- ▶ Push back the battery compartment (4).
- ✓ New battery is inserted.

	Consideration of duty according to the battery law (2006/66/EG) BattG: Old batteries do not belong to domestic waste because they could cause damages of health and environment. You can return used batteries free of charge to your dealer and collection points. As end-user you are committed by law to bring back needed batteries to distributors and other collecting points!

	Consideration of duty according to the law of electrical devices (2012/19/EU): This symbol means that you must dispose of electrical devices separated from the general household waste when it reaches the end of its useful life. Take your unit to your local waste collection point or recycling centre. This applies to all countries of the European Union, and to other European countries with a separate waste collection system.

7.5 Adjustment/rebuilding Soft-Touch Classic/Pro/One

7.5.1 Adjustment of spring pressure

Classic:

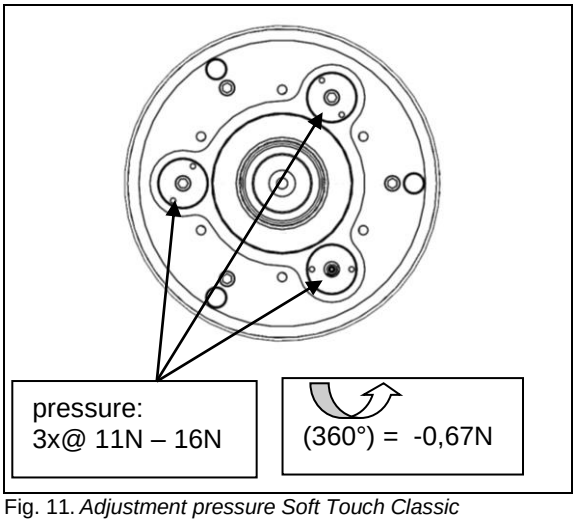


Fig. 11. *Adjustment pressure Soft Touch Classic*

Pro:

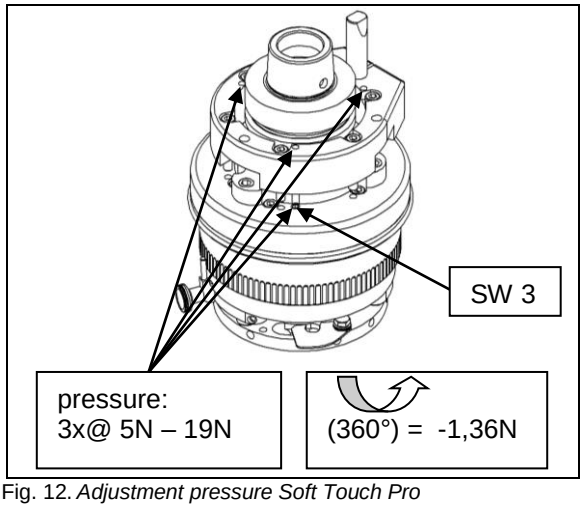


Fig. 12. *Adjustment pressure Soft Touch Pro*

7.5.2 Adjustment of floating bell to tool

Classic:

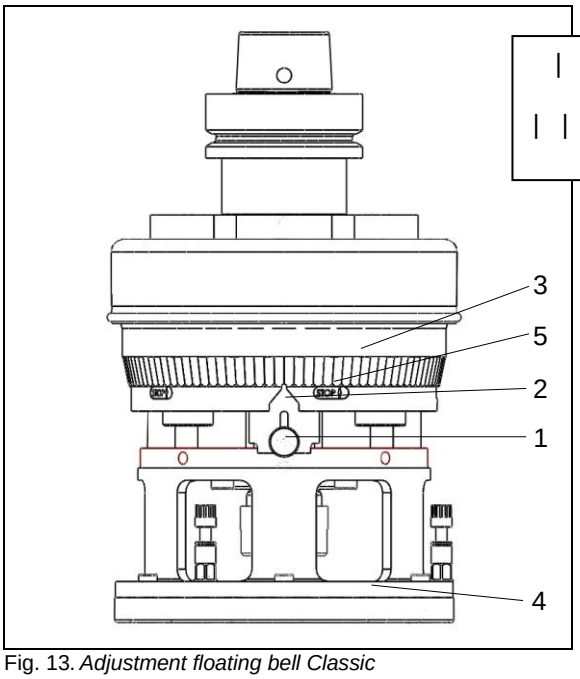


Fig. 13. *Adjustment floating bell Classic*

- ▶ Loosen clamping screw (1).
- ▶ Push the lock (2) down.
- ▶ Floating bell (4) adjustment through scale ring (3).
- ▶ Turn up scale ring (3) maximum until „STOP“ (5).
- ▶ Push up the lock (2) into the groove of the scale ring (3).
- ▶ Tighten clamping screw (1).
- ✓ Position floating bell is adjusted.

Pro:

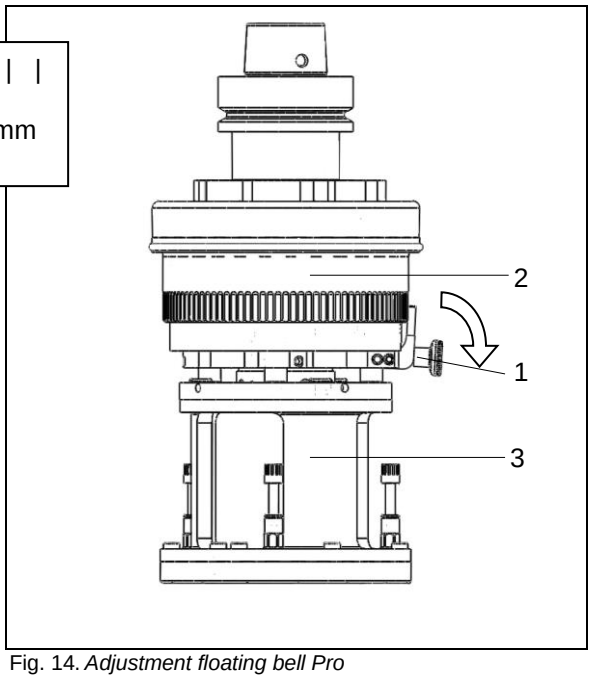


Fig. 14. *Adjustment floating bell Pro*

- ▶ Turn the lock (1) away.
- ▶ Floating bell (3) adjustment through scale ring (2).
- ▶ Turn lock (1) into the nut.
- ✓ Position floating bell is adjusted.

One:

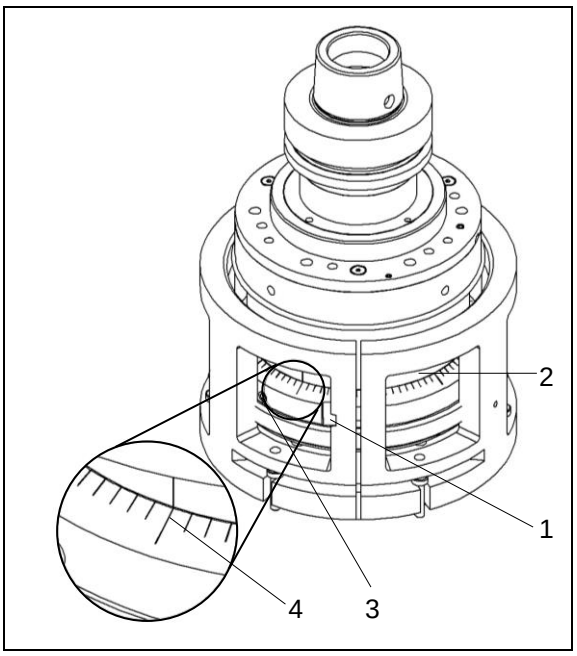


Fig. 15. *Adjustment floating bell One*

Rough setting:

- ▶ Loosen the clamping screw (1).
- ▶ Turn the floating bell (2) to manually roughly set the height 360°≙3mm)
- ▶ Tighten the clamping screw (1) with a torque of 6Nm.

Fine setting:

- ▶ Loosen the clamping of the floating bell (3) via a threaded pin SW2.5.
- ▶ Turn the floating bell (2) to set the height (scale (4) 1 scale line 0.01 mm).
- ✓ Position floating bell is set.

- ▶ Tighten the clamping of the floating bell (3) via a threaded pin SW2.5 with a torque of 0,2-0,3Nm

☞	The floating bell must be placed on the copying surface before/during processing.

7.5.3 Change of the ET-adaptor

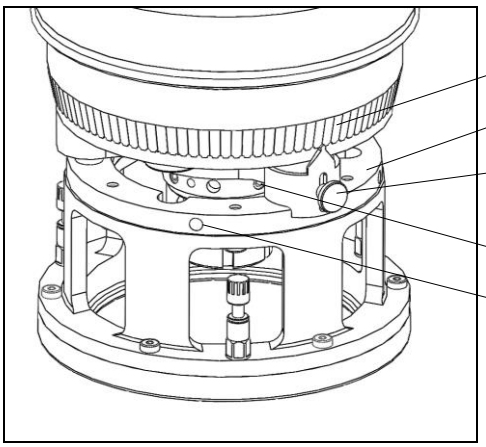


Fig. 16. *Change of ET-adaptor Classic*

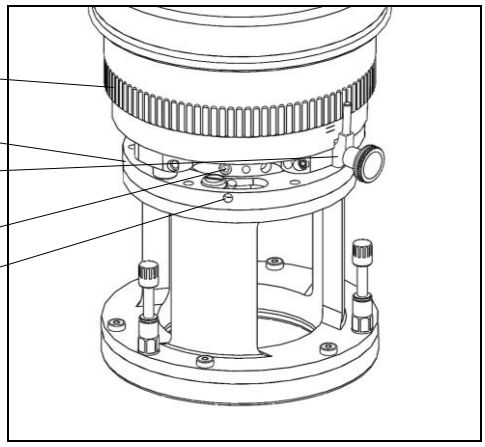


Fig. 17. *Change of ET-adaptor Pro*

- ▶ Loosen clamping screw (1) or turn the lock away.
- ▶ Set on scale ring (2) height of the floating disc (3), that mounting hole (4) and clamping screw (5) aligned.
- ▶ Remove the four clamping screws (5) (SW3).
- ▶ Remove the adaptor from the spindle.
- ▶ Clean contact- and centering surface of the new adaptor.
- ▶ Plug adaptor all the way into the spindle bore.
- ▶ Screw in the four clamping screws (5) into the spindle and secure with Loctite 222. Torque 4Nm.
- ✓ New adaptor is changed.

One:

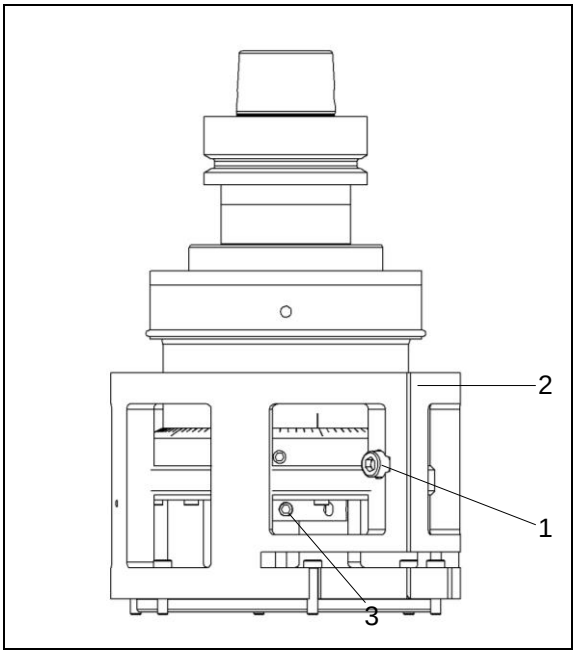


Fig. 18. *Change of ET-adaptor One*

- ▶ Loosen clamping screw (1).
- ▶ Turn the floating bell (2) to set the height so that the tensioning screws (3) are clear.
- ▶ Remove the four clamping screws (5) (SW3).
- ▶ Remove the adaptor from the spindle.
- ▶ Clean contact- and centering surface of the new adaptor.
- ▶ Plug adaptor all the way into the spindle bore.
- ▶ Screw in the four clamping screws (5) into the spindle and secure with Loctite 222. Torque 4Nm.
- ✓ New adaptor is changed

7.5.4 Tool change

Tool change at ET-adaptor see chapter 15.2

7.5.5 Change of floating bell

Classic:

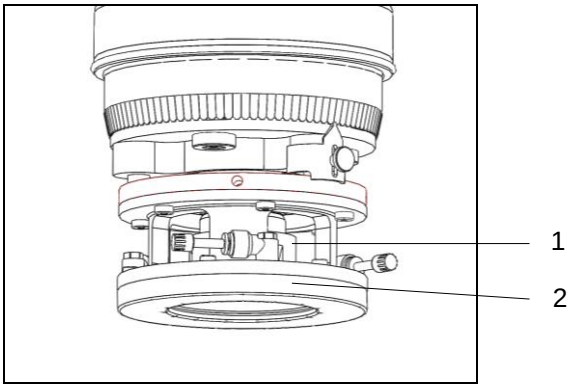


Fig. 19. *Change of floating bell Classic*

- ▶ Remove fixation screws (1) (SW3).
- ▶ Remove floating bell (2).
- ▶ Clean contact surface.
- ▶ Attach new floating bell.
- ▶ Insert fixation screws (1) (3Nm).
- ✓ Bell is changed.

Pro:

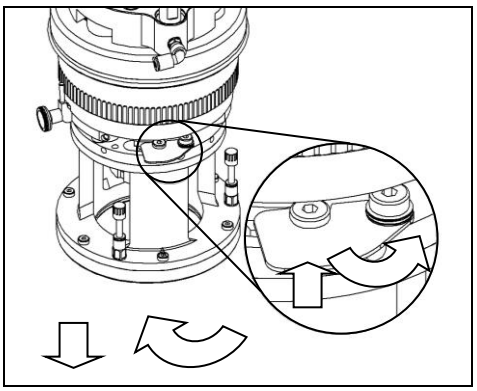


Fig. 20. *Change of floating bell Pro*

- ▶ Lift lock and tilt to the side.
- ▶ Turn bell to the left and pull out.
- ▶ Attach new bell. Turn to the right.
- ▶ Lift lock and tilt inward.
- ▶ The lock should snap into place over the screw head.
- ✓ Bell is changed.

☞	An acceleration ramp of minimum 0,5 sec. to maximum speed has to be programmed for every aggregate.

7.5.6 Assembly/Disassembly horizontal auxiliary head

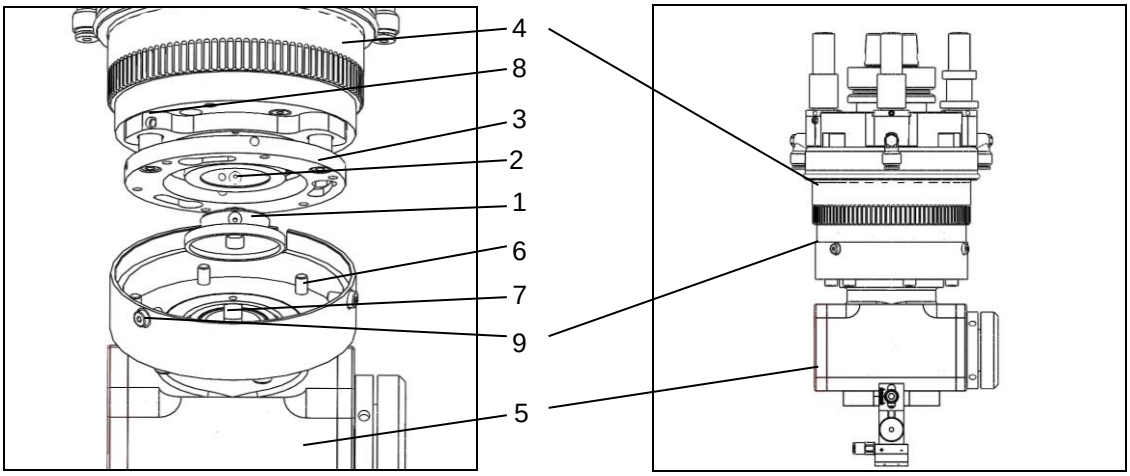


Fig. 21. *Assembly/Disassembly horizontal auxiliary head*

- ▶ Disassemble floating bell (see chapter 7.5.5).
- ▶ Insert adaptor (1) into the spindle and fix it with the 4 clamping screws M6x0,75 (2).
- ▶ Move floating ring (3) into the lower position by turning the scale ring (4).
- ▶ Attach horizontal auxiliary head (5). Be sure, that the coupling (7) moves into the adaptor (1).
- ▶ Screw on the horizontal auxiliary head (5) with 6 screws M5 (6) from below to the floating ring (3).
- ▶ Move horizontal auxiliary head (5) into position of the radial fixation thread (8) by turning scale ring (4). Screw on with 3 screws M4 (9).
- ✓ Horizontal auxiliary head (5) is attached.

☞	Disassembly in reverse direction

7.5.7 Adjustment floating shoe to the tool at the horizontal auxiliary head

Version 1:

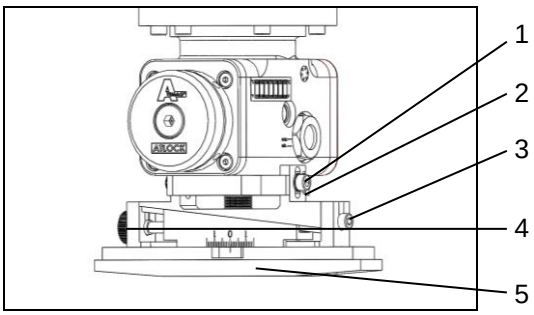


Fig. 22. *Adjustment floating shoe*

Rough adjustment:

- ▶ Loosen the M5 screws (1) at the side of the aggregate.
- ▶ Based on the scale (2) adjust rough and tighten the M5 screws (1) again.

Fine adjustment:

- ▶ Loosen the M5 screws (3). Adjust the height with the knurled screw (4) (scale (5) 1 graduation mark 0,1mm).
- ✓ Position floating shoe is adjusted.

Version 2:

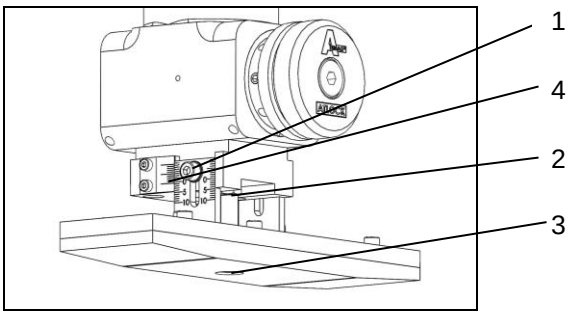


Fig. 23. *Adjustment floating shoe*

- ▶ Loosen the M5 screws (1) on the right and left side of the housing.
- ▶ Loosen M6 nut (2). Adjust the height with the M6 screw (3).
- ▶ An accuracy of 0,01mm can be achieved by the nonius (4).
- ▶ Lock the adjusting screw (3) with the M6 nut (2) again and tighten the M5 screws (1).
- ✓ Position floating shoe is adjusted.

8 Regreasing

CAUTION!

Damage caused by improper lubrication!
- ▶ Use only from manufacturer-approved lubricants (Klüber Highspeed BF 72-22)!
- ▶ Refer to Safety data sheet!

The angle heads are greased for lifetime (Smart Line, Function Line without Rota-Lube).
The re-greasing at Vario is possible through cover plate: To maximize the aggregate life expectation, apply a small amount of grease to the teeth flanks with a brush.
Rota-Lube (Function Line, Smart Line DUO): instruction see chapter 8.1.
Oil bath lubrication (Ultra Line): instruction see chapter 8.2.

8.1 Function Line, Smart Line DUO

$n_{max.}$(output): 15.000 min^{-1} > 18.000 min^{-1}; 20% ED

- ▶ After each 50 hours operation time turn twice in one direction with a hexagon key.
- ✓ Re-greasing is realized.

Fig. 24. *Re-greasing (Example Function Line with Rota-Lube)*

8.2 Ultra Line

At Ultra Line angle heads check oil daily.
- ▶ First oil change after 200 working hours.
- ▶ Further oil changes after 500 working hours each.

8.2.1 Definition

	Oil filler opening: Locking screw at highest point
	Oil drain: Locking screw at lowest point, at Vario oil gauge glass
	Replenished amount of oil: 15ml: Mono 90°/ Duo 90°, Mono/Duo any fixed angle 10ml: Vario, Mega Cutter Spec.: CLP acc. to DIN 51517, part 3 ISO VG 32 acc. to DIN 51519

8.3 Single point lubricator simalube® (optional)

8.3.1 Application, use

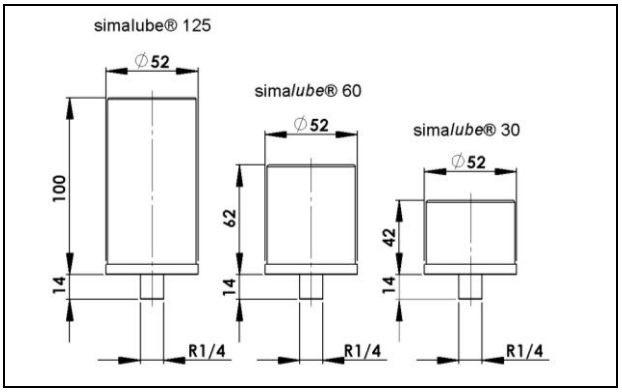


Fig. 25. *Overview single point lubricator simalube®*

Lubrication fittings are supplied automatically and cleanly with lubricant in the selected quantity during a period up to one year and longer.

It works with ambient temperature from -20°C up to +55°C (-4°F to +131°F);
It may be installed in any position - all the same whether diagonally or head over.

8.3.2 Dispensing quantity and -time

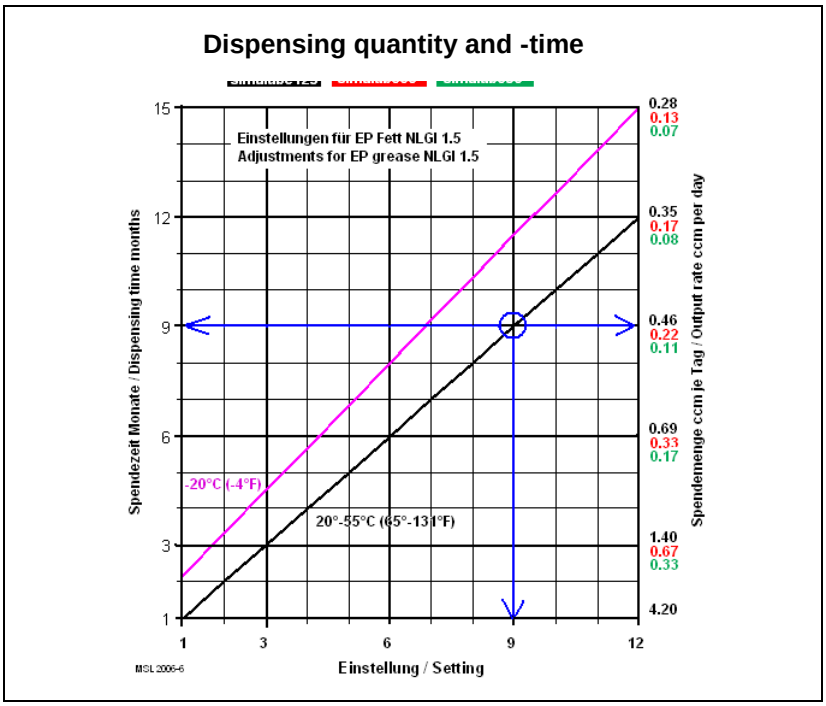


Fig. 26. *Diagram dispensing quantity and -time*

8.3.3 Assembly and installation

- ▶ Before start-up simalube® through-lubricate extensions and grease lines with METALON® HT extreme pressure grease by using a grease gun (already done at ATEMAG).
- ▶ Register starting date with water resistant pen in the provided label on the simalube® box.
- ▶ Remove the plug at the let-out thread down and screw in the simalube® (only at the replacement of simalube®)

☞	The aggregate has to be cleaned before using a new container. ▶ Remove old grease ▶ Ensure cleanliness!

- ▶ Set the dispensing time in months at the gas generator head by using a size 3 mm Allen key. Reed off from diagram the desired quantity for dispenses.

☞	We recommend – in one-shift operation – a running time of one year.

Further information
In addition, a simple adjustment can change the feeding rate when ambient conditions or grease application require it.
For longer operation breaks simalube® can be switched on and off.
The transparent PET-housing allows monitoring of the function at any time.

8.3.4 Cleaning of the aggregate

☞	Opening the aggregate without prior permission by ATEMAG voids any warranty claims. Only the cleaning procedure as described here is allowed.

8.3.4.1. Aggregates with service opening- or tin cover

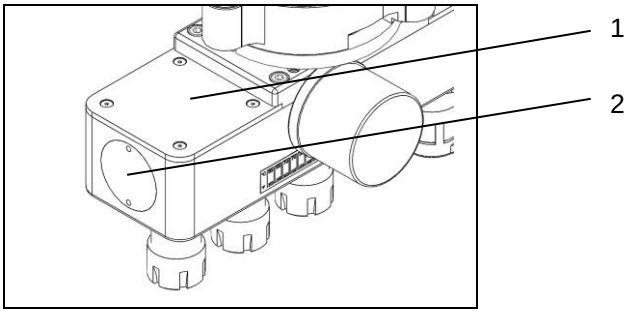


Fig. 27. *Re-greasing*

- ▶ If provided, open cover (2).
- ▶ For aggregates without cover (2), disassemble tin cover (1).
- ▶ For cleaning please use an appropriate tool, e.g. small brush or wooden spade and remove grease where accessible.
- ▶ Clean surfaces and threads of covers and housing. Make sure that no dirt will enter the aggregate.
- ▶ Remount either tin cover (1) or cover (2). The cover (2) has to be glued in with Loctite 222.
- ✓ Aggregate is cleaned.

8.3.4.2. Aggregates without service opening- or tin cover

Without service opening- or tin cover the aggregate cannot be cleaned without disassembly. This can only be done at ATEMAG. Send the aggregate, before use of a new lubricator, for inspection back to us.

9 Angle head send to manufacturer

CAUTION!
Damages of the angle head! ▶ Handle angle head carefully! ▶ Send angle head in its original packaging!

☞	To be repaired angle head must be accompanied a delivery note with an error description respectively a separate description of the error.

▶ Return to the following address:
ATEMAG
Aggregatetechnologie und Manufaktur AG
Mühlenmatten 2
D-77716 Hofstetten, Germany

10 Dysfunction

Dysfunction	Possible causes	Possible operations
Extreme noise emission	Length of the arrestor pin and if applicable of the support pin is not correct	Length of the pins has to be adjusted precisely by ATEMAG or by the operator
	Inserted Tool is worn or has an uneven concentrically run-out.	If necessary change tool and check run-out.
Excessive heating	leaks or loss of lubricant	Complete maintenance and repair by ATEMAG
Dimensional and shape defects at work piece	Work process is not appropriate for the required accuracy	Use appropriate work process
	Excessive tool wear	Change tool
	Moving away of tool due to excessive cutting forces	Reduce operating parameters
	Excessive run-out defect	Check tool clamping
	Angle deviation	Check angle position of angle head

Tab 9: Dysfunction

11 Maintenance and repair

⚠ WARNING!

Risk due to improper work!

- ▶ Repair jobs must only be executed by skilled and trained personnel!
- ▶ Only original ATEMAG spare parts are used!

⚠ WARNING!

Risk of used lubricants!

Health injuries can occur by contact with the used lubricants!

- ▶ Always wear protection gloves when working with the aggregate! At skin contact clean the affected spot thoroughly with mild soap and plenty of water!
- ▶ At eye contact use eye cleaning bottle! Consult a doctor immediately!
- ▶ When swallowed do not provoke vomiting! Consult a doctor immediately!

CAUTION!

Damages of the angle head by collision!

- ▶ A complete and exact collision check has to be executed before each operation!

☞ The life time of the angle head depends on the condition of the tool and of the machine.
- ▶ Check tool and machine regularly for proper operation.

☞ Please contact ATEMAG for spare parts and have your manual available for a faster processing.

☞ On request we offer a maintenance service for the angle head. This includes all services for disassembly, inspection, maintenance of all wearing parts and assembly at a fixed price. Necessary spare parts are charged separately.

11.1 Maintenance plan

Interval	Part/component	Operation
as needed	Angle head	Implement appropriate corrosion protection measure.
2 weeks	all accessible components	Cleaning of accumulated chips, dirt and other residues. **Do not use compressed air for cleaning!**
		Check moveable parts for clearance.
yearly	Angle head	Complete check of correct operation. Please contact ATEMAG service for further information.

Tab 10: Maintenance plan

12 Cleaning

CAUTION!
Damaging of the angle head! ▶ Compressed air must not be used for cleaning the angle head!

▶ Clean surfaces with a suitable, dry cloth.
▶ Clean remote areas with a dry brush.

13 Disposal

CAUTION!	
	**Risk due to environmental pollutants!** The hazard to the environment depends on the materials used. ▶ Clean contaminated components before disposal in principal! ▶ Clarify proper disposal with waste management and if applicable with competent authorities!

Liquids	
lubricant	eliminate in accordance with environmental recommendations
Contaminated cleaning cloths	eliminate in accordance with environmental recommendations
Angle head	
Housing	separate disposal
Mounting parts	separate disposal

Tab 11: Disposal

14 Extract from the EC declaration of conformity

The angle heads Mono, Duo, Duo Sprint, Quattro, Extra, Extra 2, Extra Plus, Vario, Vario Viso, Trio, Sotto and Mega Cutter of the series Smart Line, Function Line und Ultra Line achieve the requirements of the following EC directives:

- Directive 2006/42/EC (Machinery Directive)

Following standards were applied at development, design and manufacture:

- DIN EN 12100, 60204-1

☞	The detailed EC declaration of conformity is included.

15 Tool change

⚠ WARNING!

Risk of injury from lack of protective device!
It may cause injuries due to missing or incorrect personal protective device.
▶ Make sure the personal protective device (safety glasses, protection gloves, safety shoes, ear protector) is applied when working at the angle head.

⚠ WARNING!

Risk of injury due to hot surfaces!
▶ Cool down hot surfaces of the housing, before working on the angle head!

⚠ WARNING!

Risk of injure due to improperly installed tooling!
▶ Because of safety reasons at angle heads with a combined tool connection, such as drill/milling tool and saw blade, may only be used one of the two tools.

CAUTION!

Damage of the angle head!
Misusing and ignoring may cause severe gear damages.
▶ Fix tool spindle with appropriate key!

CAUTION!

Damage of the angle head!
Wrong or defective tools and clamping devices can cause damages to the angle head.
▶ Only use tools and collets that are appropriate for the maximum revolution of this angle head!
▶ For multiple-spindle aggregates with axis spacings below 32mm, only drilling tools with centring tips should be used

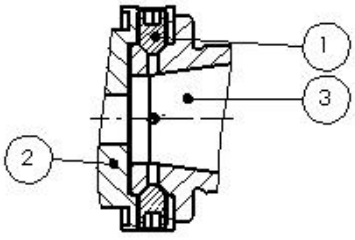
15.1 Tool change for tools with bore

▶ Refer to attached sketch for tool connection dimensions.
▶ Put tool onto centralising flange.
▶ Fix the tool with the provided screws.
▶ Tighten screws with 5Nm (M5), 8,5Nm (M6) or 41Nm (M10) (fix spindle with appropriate key).

15.2 Tool change ET-adapter

CAUTION!

Damage of the ET-adapter!
▶ Only use the clamping screws provided for fixation the ET-adapter!
▶ Avoid imbalance and reduced clamping force by cleaning the contact surfaces!



▶ Remove the 4 clamping screws (1).
▶ Take the adapter (3) off the spindle (2).
▶ Clean the reference and centralising surfaces of the new adapter.
▶ Put adapter (3) into centralising bore until stop.
▶ Glue in the clamping screws with Loctite 222 and tighten them with 4Nm torque.
▶ Check for correct adapter fixation.

Fig. 28. *Tool change ET-adapter*

15.2.1 Tool presetting

Tools can be preset in ET-adaptors and measured. This eliminates the measuring process at the aggregate itself.

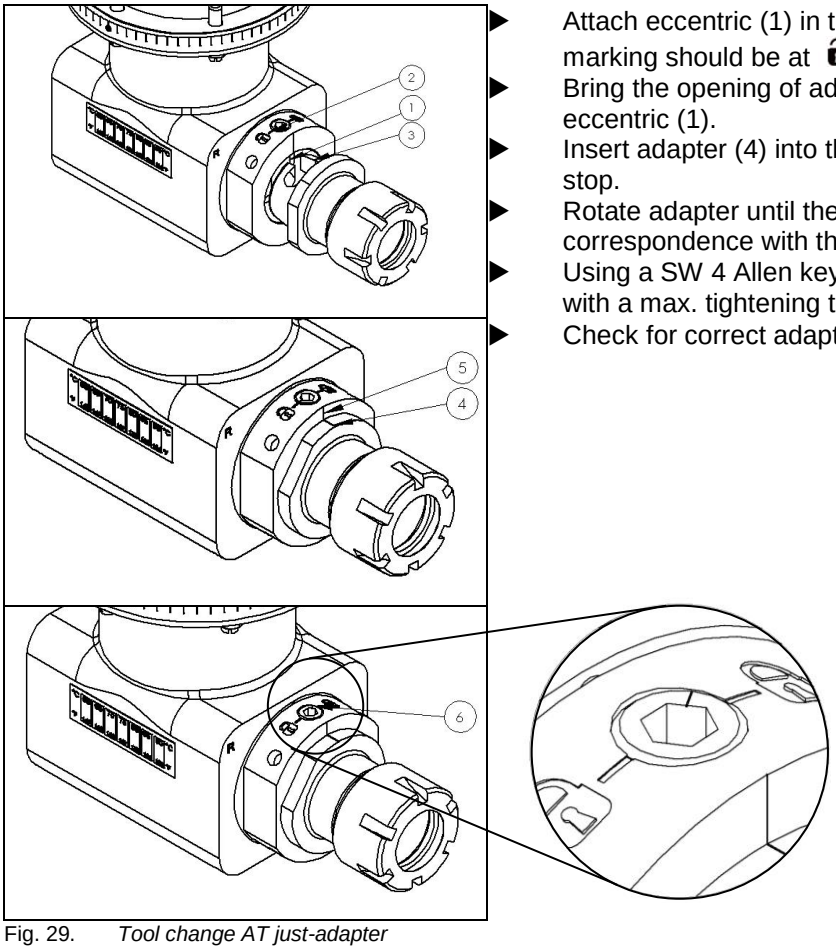
- ▶ Clamp the ET-adapter tightly in the clamping device (art.no. 201138).
- ▶ Tool clamping (see relevant chapter).
- ▶ Measure the distance between the top of tool and the reference surface of ET-adapter.
- ▶ This value adds to the value of the aggregate's data sheet.
- ▶ Enter the sum into the machine's data bank.

15.3 Tool change AT *just*-adapter

CAUTION!

Damage of the AT *just*-adapter!

- ▶ Avoid imbalance and reduced clamping force by cleaning the contact surfaces!
- ▶ Only operate the aggregate with inserted adapters!



- ▶ Attach eccentric (1) in the release position The marking should be at 🔓 (2).
- ▶ Bring the opening of adapter (3) flush with the eccentric (1).
- ▶ Insert adapter (4) into the spindle up to the limit stop.
- ▶ Rotate adapter until the marking of adapter (4) is in correspondence with the marking of spindle (5).
- ▶ Using a SW 4 Allen key, tighten the eccentric (1) with a max. tightening torque of 10Nm (6).
- ▶ Check for correct adapter fixation.

Fig. 29. *Tool change AT just-adapter*

15.3.1 Tool presetting

Tools can be preset in AT *just*-adaptors and measured. This eliminates the measuring process at the aggregate itself.

- ▶ Place the AT *just*-adapter onto a fixture on its bearing surface.
- ▶ Tool clamping (see relevant chapter).
- ▶ Measure the distance between the top of tool and the reference surface of AT *just*-adapter.
- ▶ This value adds to the value of the aggregate's data sheet.
- ▶ Enter the sum into the machine's data bank.

15.4 Tool change S1, S2, K2

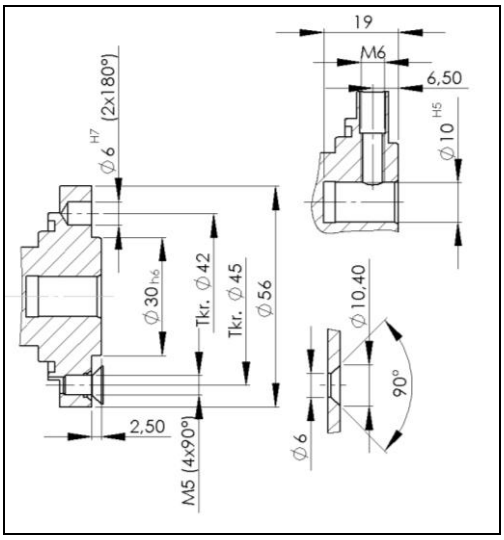


Fig. 30. *Tool interface diameter 45 mm*

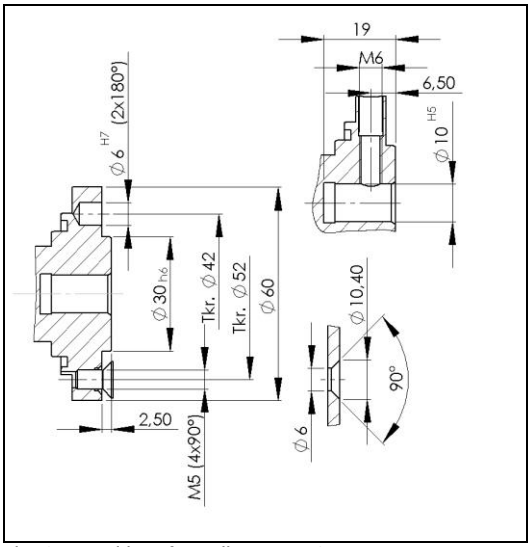


Fig. 31. *Tool interface diameter 52mm*

- ▶ Refer to sketch above for tool connection dimensions (use only tools with appropriate driving holes).
- ▶ Put tool onto centralising flange.
- ▶ Fix the tool with the four screws provided. (hold spindle with counter key).
- ▶ Tighten screws with 8Nm.
- ▶ Check for correct tool fixation.

15.5 Tool change ATLOCK clamping system (A1, A2, A3, …)

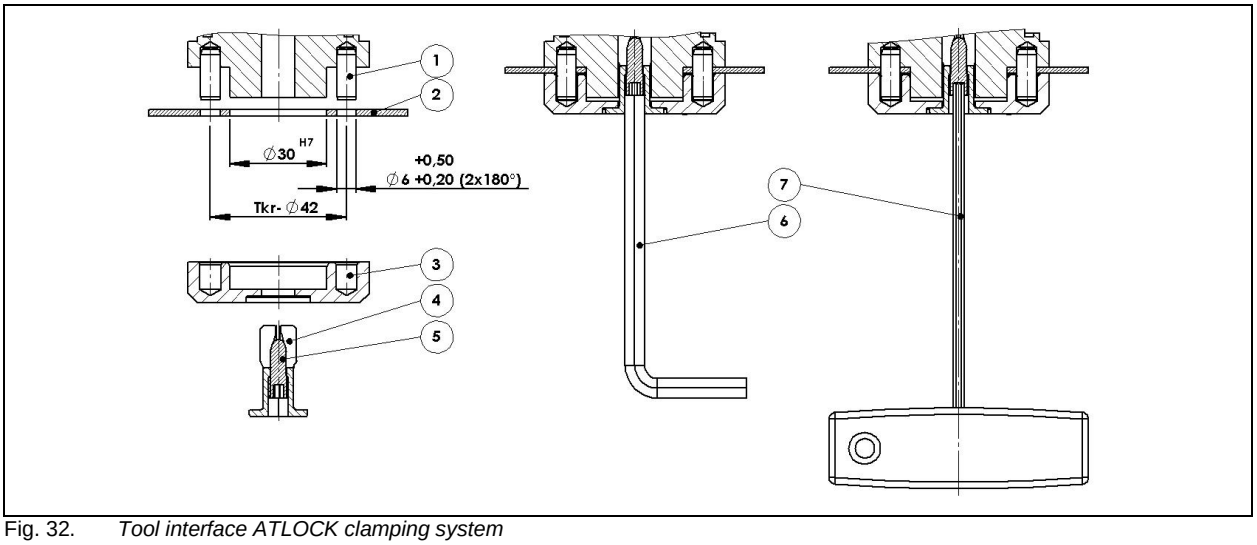
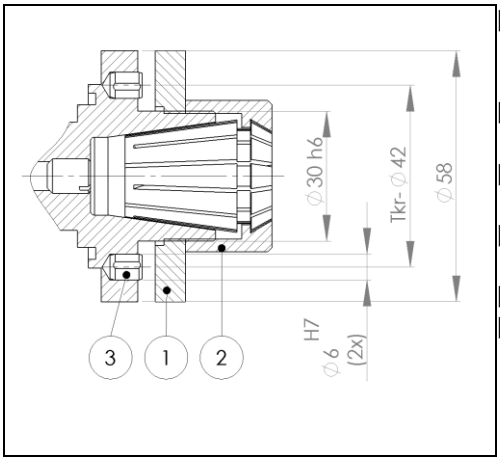


Fig. 32. *Tool interface ATLOCK clamping system*

- ▶ Refer to sketch above for tool connection dimensions (use only tools with appropriate driving holes).
- ▶ Put tool (2) and clamping flange (3) onto centralizing flange and position it with the cylindrical pins (1) provided.
- ▶ Turn the clamping screw (4) with hexagon key SW6 (6) onto the clamping flange (3).
- ▶ Tighten fixation screw (5) with hexagon key SW3 (7) and a torque of max. 6Nm.
- ▶ Check for correct tool fixation.

15.6 Tool change combination spindle K1



- Refer to sketch on the left side for tool connection dimensions (use only tools with appropriate driving holes)).
- Put tool onto centralizing flange and position it with the cylindrical pins (3) provided.
- Clamp tool with flange nut (1) provided (Groove must shown toward tool!).
- Fix flange nut with collet nut (2) (The collet must be removed from tool spindle).
- Tighten collet nut (2) (hold spindle with counter key).
- Check for correct tool fixation (when using collets see chapter 15.8).

Fig. 33. *Tool interface combination spindle K1*

15.7 Tool change Mega Cutter

☞	When using tools l<120mm, spacer rings must be used to overcome the difference. These spacers must be secured against turning.

☞	Volume of hardwood removed by cutting: max. 6400cm³/min Volume of softwood removed by cutting: max. 12000cm³/min

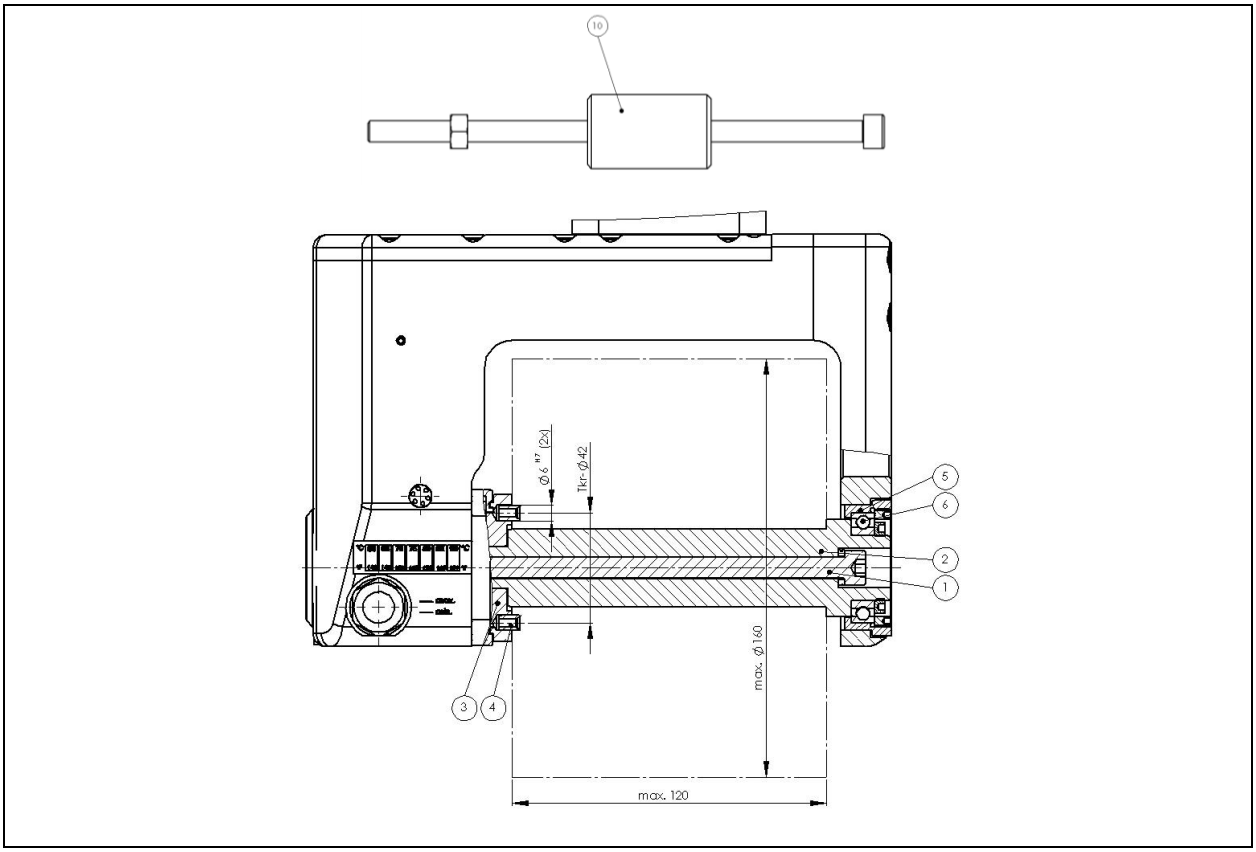


Fig. 34. *Tool change moulder knife*

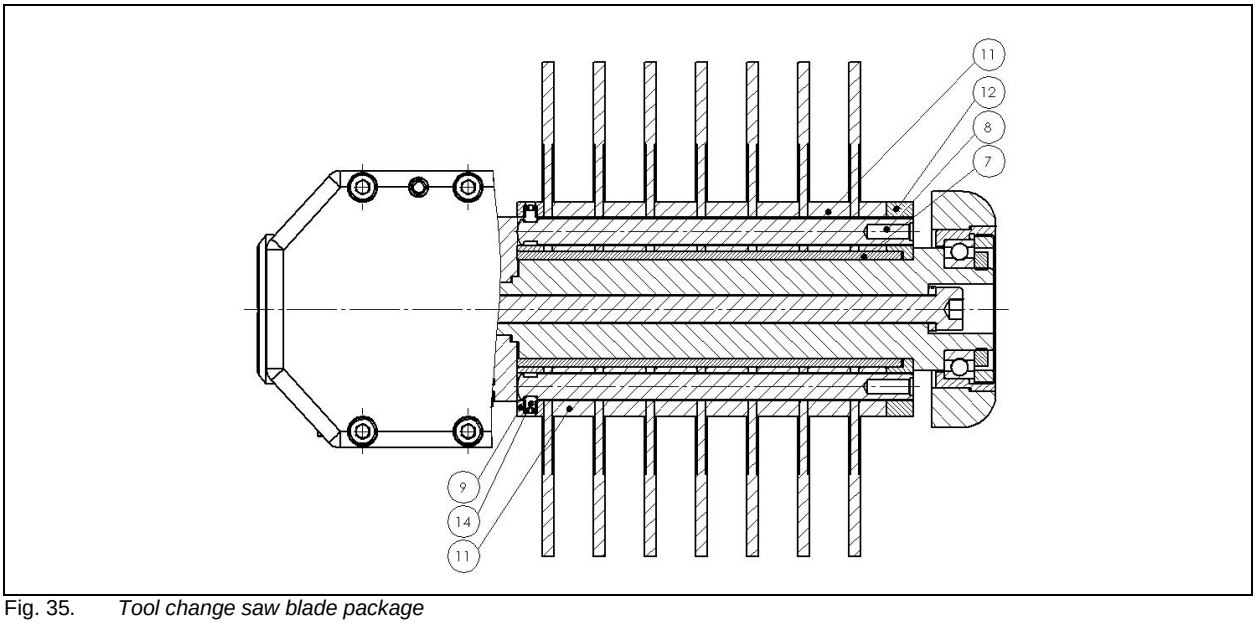


Fig. 35. *Tool change saw blade package*

- ▶ Loosen clamping screw (1). Hold spindle (3) with counter key.
- ▶ Remove tool spindle (2) carefully with counter bearing (5, 6) from housing. Use the M10 thread (7) and the removing aid (10).
- ▶ It is essential to secure tool from falling down.
- ▶ Remove spindle (2) and tool carefully.
- ▶ Clean contact surfaces (spindle bore, reference surface, counter bearing support and tool spindle (2)).

According to tool please proceed as follows:

Tool change moulding tool (profile cutter tool):

- ▶ Pre-center tool using spindle surface and cylindrical pins (4).
- ▶ Move tool spindle (2) and counter bearing (5, 6) carefully through housing bore, and tool back into spindle bore. Make sure that the tool spindle (2) locks with its driving surfaces in the spindle (3) of the aggregate. The right position of tool spindle (2) is reached when the housing of counter bearing (5, 6) is flush with the housing of the aggregate.

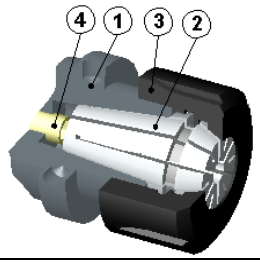
Tool change saw blade package:

- ▶ Put spacer (9) on an appropriate ground. Cylinder bars (8) to be mounted on spacer (9). Put bush (7) into the spacer (9).
- ▶ Slide on tools and further spacers (11) onto the bush (7). Put at last spacer (12).
- ▶ Insert cylindrical pins (4) into the spindle (3).
- ▶ Set saw blade package onto the cylindrical pins (4).
- ▶ Move tool spindle (2) and counter bearing (5, 6) carefully through housing bore, and tool back into spindle bore. Make sure that the tool spindle (2) locks with its driving surfaces in the spindle (3) of the aggregate. The right position of tool spindle (2) is reached when the housing of counter bearing (5, 6) is flush with the housing of the aggregate.
- ▶ Clean set screws (14) and thread in spacer (9) with Loctite cleaner. Glue set screws (14) with Loctite 243 and secure.

- ▶ Tighten screw (1) with 40Nm. Counter with hook at spindle (3).
- ▶ Check run-out of tool.
- ▶ The tool width according to control certificate must be maintained. Otherwise the tool may create too much tension.

15.8 Tool change collet chuck Typ Hi-Q/ER (ERM), Hi-Q/ERB

Please observe that customer specific solutions may have other technical data as specified. Significant is the attached drawing.



Position	Description
1	Bore or reference surface to block the spindle
2	Collet
3	Nut
4	Set screw for axial tool adjustment

Fig. 36. *Collet chuck DIN 6499 Form B*

☞	Mount nuts with properly clamped-in collet only. Do not clamp shafts with larger diameter. Spindle failure is threaten! For example, never tension a collet with Ø 12.2 mm in a chuck with Ø 12-11. Use the next larger chuck (here Ø 12.5-11.5 mm or Ø 13-12 mm) Tension the tool shank over the entire length of the collet if possible (however at least 2/3 of the collet length). Clamp cylindrical shafts only. Always hold spindle with key when tightening the clamping nut. Gear failure is threaten!

Assembly

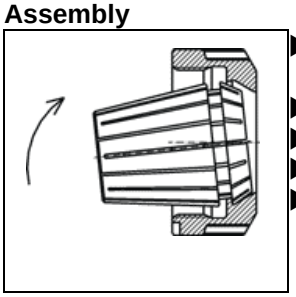


Fig. 37. *Assembly*

- Insert groove of collet into eccentric ring of the clamping nut at the mark on the bottom of the nut.
- Push collet in direction of the arrow until it clicks in place.
- Insert tool.
- Screw nut with collet onto tool holder.
- Recommendation: tighten nut with a torque wrench (see Tab 13:).

Disassembly

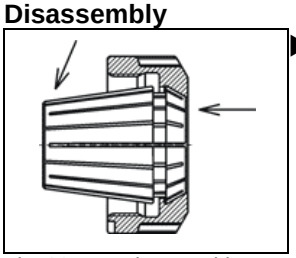


Fig. 38. *Disassembly*

- After removing from holder, press front part of collet and disengage it from collet nut by putting pressure of rear part.

Tolerance table and torque specification

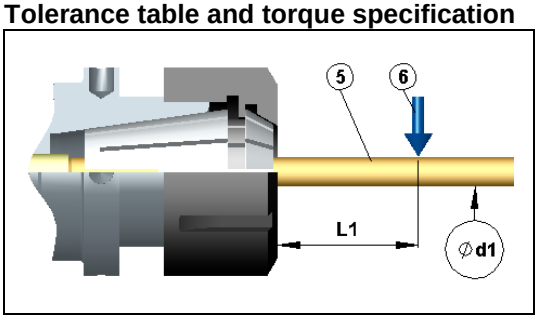


Fig. 39. *Collet*

Clamping diameter d_1^{H7} Pos.5		L1	Concentricity [mm] @ measuring point Pos.6	
from [mm]	until [mm]	[mm]	Typ ER	Typ ER-UP
1	1,6	6	0,015	0,01
1,6	3	10		
3	6	16		
6	10	25		
10	18	40	0,02	0,015
18	26	50		
26	34	60	0,025	0,02

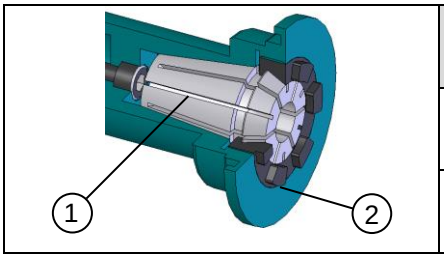
Tab 12: Tolerance table

Size	ATEMAG-type	Clamping Range	M_{Amax}	Size	ATEMAG-type	Clamping Range	M_{Amax}
ER11	R1	1 – 7	8 – 24	ERM16	M3	1 – 10	12 – 24
ER16	R3	1 – 10	8 – 56	ERM20	M4	1 – 13	16 – 28
ER20	R4	1 – 13	16 – 80	ERM25	M5	1 – 17	24 – 32
ER25	R5	1 – 17	24 – 104	ERB16	GR3	1 – 10	6 – 56
ER32	R6	2 – 22	24 – 136	ERB20	GR4	1 – 13	12 – 80
ER40	R7	3 – 26	176	ERB25	GR5	1 – 17	20 – 104
ER50	R8	6 – 36	240	ERB32	GR6	2 – 22	20 – 136
ERM8	M0	1 – 5	6	ERB40	GR7	3 – 26	176
ERM11	M1	1 – 7	8 – 16	ERB50	GR8	6 - 36	240

Tab 13: Torque specification

15.9 Tool change collet chuck internal Typ Hi-Q/ERAX

Please observe that customer specific solutions may have other technical data as specified. Significant is the attached drawing.



Position	Description
1	Collet
2	Nut

Fig. 40. *Collet chuck internal DIN 6499*

☞	Mount nuts with properly clamped-in collet only. Do not clamp shafts with larger diameter. Spindle failure is threaten! Clamp cylindrical shafts only. Always hold spindle with key when tightening the clamping nut. Gear failure is threaten!

Assembly

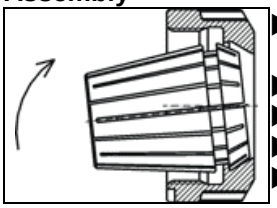


Fig. 41. *Assembly*

- Insert groove of collet into eccentric ring of the clamping nut at the mark on the bottom of the nut.
- Push collet in direction of the arrow until it clicks in place.
- Insert tool.
- Screw nut with collet onto tool holder.
- Recommendation: tighten nut with a torque wrench (see Tab 14:).

Disassembly

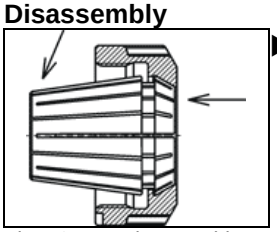


Fig. 42. *Disassembly*

After removing from holder, press front part of collet and disengage it from collet nut by putting pressure of rear part.

Tolerance table and torque specification

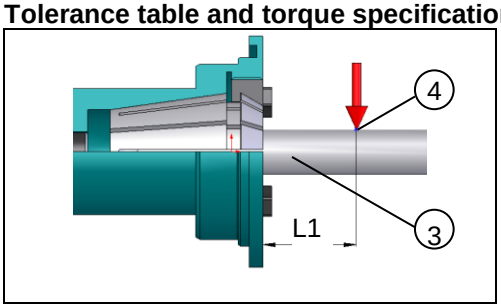


Fig. 43. *Collet*

Size	ATEMAG-type	Clamping Range	M_{Amax}
ERAX11	I1	1-7	8 – 24
ERAX16	I3	1-10	8 – 40
ERAX20	I4	1-13	15 – 52
ERAX25	I5	1-17	24 – 80

Tab 14: Torque specification

Clamping diameter d_1^{H7} Pos.3		L1	Concentricity [mm] @ measuring point Pos.4	
from [mm]	until [mm]	[mm]	Typ ER	Typ ER-UP
1	1,6	6	0,015	0,01
1,6	3	10		
3	6	16		
6	10	25		
10	18	40	0,02	0,015
18	26	50		
26	34	60	0,025	0,02

Tab 15: Tolerance table

15.10 Tool connection according to DIN 1835 Form E „Whistle-Notch“

The Whistle-Notch connection is used for the clamping of cylindrical shafts with a 2° inclined surface.

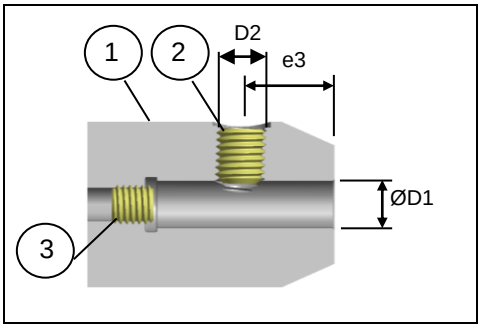


Fig. 41. *For shafts with one Reference surface D_1 = 6 to 20 mm*

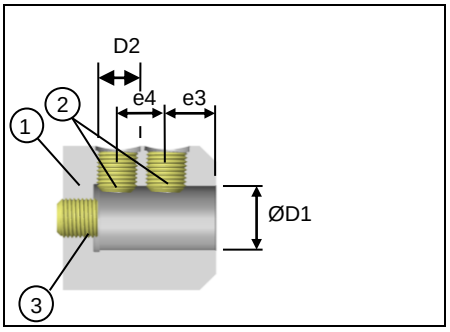


Fig. 42. *For shafts with two Reference surfaces D_1 = 25 to 63 mm*

Position	Description
1	Tool holder
2	Clamping screw
3	Adjustment screw

Tab 16: Components of the tool spindle

Refer to attached drawing for dimensions.

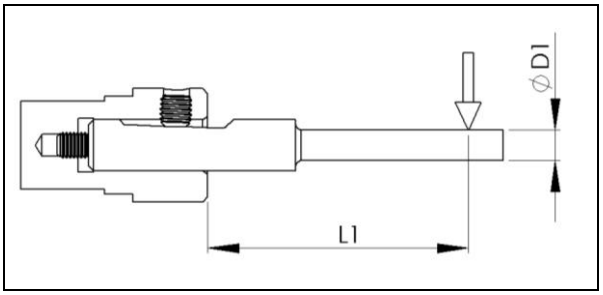


Fig. 43. *Run out inspection*

D2 [metric]	M_{Amax} [Nm]
M5	3
M6	5
M8	10
M10	16
M12	28
M14	42
M16	48

Tab 17: Torque specification

D1 = Clamping diameter; L1 = max. Run out 0,035 mm [L1 = 100 mm]

Dimensions for tools with cylindrical shaft

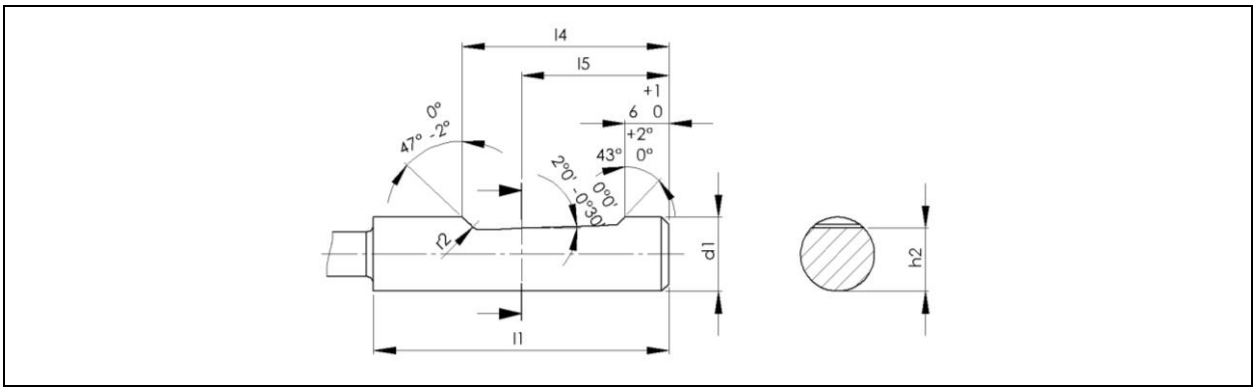


Fig. 44. *Dimensions for tools with cylindrical shaft with inclined surface*

d1 h6	h2 h11	l1 +2	l4 -1	l5 nominal dimension	r2 min.
6	5,1	Refer to aggregate-drawing	25	Refer to aggregate-drawing	1,2
8	6,9		25		1,2
10	8,5		28		1,2
12	10,4		33		1,2
14	12,7		33		1,2
16	14,2		36		1,6
18	16,2		36		1,6
20	18,2		38		1,6

Tab 18: Dimensions

15.11 Tool connection according to DIN 1835 Form B „Weldon“

The Weldon-Insert can be used to clamp cylinder shafts with one or two side surfaces.

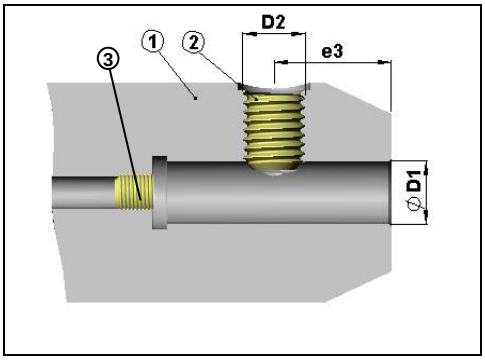


Fig. 45. *For shafts with one Reference surface D_1 = 6 to 20 mm*

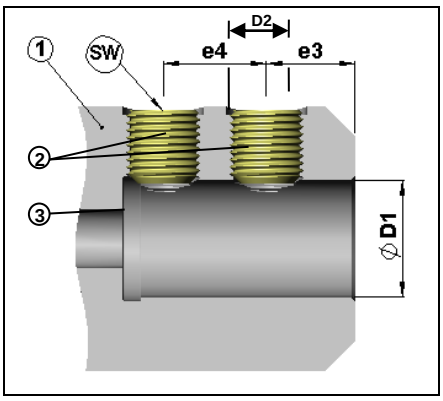


Fig. 46. *For shafts with two Reference surfaces D_1 = 25 to 63*

Position	Description
1	Tool holder
2	Clamping screw
3	Adjustment screw

Tab 19: Components of the tool spindle

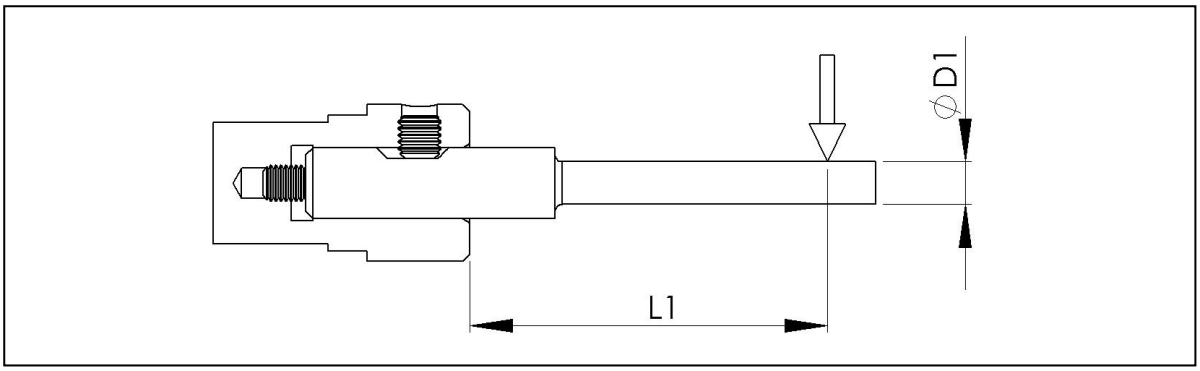


Fig. 47. *Run out inspection*

D1 = Clamping diameter; L1 = max. Run out 0,035 mm [L1 = 100 mm]

D2 [metric]	M_{Amax} [Nm]
M5	3
M6	5
M8	10
M10	16
M12	28
M14	42
M16	48

Tab 20: Torque specification

Dimensions for tools with cylindrical shaft

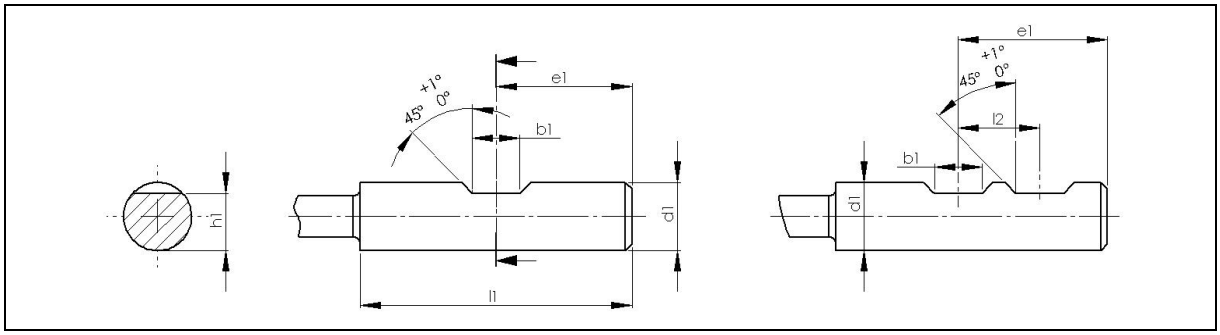


Fig. 48. *Dimensions for tools with cylindrical shaft*

d1 h6	b1 + 0,05	e1 -1	h1 h13	l1 +2	l2 +1
6	4,2	Refer to aggregate-drawing	4,8	Refer to aggregate-drawing	Refer to aggregate-drawing
8	5,5		6,6		
10	7		8,4		
12	8		10,4		
16	10		14,2		
20	11		18,2		

Tab 21: Dimensions

15.12 Tool change chisel mortising

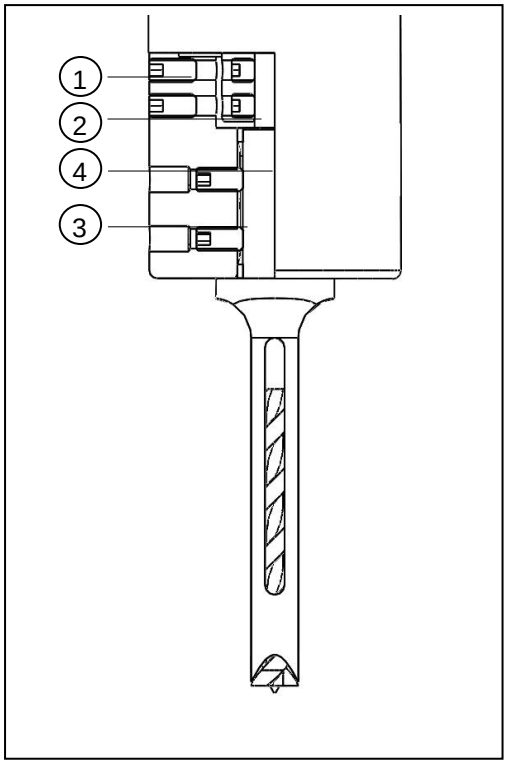


Fig. 49. *Tool change chisel mortising*

- ▶ Remove locking screw (1).
- ▶ Loosen clamping screw drill (2).
- ▶ Loosen clamping screw chisel (3).
- ▶ Pull out drill and chisel.
- ▶ Insert new drill and chisel.
- ▶ If required use adapter sleeve (4).
- ▶ Tighten clamping screw chisel (3) with 5Nm.
- ▶ Tighten clamping screw drill (2) with 5Nm.
- ▶ During rotation drill must not be in contact with chisel!
- ▶ Glue in locking screw (1) with Loctite 222.
- ✓ Tool is changed

15.13 Tool change Fitschen knife

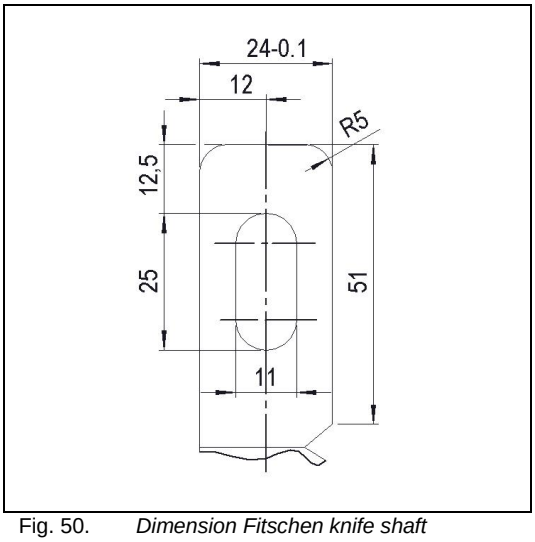


Fig. 50. *Dimension Fitschen knife shaft*

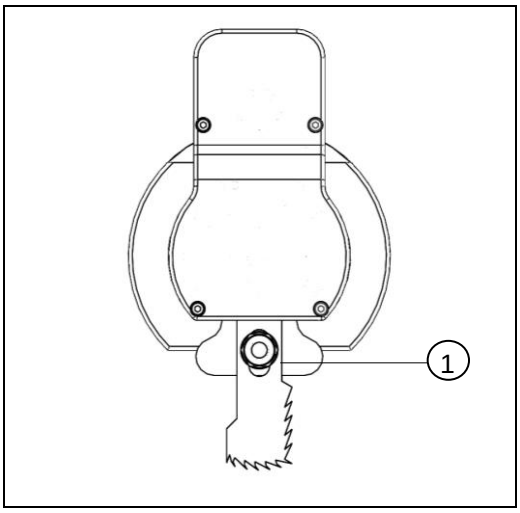


Fig. 51. *Tool change Fitschen knife*

- ▶ Remove hexagon nut and washer (1).
- ▶ Insert Fitschen knife (connection dimensions see Fig. 50Fig. 50)
- ▶ Clamp knife with washer and hexagon nut (1) (41Nm).
- ✓ Knife is changed.

15.14 Tool change Soft Cutter Pro

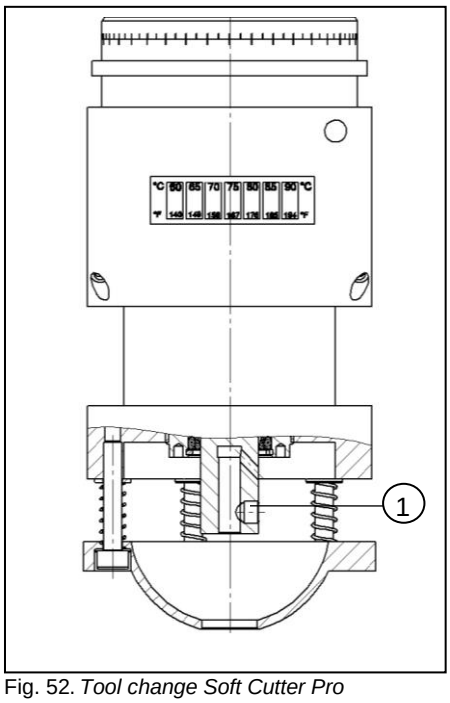


Fig. 52. *Tool change Soft Cutter Pro*

- ▶ Loosen clamping screw (1).
- ▶ Pull out knife.
- ▶ Insert new knife.
- ▶ Tighten clamping screw (1) with 5Nm.
- ✓ Tool is changed

☞	For the machining a front ground beveled knife and a carrier plate are required! If the carrier plate is not suitable for cutting, the contour for the knife must be milled out!

CAUTION!

Damage of the angle head!
Misusing and ignoring may cause severe gear damages and tool breakage!

15.15 Spring change Soft Grinder

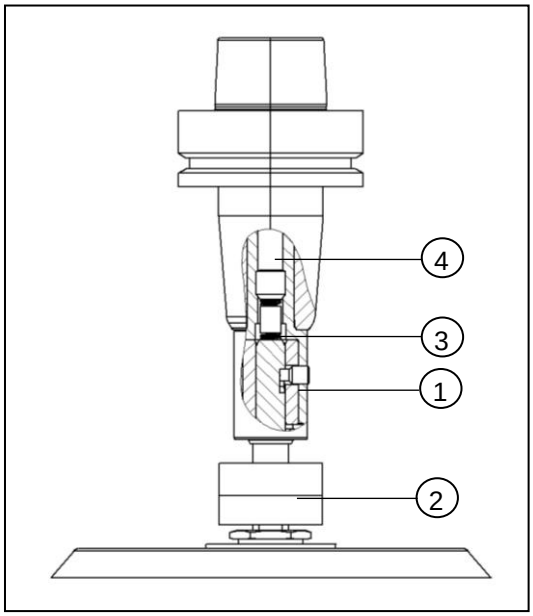


Fig. 53. *Spring change Soft Grinder*

- ▶ Loosen clamping screw (1).
- ▶ Pull out the sanding disc with counter weight (2).
- ▶ Remove installed spring (3).
- ▶ Insert the new spring.
- ▶ Insert the sanding disc with counter weight (2). Make sure that the feather key and the threat of the clamping screw (1) are align.
- ▶ Glue in clamping screw (1) with Loctite 222. Make sure that the axial movement of the sanding disc (2) works. Allow adhesive to dry according to adhesive manufacturer's specifications before commissioning.
- ▶ Adjust spring force with set screw (4) with hexagon key SW5.
- ✓ Spring is changed.

☞	The Soft Grinder is balanced to G=2.5 at 12,000rpm as standard.

CAUTION!

Change in balancing quality!
Changing components, e.g. HSK-adapter or sanding discs, can lead to changes in the balancing quality.

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