

Installation manual

EN

Segmented mandrel
MANDO T211

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»Translation of original installation manual«

1 General

1.1 Information about this manual

This manual enables safe and efficient handling of the clamping device.

The manual is a component of the clamping device and must be kept in the immediate vicinity of the clamping device where it is accessible for personnel at all times. Personnel must have carefully read and understood this manual prior to starting all tasks. The basic prerequisite for safe work is compliance with all the safety instructions and handling instructions in this manual.

Illustrations in this manual are provided for a basic understanding and may deviate from the actual model of the clamping device.

It is assumed that the reader is familiar with standard procedures, such as cleaning the mounting surfaces.

1.2 Explanation of symbols

Safety instructions

Safety instructions are indicated by symbols in this operating manual. The safety instructions are introduced by signal words that express the scope of the hazard.

The safety instructions must be strictly adhered to. You must act prudently to prevent accidents, personal injury, and material damage.



DANGER

... indicates an imminent dangerous situation that can result in death or serious injury if it is not avoided.



WARNING

... indicates a possible dangerous situation that can result in death or serious injury if it is not avoided.

**CAUTION**

... indicates a possible dangerous situation that can result in minor or light injury if it is not avoided.

**NOTE**

... indicates a possible dangerous situation that can result in material damage if it is not avoided.



... indicates useful tips and recommendations, as well as information for efficient and trouble-free operation.

Tips and recommendations**1.3 Limitations of liability**

All information and instructions in this operating manual have been provided under due consideration of applicable standards and regulations, the current state of technology, as well as our many years of experience.

The manufacturer assumes no liability for damage due to:

- Failure to follow the instructions in the manual
- Non-intended use
- Deployment of untrained personnel
- Unauthorized conversions
- Technical changes
- Use of non-approved spare parts

The actual scope of delivery can vary from the explanations and graphic representations provided in this manual in the case of special versions, if supplemental order options are desired, or on the basis of the latest technical changes.

The agreed obligations in the delivery contract, the general terms and conditions, as well as delivery conditions of the manufacturer, and the statutory regulations valid at the time the contract was concluded, apply.

**CAUTION!**

Our clamping devices are balanced with balance quality $G = 4$, in one level $n = 1$.

The data on the rotation balance refers to rotationally symmetrical work pieces.

The clamping of not rotationally symmetrical work pieces may not be clamped and/or only be clamped after consultation with the manufacturer.

Balancing bolts and balancing weights at the clamping devices may not be removed / disassembled!

1.4 Max. RPM

**CAUTION!**

The maximum permissible speed is marked on the product.

By the combination of a clamping device and an add on clamping element a reduction of the maximum permissible speed may be necessary.

- Of all RPMs of the groups specified, the **lowest given RPM** must always be used.

Note that the clamping force is influenced by the centrifugal force of the clamping elements.

- If necessary, adjust the machining force!

1.5 Copyright

This manual is protected by copyright and is provided exclusively for internal purposes.

Delivery of the operating manual to third parties, duplication in any form – including excerpts – as well as exploitation and/or communication of the content, are not permitted [except for internal use] without written approval from the manufacturer.

Actions to the contrary make damage compensation mandatory. We reserve the right to enforce additional claims.

1.6 Scope of delivery



All tools and accessories that are not included in the scope of delivery are marked as optional.

In scope of delivery of the clamping device:

- 1 segmented mandrel

Optionally the scope of delivery of the clamping device includes:

- Spindle flange
- Segmented clamping bushing
- Work piece end-stop
- Draw tube adapter
- Eye bolts

1.7 Spare parts



WARNING!

Safety risk if the wrong spare parts are used!

Incorrect or defective spare parts can cause damage, malfunction, or total failure; they can also impair safety.

- Only use manufacturer's original spare parts.

Only purchase spare parts from authorized dealers or direct from the manufacturer. Addresses are in the appendix.

1.8 Warranty terms

The warranty terms are included in the manufacturer's terms and conditions.

2 Safety

This section provides an overview of all the important safety aspects for optimal protection of personnel, as well as for safe and trouble-free operation.

2.1 Responsibility of the customer

The device is used in industrial applications. Consequently the owner of the device is subject to legal industrial safety obligations.

In addition to the safety instruction in this manual, generally valid safety and accident protection guidelines, and environmental protection guidelines as well as the machines' manual must be adhered to and complied with for the area of implementation of the device.

Note in particular that the status scans of the machine must be adjusted to the respective clamping device.



DANGER!

Risk of injury due to thrown out parts!

Incorrect machine settings may lead to the throwing out of parts.

- The status scans the machine must be set to the respective clamping device.
- Observe the operating instructions of the machine.



WARNING!

Risk of injury!

An incorrect media supply [hydraulic, pneumatic], e.g. by damaged or missing seals or pipes, can cause serious personal injury.

- Hydraulic and / or pneumatic tubes must be secured by the machine by check valves and a permanent pressure monitoring!

2.2 Personnel requirements



WARNING!

Danger of injury due to insufficient qualification!

Improper handling of the clamping device can cause serious injury or material damage.

- Only have activities performed by personnel who are qualified to perform these activities.

The following qualifications are cited in the operating manual for the various activity areas.

- **Specialized personnel**
are personnel who due to their specialized training, skills, and experience, as well as knowledge of the applicable regulations, are capable of executing the tasks assigned to them and of recognizing and avoiding possible hazards on their own.
- **Hydraulic specialist**
The hydraulic specialist has been trained for the particular task area in which he is active and is familiar with the relevant standards and regulations. Due to his specialized training and experience the hydraulic specialist can perform tasks on hydraulic equipment and recognize and avoid possible dangers on his own.
- **Electric specialist**
The electric specialist has been trained for the particular task area in which he is active and is familiar with the relevant standards and regulations. Due to his specialized training and experience the electric specialist can perform tasks on electric equipment and recognize and avoid possible dangers on his own.

Only persons from whom it can be expected that they reliably execute their work are considered as personnel. Persons whose capability to react is impaired, for instance through drugs, alcohol, or medication, are not approved.

- Comply with age-specific and job-specific regulations that are applicable at the installation site when select-

ing personnel.

2.3 Intended use

The clamping device is designed for installation in a machine tool according to CE compliant. Within the machine tool the clamping device is designed exclusively as a through-bore chuck for bar work and / or as an end-stop chuck for chuck work.

The clamping device should only be mounted, operated, maintained, and cleaned by instructed, specialized personnel.

Intended use also includes compliance with all the instructions in this manual.

The clamping device is to be used for the case of application contractually agreed between the producer/deliverer and the user, as well as such cases of application described in the product description which are also in accordance with the technical values.

The safe function of the clamping device is, as far as it can be foreseen, guaranteed when it is used for the intended purpose in accordance with the appropriate safety regulations.

Any use that extends beyond the intended use, or any other use of the clamping device is considered to be misuse and can cause dangerous situations.



WARNING!

Danger due to misuse!

Misuse of the clamping device can cause dangerous situations.

Particularly refrain from the following uses of the clamping device:

- Use in machines other than machine tools.
- Use in machine tools with technical data other than that specified on the clamping device.

Claims of any type due to damage arising from non-intended use are excluded.

Unintended and improper use of the Power Chuck is for example

- If workpieces are not clamped properly
- If safety regulations are disregarded and persons are working at the clamping device without additional protective devices e.g. for machining.
- If the clamping device is used for machines or tools for which it is not intended.

2.4 Personal protective equipment

Wearing of personal protective equipment is required to minimize health hazards when working with the device.

- Always wear the protective equipment necessary for the respective task when working with the device.
- Follow the instructions that have been posted in the work area.

Always wear



For all tasks always wear:

Protective work clothing

is tight-fitting work clothing with low resistance to tearing, with tight sleeves, and without projecting parts. It is primarily used to protect against entanglement by moving machine parts.

Do not wear rings, chains, or other jewelry.



Safety footwear

for protection against heavy falling parts and slipping on slippery substrates.

For special tasks wear



Special protective equipment is required when executing special tasks. Separate reference is made to this equipment in the specific sections of this manual. This special protective equipment is explained below:

Hard hat

to protect against falling and flying parts and materials.



Protective goggles

to protect eyes from flying parts and liquid splashes.



Protective gloves

to protect hands from friction, abrasion, puncture wounds, or deeper injuries, as well as from contact with hot surfaces.

2.5 Special dangers

In the following section residual risks are cited that occur due to installation of the clamping device in a machine tool. In each case the residual risks that have been determined based on a risk analysis of the machine must be specified by the customer.

- Follow the safety instructions listed here and the warnings in the other sections of this manual to reduce health hazards and to avoid dangerous situations.

Horizontal / lying parts



WARNING!

Danger of injury due to horizontal parts!

Before transporting the clamping device in horizontal condition:

- Put the clamping device on a non-slip pad
- Screw in the eye bolts

Suspended loads



WARNING!

Life-threatening danger due to suspended loads!

Some clamping devices must be lifted with a crane. When lifting the clamping device there is a life-threatening hazard due to falling parts or parts swinging out of control.

- Never step under suspended loads.
- Comply with the instructions concerning the intended attachment points. Ensure that the sling gear is securely seated!
- Do not attach lifting gear in projecting components.
- Only use approved hoists and sling gear with sufficient bearing capacity.
- Do not use rope and belts that are torn or frayed.

Moving parts



WARNING!

Danger of injury due to moving parts!

Rotating parts of the clamping device can cause serious injuries.

- Do not reach into moving parts or handle moving parts during operation.
- Note the gap dimensions of moving parts.
- Do not open covers when the device is in operation.
- Be aware of afterrun time:
Prior to opening the covers ensure that all parts have come to a standstill.
- Wear tight-fitting protective work clothing in the danger zone.

Wrong clamping of the work piece**WARNING!****Danger of injury due to incorrect clamping of the work piece!**

Incorrect work piece clamping may lead to the ejection of the work piece and result in serious injuries.

Under dimensioned (tolerance) parts can lead to incorrect clamping!

- Check the unmachined work pieces at random on dimensional accuracy.

Too low supply pressure can lead to the reduction of clamping force!

Too high supply pressure can lead to damage of the components of the clamping device!

- Check and adjust, if necessary, the supply pressure regularly.
- Do random checks of the unmachined work pieces on dimensional accuracy.

Missing changing parts**WARNING!****Danger of injury due to missing changing parts!**

When operating the clamping device without changing parts [segmented clamping bushing, clamping heads, work piece end-stops] there is a higher danger of crushing injuries due to the stroke of movable components of the clamping device.

- The clamping process may not be initiated without assembled segmented clamping bushing and/or work piece end-stop.

Parts with sharp edges



WARNING!

Risk of injury!

When screwing in individual components such as for example work piece end-stops, threaded adapters and similar devices that are equipped with an external thread or wear caused by burrs, there is risk of cutting.

- The operation must be done only by qualified personnel.
- Wearing of gloves / [PSA] is required!



CAUTION!

Risk of injury!

A special use-dependent or job-based design can result in variations in the clamping strokes and thus the clamping force.

- The notes on the associated clamping situations or product drawing must always be observed

2.6 Further warnings



WARNING!

Risk of injury!

Never start rotating the clamping device without a clamped work piece.

- For operation any available clamping position must be clamped with a suitable work piece.



WARNING!

Risk of injury!

Never reach for the clamping device while the spindle is rotating. Before starting to work on the mandrel, make sure the machine spindle cannot be put in motion.

**WARNING!****Risk of injury!**

Falling down of the clamping device or its parts can cause severe bruises and fractures.

The dead weight of the clamping device or its parts can lead to high physical stress.

**WARNING!****Risk of injury!**

By repeated reworking or wear and tear of the clamping surfaces sharp edges and burrs may appear and lead to severe cutting damages.

**WARNING!****Damage of clamping device!**

The clamping device may be released exclusively in the standing condition!

**Risk of injury!**

Leaking [sprayed out] hydraulic oil can cause serious injury.

- Make sure that all O-rings / seals for the hydraulic and/or pneumatic connections are available and undamaged

**WARNING!****Risk of injury!****Missing o-rings or seals may cause severe injuries!**

Due to missing / fallen out O-rings and seals compressed air or hydraulic fluids which are under high pressure may expel!

- Make sure that all O-rings / seals for the hydraulic / pneumatic connections are available and undamaged!
- If necessary lubricate them before assembly and/or during service.

**WARNING!****Risk of injury!**

The operating screw may be turned out and/or thrown off!

- Never put the machine adapter into rotation if the operating system is not tightened with the given tightening torque!

2.7 Clamping force

The achieved clamping force can vary due to the maintenance condition of the clamping device [state of lubrication and degree of contamination] [see chapter »Maintenance«].

The clamping force must be checked at regular intervals. This requires the use of static clamping force measuring devices.

**CAUTION!****Damages due to excessive draw and compressive force!**

An excessive draw force and/or compressive force may damage the clamping device.

- The max. draw force and compressive force may not be exceeded.

2.8 Screws

Moving parts



WARNING!

Danger of injury due to screws and stud screws being accelerated out of the device!!

Screws and stud screws radially attached to the product can be accelerated out of the device and cause severe injuries.

- At the product radially mounted screws and stud screws which were loosened for assembly and maintenance must be re-tightened with the correct tightening torque!
The tightening torque is given at the product itself, near the screw or threaded pin, and/or given in chapter »Bolt torque«.
- All screws or stud screws that are not marked with a tightening torque specification are tightened with the prescribed tightening torque and locked [medium-strength bonding] in the factory and should only be unscrewed after consultation with the manufacturer. If in doubt you must contact the manufacturer immediately do determine the subsequent procedure.

2.9 Functionality



NOTICE!

With high contamination of the clamping device the functionality is no longer guaranteed.

- The cleaning and maintenance intervals must be observed.

2.10 Environmental protection



NOTE!

Environmental hazard due to incorrect handling!

Incorrect handling of environmentally hazardous substances, particularly improper disposal, can cause significant environmental damage.

- Always comply with the instructions cited below
- If environmentally harmful substances should inadvertently get into the environment, initiate suitable measures immediately. If in doubt notify the responsible municipal authority about the damage.

The following environmentally harmful substances are used:

Lubricants

Lubricants like greases and oils can contain toxic substances. Ensure that they do not get into the environment. The device must be disposed of by a specialized disposal company.

To achieve trouble-free operational performance of the clamping device only use HAINBUCH lubricants. See the appendix for reference addresses.

3 Technical data

3.1 General information

The clamping device is available in different sizes and variants.

Information about e.g.

- dimensions
- weight

you will find on the corresponding drawing that you can order at HAINBUCH.

For examples some technical data:

Size	Clamping range [mm]	Dimensions [ø x length in mm]	Speed max. [1/min]	Clamping force F_{rad} max. [kN]	Clamping force F_{ax} max. [kN]	Weight [kg]
0	ø20 - ø28	Ø 139 x 100	7000	42	10	5
1	ø26 - ø38	Ø 139 x 110	7000	42	10	5
2	ø36 - ø54	Ø 139 x 130	7000	85	20	5,5
3	ø50 - ø80	Ø 139 x 140	6000	105	25	6
4	ø70 - ø120	Ø 139 x 155	6000	150	35	7

F_{rad} max. can only be reached in lubricated condition.

In unlubricated condition F_{rad} max. is much lower.



WARNING!

Risk of injury!

Using false technical data can lead to serious personal injury and property damage.

- The technical data [label on the product, assembly drawing] must be observed and may not be modified by the operator!

3.2 Operating conditions

Environment	Specification	Value	Unit
	Temperature range	15 - 65	°C

Mechanical actuating In each possible operating condition the maximum draw force and compressive force may not be exceeded!

3.3 Power specifications



NOTE!

Material damage if the power specifications do not agree!

If the power specifications of clamping device, machine adapter and machine do not agree, severe damage extending to total damage can occur.

- Only operate clamping devices and adapters in machines with the same power specifications.

Information on maximum clamping force and draw tube force is provided on the clamping device and the adapter.

3.4 Dimensional sheet

Dimension sheets for the respective product can be requested from HAINBUCH.

3.5 Type designation



The type designation is on the product and includes the following information:

- 1 ID no. [marked with the # symbol]
- 2 Maximum speed [rpm]
- 3 Maximum clamping force [kN]

Fig. 1

4 Structure and function

4.1 Overview and brief description

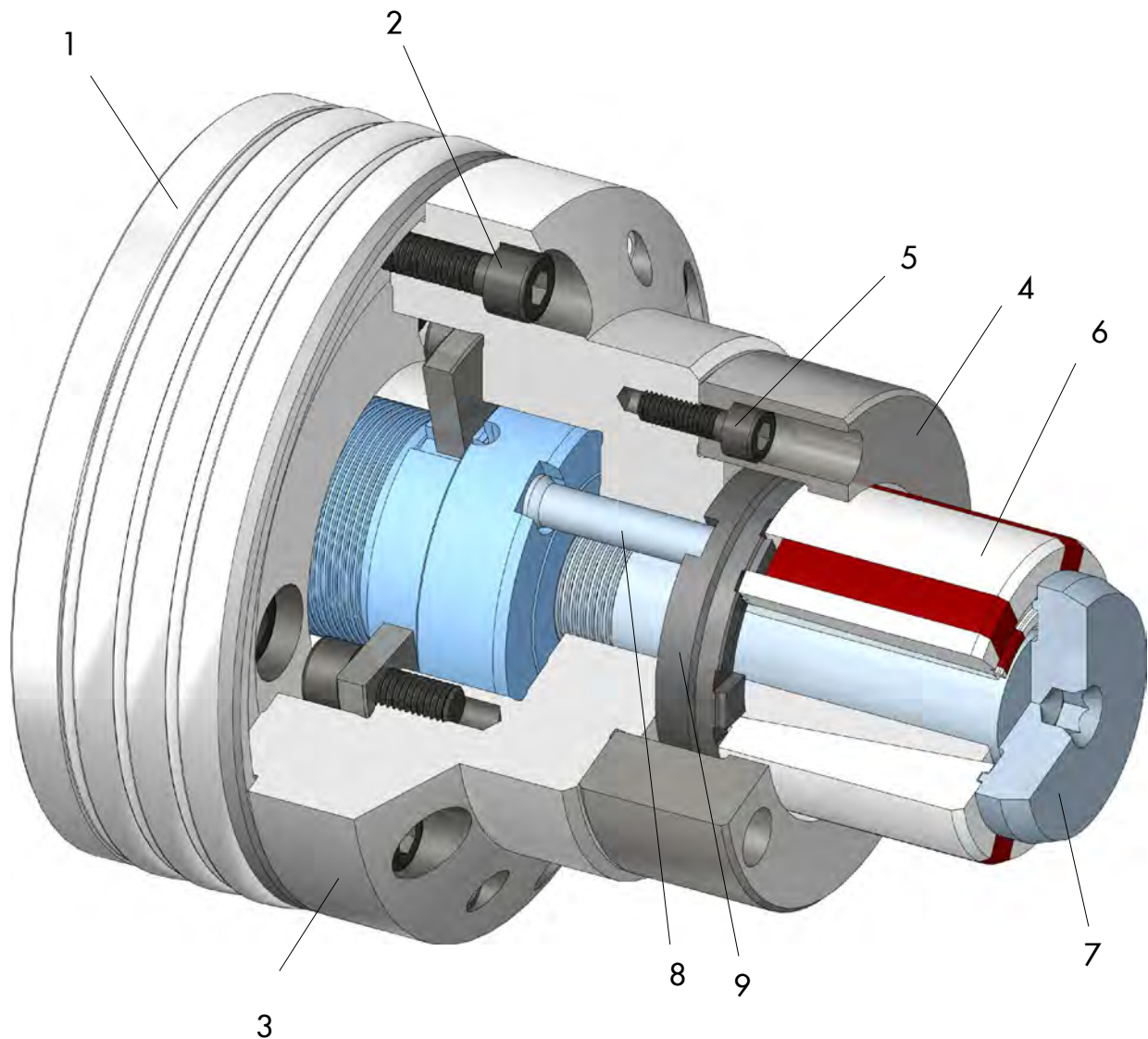


Fig. 2

- | | |
|-------------------------------|-------------------------------|
| 1. Spindle flange | 6. Segmented clamping bushing |
| 2. Allen screws | 7. Draw bolt |
| 3. Mandrel body | 8. Ejector pin |
| 4. End-stop | 9. Ejector |
| 5. Mounting screws [end-stop] | |

Brief description

The segmented mandrel MANDO T211 is specifically designed for inner clamping, which requires high concentricity.

The HAINBUCH segmented clamping bushing is the central element and guarantees the best possible concentricity. It is made of chrome/nickel case hardened steel that is very hard, extremely wear resistant and rigid. After separation, a special procedure is used to vulcanize the clamping segments back together. This guarantees the highest elasticity and a large opening stroke for easy work piece loading.

Even on mandrels for small diameters the HAINBUCH vulcanization process is extremely beneficial. Regardless of how extensively it is going to be used.

4.2 Optional Accessories

The accessories described here are not included in the scope of delivery.

Specially developed segmented clamping bushings match to the respective maximum RPM are available for each clamping device. Trouble-free and precise function of HAINBUCH clamping devices is only ensured when using original HAINBUCH segmented clamping bushings.

Lubricating grease and grease gun are required for cleaning and preservation of the clamping device. The lubricating grease is also specially matched for protection of the vulcanized segments of the segmented clamping bushings and increase their service life and elasticity by a significant factor.

4.2.1 Segmented clamping bushing

Fig. 3

The segmented clamping bushing is offered with a clamping diameter manufactured according to the customers needs.

4.2.2 Spindle flange

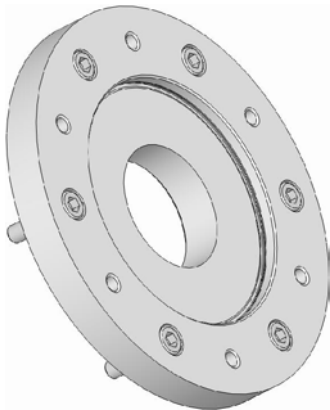


Fig. 4

The spindle flange serves for adaption of the segmented mandrel to the machine.

Depending on the order the spindle flange can be included in the delivery or provided by the customer.

4.2.3 Work piece end-stop

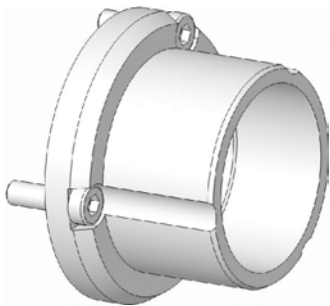


Fig. 5

The work piece end-stop is manufactured with a end-stop dimension according to the customers request. In combination with the segmented clamping bushing and the segmented mandrel it provides a functional unit.

4.2.4 Grease



Fig. 6

The universal grease for chuck and mandrel lubrication is supplied in a 1000g can. The order number for the universal grease is 2085/0003; it can be ordered from HAINBUCH.

5 Transporting, packaging, storing

5.1 Safety instructions for transporting

**Unbalanced pack-
age**



WARNING!

Danger of falling due to an unbalanced package

Packed goods can have an unbalanced package. If attached incorrectly the package can tip and cause life-threatening injuries.

- Note the markings on the packages.
- Attach the crane hook in such a manner that it is located above the center of gravity.
- Carefully lift and see if the load tilts. If necessary change the attachment.



Transport!

- For transport always use a suitable clamping means / crane.
- Make sure that a rolling / falling of the clamping device is not possible.

5.2 Symbols on the packaging



Fragile

Identifies packages with fragile or sensitive contents. Handle the packed goods with care; do not allow them to fall, and do not subject them to impact.



Protect from moisture

Keep packed goods dry and protected against moisture.

5.3 Transport inspection

Check delivery immediately upon receipt to ensure that delivery is complete and to identify any transport damage.

Proceed as follows if there is apparent external damage:

- Do not accept the delivery, or only accept it with reser-

vation.

- Note the extend of transport damage on the transport documents or on the transport company's delivery ticket.
- Submit a complaint.



Report any defect as soon as it is detected. Claims for damage compensation can only be enforced during the applicable periods for giving notice of lack of conformity.

5.4 Unpacking and inner-company transport



Usually the clamping device is packed vertically. Depending on the size it has threaded bores in the circumference of the clamping device for assembling the eye bolts.

In these threaded bores lifting eye bolts can be screwed in.

To safely lift the clamping device out of the package it must be hooked into a crane depending on the weight.

For transporting with transport trolley the clamping device must be positioned in standing condition. Make sure that a non-slip pad has been laid.

All tools and accessories which are not in scope of delivery are marked as optional in the operating instructions.

- Two people are required for this task.
 - Special tools required:
 - Crane and lifting eye bolts from weight 15 kg
1. Screw lifting eye bolts into the thread in the circumference of the clamping device.
 2. Hook the load-handling equipment into the lifting eye bolts.
 3. Use a crane to carefully lift the clamping device out of the transport packaging and put it down on a stable, level substrate.
 4. Prevent the clamping device against rolling away.



Fig. 7

5.5 Packaging

About the packaging

Individual packages are packed according to the expected transport conditions. Environmentally-friendly materials have been used exclusively for the packaging.

Packaging should protect the specific components from transport damage, corrosion, and other damage until installation. Therefore do not destroy the packaging, remove it just before installation.



The packed goods are sealed in foil airtight and packed in cartons. See the »Technical Data« section for the specific weight of the respective sizes.

Handling packaging materials

Dispose of packaging materials in accordance with the respectively valid statutory regulations and local guidelines.



NOTE!

Improper disposal causes environmental damage!

Packaging materials are valuable raw materials and in many cases they can be reused, or they can be effectively treated and recycled.

- Dispose of packaging materials in an environmentally responsible manner.
- Comply with locally applicable disposal guidelines. If necessary commission a specialized company to dispose of packaging.

5.6 Storing



Under certain circumstances instructions for storage and subsequent storage are affixed to the packages that extend beyond the requirements cited here.

Comply with these instructions accordingly.

Storage of packages

Only store packages under the following conditions:

- Do not store outdoors.
- Store in a dry and dust-free location
- Do not expose to aggressive media
- Protect from direct sunlight
- Avoid mechanical vibration
- Storage temperature: 15 bis 35 °C
- Relative humidity: max. 60 %
- For storage periods longer than 3 months:
 - Check the general condition of all parts and the packaging at regular intervals.
 - Touch up or re-apply anti-corrosion agents as needed

Subsequent storage of the clamping device

Only re-store the clamping device under the following conditions:

- Thoroughly clean the clamping device prior to subsequent storage [see section »Cleaning«]
- Thoroughly oil and grease the clamping device. [see section »Cleaning«]
- Store the clamping device in airtight foil
- The clamping device must be stored securely in position. If this is not guaranteed, use a suitable container for the clamping device or equip the shelf with a circumferential securing edge.

6 Assembly



WARNING!

During the initial installation of the clamping device severe injuries may occur.

- The initial installation must be done only by qualified personnel.
- All screws remaining in the clamping must be tightened firmly.
- All tools and keys must be removed after installation.



WARNING

Risk of injury due to stored energy!

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

6.1 Pre-consideration

- Screws are tightened according to the size of the screw and the general torque.
To avoid axis-parallel warpage under load and to get stiffness turn in the screws evenly.
- To avoid precision error clean the screw joint surfaces and also the mating surfaces, see »Maintenance«.
The ex works wetting of the plate surfaces and the clamping element is only corrosion protection. It's not functionally lubricated.

- The insertion of lubricant is provided only on the mechanical surfaces. Pay attention to the instructions for lubricants in the chapter »Maintenance«.
- Avoid too much lubricant on the bearing surface, as this can cause face runout.
- Seal rings (e.g. o-ring, quad-ring seal) and sealing surfaces must be lubricated.
Note the information in the chapter »Maintenance«.
- Note that the function surfaces (plate surface, mating surface, cone surface and seal surface) may not be damaged.

**CAUTION!**

Wear safety shoes during the assembly and maintenance work.

Make sure that the starting of the spindle is impossible.

6.2 Preparations

The total weight of the clamping device, consisting of spindle flange and clamping unit, depends on the size. Standards can be as much as 10 kg, special mandrels may be as much as 40 kg.

Depending on the weight, to safely lift the clamping device out of the package and position it in the machine it must be hooked into a crane.

**WARNING!****Danger of injury due to falling components!**

When mounting components can fall and cause severe injury and material damage.

- Two people are always required for this task.
- Use a crane.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

If the clamping device is delivered in combination with a flange, the flange must be assembled before the clamping device!

Special tools required:

- Allen wrench
- Oil stone
- Crane
- Eye bolts

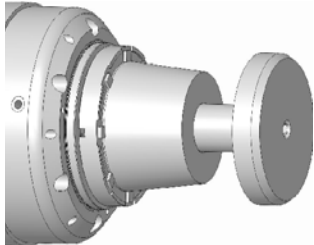


Fig. 8

1. Loosen and remove the draw bolt.

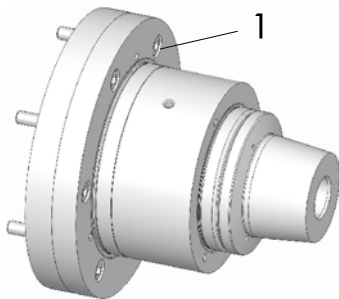


Fig. 9

2. Loosen, unscrew and remove the cylindrical screws [1] in the clamping device; use an allen wrench.

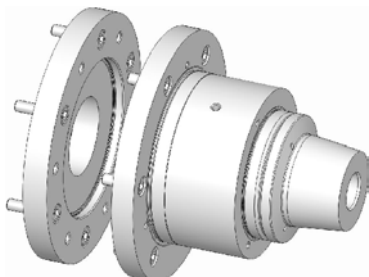


Fig. 10

3. Remove the flange from the clamping device.

4. Clean the mating surfaces at flange and clamping device with a soft, lint-free cloth and remove all oil and grease residues.

5. Hone the mating surfaces on the spindle flange with an oil stone.

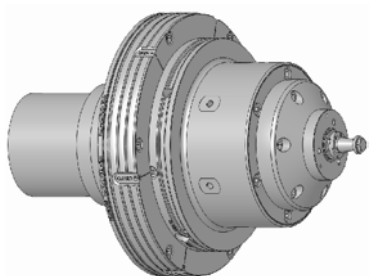


Fig. 11

If the clamping device is delivered with a quick-change machine adapter the flange of the quick change adapter must be removed from the clamping device before assembling to the machine

The description of the disassembly of the quick change machine adapter from the clamping device see the manual for the adapter.

6.3 Installation



WARNING!

Danger of injury due to unintentional startup of the tool spindle!

Unexpected start up of the tool spindle can cause severe injury.

- Prior to switching on automatic mode close all protective doors or hoods that are present on the machine tool.
- Unscrew all eye bolts from the clamping device and remove them from the interior of the machine.
- Only run the machine in set-up mode or jog mode.
- Always remove immediately all the tools and wrenches from the clamping device after use.



WARNING!

Risk of injury!

By operating the clamping device without changing parts [clamping head, segmented clamping bushing, work piece end-stops ...] there is an increased risk of crushing injuries by the stroke of the moving components of the clamping device. By uncontrolled discharge of the clamping process [e.g. by incorrect installation of the energy supply or faulty programming] there is an increased danger.



WARNING!

Risk of injury!

Bending in the working area of the machine can cause severe head injuries!

**CAUTION!****Risk of injury!**

Unexpected start up of the tool spindle can cause severe injury.

- Make sure that the system is pressure-free and that a restart of the machine can be excluded!

**Risk of injury!**

Contamination of the mechanism can influence/reduce the stroke, thus the clamping force is reduced and thus, the work piece is not properly tightened and can be thrown out.

- Clean the product regularly [see chapter »Maintenance and service«].

**Risk of injury!**

If the clamping pressure is too low clamped work piece may be thrown out.

If the clamping pressure is too high severe damages of the components of the clamping device may occur the throwing out of the work piece.

- Before operation set the operation pressure back to operation level.
- The operating pressure should be checked and adjusted regularly!
- The dimension of the work pieces should be checked regularly [clamping- \emptyset]!

**Transport!**

- For transport always use a suitable clamping means / crane.
- Make sure that a rolling / falling of the clamping device is not possible.

**WARNING!****Danger of injury due to vertical suspended spindle!**

Bending into the machine work area when assembling overhead can cause severe head injuries.

- Secure components prior to overhead assembly.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

**Positioning!**

By clever positioning of the clamping device, the subsequent lubricating may be easier.

- Position the clamping device in a way that the lubrication points of the clamping device are always accessible.

6.3.1 Assembling the flange

**NOTE!****Material damage due to wrong tightening torque of the cylindrical screws in the spindle flange!**

The tightening torque of the cylindrical screws is prescribed by the spindle or machine manufacturer. Incorrect tightening torque of the cylindrical screws in the flange can cause significant material damage on the clamping device and on the machine.

- Only tighten the cylindrical screws of the spindle with the torque prescribed by the spindle or machine manufacturer.



Fig. 12

1. Put the machine in set up mode.
2. Wipe off the mating surfaces of the machine spindle with a soft, lint-free cloth and remove all oil and grease residues.
3. Lift the flange into the machine by hand or with the aid of a crane and place it on the machine spindle. Position the flange on the machine spindle with the aid of the bores.
4. Screw all cylindrical screws into the flange with an allen wrench and hand tighten in a cross pattern.

**NOTE!****Material damage is possible if the ring nuts are left in the spindle flange!**

Ring nuts that are left in the clamping device can significantly damage or even destroy lathe, clamping device and work piece.

- Always remove ring nuts immediately after mounting the clamping device in the lathe.

**NOTE!****Material damage due to insufficient face run and concentricity!**

Due to insufficient face run and concentricity work pieces can be damaged during processing.

- After each mounting check, and if necessary re-adjust, the face run and concentricity of the clamping device.

Checking face run

Special tools required:

- Dial indicator
- Plastic tip hammer



Fig. 13

1. Place the magnetic base of the dial indicator on the inside of the machine.
2. Place the dial indicator for face run on the face of the clamping unit.
3. Use a plastic tip hammer to carefully knock the clamping unit into position.
4. Tighten the cylindrical screws finger-tight.



For exact adjustment, if necessary loosen the cylindrical screws several turns and re-tighten in a cross pattern.

5. Wipe off the taper of the the segmented mandrel with a soft, lint-free cloth and remove all oil and grease residues.

Checking concentricity

Special tools required:

- Dial indicator
- Plastic tip hammer
- Torque wrench



Fig. 14

1. Place the magnetic base of the dial indicator on the inside of the machine.
2. Place the dial indicator [2] for concentricity on the clamping taper [1].
3. Adjust the segmented mandrel in such a manner that the dial indicator shows the value »0«.



For exact adjustment, if necessary loosen the cylindrical screws several turns and re-tighten in a cross pattern.

4. Tighten the cylindrical screws in a cross pattern with the correct tightening torque [see »bolt torque«].
5. Remove all tools from the machine.

6.3.2 Assembling the quick-change machine adapter

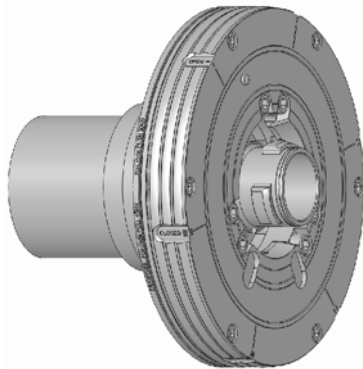


Fig. 15

The assembly of the quick-change machine adapter to the machine is described in the manual of the machine adapter.

6.3.3 Assembly of the segmented mandrel

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts

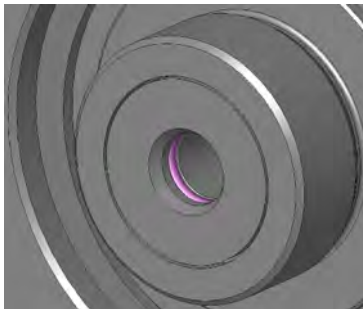


Fig. 16

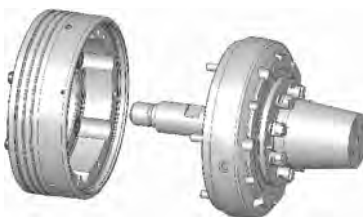


Fig. 17

1. Put the machine in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into front stop position.
5. If an LAK-adapter is available make sure that the O-ring [see figure] is present and greased.
6. Put the segmented mandrel on the pre-assembled flange on the machine spindle by using a crane.
7. Screw the segmented mandrel by its threaded adapter on the draw tub of the machine or on the draw tube adapter till end.
8. Turn back the segmented mandrel until the bolt hole circles fit.
9. Screw in all cylindrical screws into the segmented mandrel with an allen wrench and tighten them only finger-tight in a cross pattern.

**NOTE!**

Before operating the segmented mandrel must be adjusted, see chapter »Checking and adjusting the face run and the concentricity«.

6.3.4 Assembly of the segmented mandrel [bayonet]

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts

1. Put the machine in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into front stop position.
5. Put the segmented mandrel on the pre-assembled flange on the machine spindle by using a crane.
6. Secure the clamping device by turning it in the bayonet.
7. Screw in all cylindrical screws into the segmented mandrel with an allen wrench and tighten them only finger-tight in a cross pattern.

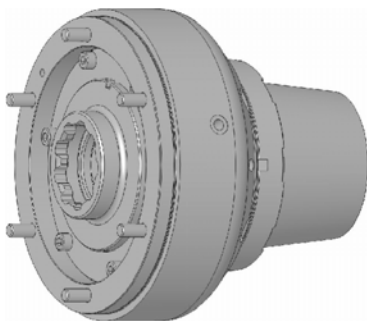


Fig. 18

**NOTE!**

Before operating the segmented mandrel must be adjusted, see chapter »Checking and adjusting the face run and the concentricity«.

6.3.5 Assembly of the segmented mandrel by clamping mechanism

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts



WARNING!

Crushing danger due to machine movement!

Due to the design of the draw tube a gap may result between draw tube adapter and clamping device / clamping unit. When assembling the clamping device / clamping unit there is a high risk squeezing danger. Due to this gap there is a high risk of crushing, which can lead to serious injuries.

- Never reach into the gap between the machine / spindle flange and clamping device!

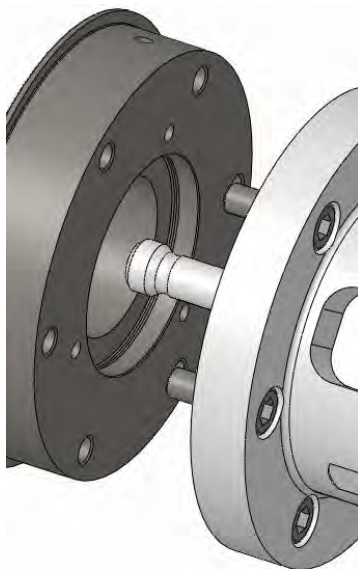


Fig. 19

1. Put the machine in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into front stop position.
5. Put the segmented mandrel on the pre-assembled flange [optionally] on the machine spindle by using a crane.
6. Insert the draw bolt of the clamping device into the clamping mechanism of the machine.
7. Screw in all cylindrical screws into the segmented mandrel with an allen wrench and tighten them only finger-tight in a cross pattern.

6.3.6 Assembly of the segmented mandrel [quick change-over interface]

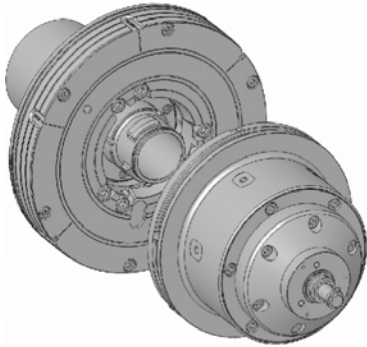


Fig. 20

The assembly of the segmented mandrel from the quick change machine adapter is described in the manual of the machine adapter.

6.3.7 Checking and adjusting the face run and the concentricity



NOTE!

Material damage due to insufficient face run and concentricity!

Due to insufficient face run and concentricity work pieces can be damaged during processing.

- After each mounting check, and if necessary re-adjust, the face run and concentricity of the clamping device.

Checking face run

Special tools required:

- Dial indicator
- Plastic tip hammer

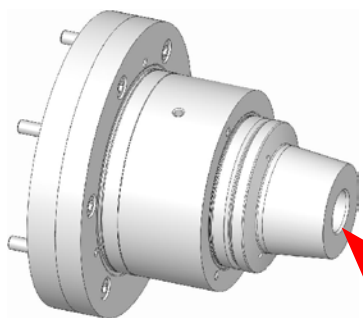


Fig. 21

1. Place the magnetic base of the dial indicator on the inside of the machine.
2. Place the dial indicator for face run on the face of the clamping unit.
3. Use a plastic tip hammer to carefully knock the clamping unit into position.



4. Tighten the cylindrical screws with a torque wrench in a cross pattern [see section »Screw tightening torque«].



For exact adjustment, if necessary loosen the cylindrical screws several turns and retighten in a cross pattern.

- Wipe off the taper of the the segmented mandrel with a soft, lint-free cloth and remove all oil and grease residues.

Checking concentricity

Special tools required:

- Dial indicator
- Plastic tip hammer
- Torque wrench

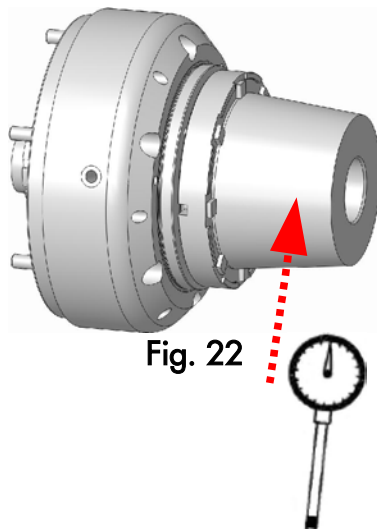


Fig. 22

- Place the magnetic base of the dial indicator on the inside of the machine.
- Place the dial indicator [2] for concentricity on the clamping taper [1].
- Adjust the segmented mandrel in such a manner that the dial indicator shows the value »0«.



For exact adjustment, if necessary loosen the cylindrical screws several turns and retighten in a cross pattern.

- Tighten the cylindrical screws in a cross pattern with the correct tightening torque [see chapter »Bolt torque«].



WARNING!

Risk of injury!

By operating the clamping device without changing parts [clamping head, segmented clamping bushing, work piece end-stops ...] there is an increased risk of crushing injuries by the stroke of the moving components of the clamping device. By uncontrolled discharge of the clamping process [e.g. by incorrect installation of the energy supply or faulty programming] there is an increased danger.

6.3.8 Assembling of the work piece end-stop

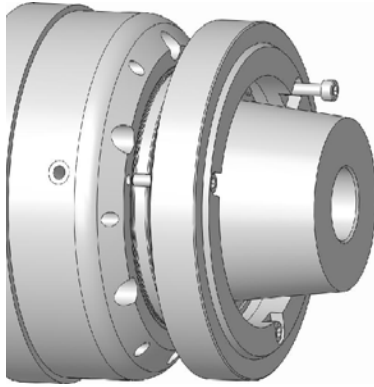


Fig. 23

Special tools required:

- Torque wrench

1. Put the machine tool in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.
5. Put the work piece end-stop on the segmented mandrel.
6. Screw in all cylindrical screws into the work piece end-stop with an allen wrench and tighten them clockwise with an allen wrench [see section »Screw tightening torque«].



WARNING!

Risk of injury!

Tools and gages that are thrown out of the machine can cause injury.

- Remove all tools and gages from the working area of the machine before the machine is started up.



Risk of injury!

If the clamping pressure is too low clamped work piece may be thrown out.

If the clamping pressure is too high severe damages of the components of the clamping device may occur the throwing out of the work piece.

- Before operation set the operation pressure back to operation level.
- The operating pressure should be checked and adjusted regularly!

**WARNING!****Slipping danger due to escaping hydraulic fluid!**

Escaping (sprayed out) hydraulic oil can cause serious injuries.

- Make sure that all o-rings/seals for the hydraulic / pneumatic interfaces are available and in undamaged condition.
- Make sure that the clamping device is empty and leakage of hydraulic fluid is avoided.

**WARNING!****Risk of injury due to stored energy!**

The work piece end-stop may be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- The screws which are secured by sealing wax may not be opened.
- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- Always wear personal protective equipment!

6.3.9 Assembly of the segmented clamping bushing

Special tools required:

- Allen wrench
1. Put the machine in set up mode.
 2. Remove all tools from the interior of the machine.
 3. Set the clamping pressure of the machine on the lowest setting.
 4. Move the draw tube of the machine tool into the front stop position.

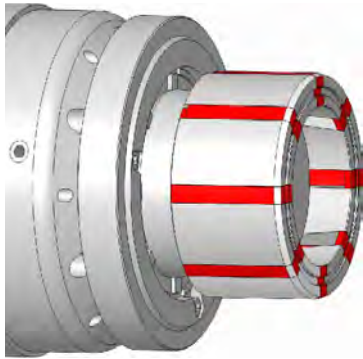


Fig. 24

5. Put the segmented clamping bushing on the segmented mandrel.

**WARNING!****Risk of injury due to ejected parts!**

When operating the clamping device without changing parts [segmented clamping bushing, work piece end-stop] the coupling rings can be ejected.

- Operate the clamping device always with assembled changing parts.

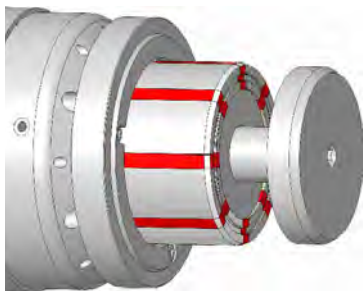


Fig. 25

6. Screw in the draw bolt
7. If existing: screw in the safety screw [1] while turning the clamping unit.
8. Tighten the safety screw.
9. Tighten the draw bolt firmly by using an allen wrench [not in scope of delivery].

**WARNING!****Risk of injury due to ejected parts!**

During operation of the clamping device with poor tightened draw bolt can loosen the draw bolt, the draw bolt and the work piece may be thrown away.

- Always tighten the draw bolts with the correct tightening torque [engraved torque]!

6.3.10 Assembly of the segmented clamping bushing SE

Special tools required:

- Allen wrench

1. Put the machine in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.

**WARNING!****Risk of injury due to ejected parts!**

When operating the clamping device without changing parts [segmented clamping bushing, work piece end-stop] the coupling rings can be ejected.

- Operate the clamping device always with assembled changing parts.

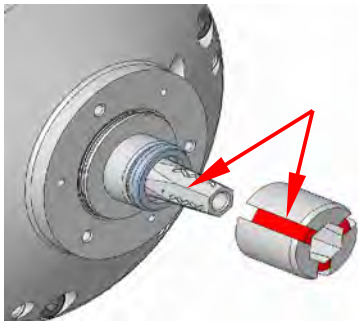


Fig. 26

**NOTE!**

In incorrect assembly lubricating grease is pressed through the vulcanization. The vulcanization can be damaged!

- Make sure when installing the segment clamping bushing that the vulcanization fits always on the edge of the mandrel body in which are no lubrication grooves!

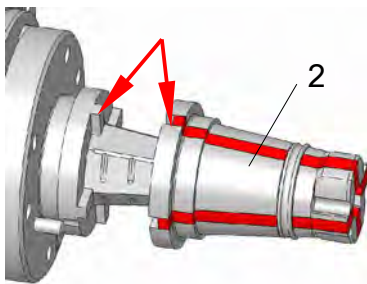


Fig. 27

- Put the segmented clamping bushing [2] on the segmented mandrel.

**NOTE!**

The grooves at the segmented clamping bushing must fit to the opposite lying springs at the segmented mandrel!

- Screw in the draw bolt and tighten it firmly by using the allen wrench [not in scope of delivery].

**WARNING!****Risk of injury!**

Tools and gages that are thrown out of the machine can cause injury.

- Remove all tools and gages from the working area of the machine before the machine is started up.

**Risk of injury!**

Contamination of the mechanism can influence/reduce the stroke, thus the clamping force is reduced and thus, the work piece is not properly tightened and can be thrown out.

- Clean the product regularly [see chapter »Maintenance and service«].

**Risk of injury!**

If the clamping pressure is too low clamped work piece may be thrown out.

If the clamping pressure is too high severe damages of the components of the clamping device may occur the throwing out of the work piece.

- Before operation set the operation pressure back to operation level.
- The operating pressure should be checked and adjusted regularly!
- The dimension of the work pieces should be checked regularly [clamping- \varnothing]!

6.4 Work piece

**WARNING!****Risk of injury due to thrown out parts!**

During clamping of the work piece and the processing parts can be thrown and cause severe injuries and property damage.

- Check the clamping diameter of the work piece.
- Tighten only work pieces that meet the dimensional requirements.
- For clamping very long work pieces use in addition a tailstock / a steady rest for support.
- Do not exceed the maximum permissible clamping force.
- Make sure that the applied clamping force is set correctly [neither too high nor too low].

**CAUTION****Risk of injury!**

When placing the work piece:

- Make sure that the hands / fingers may not be clamped between the flange and the work piece!

6.5 Inspections

NOTE!**Material damage due to damaged clamping devices!**

A damaged, incomplete, or unbalanced clamping device can significantly damage or even destroy the machine tool and the work piece.

- Only install undamaged, complete, and precisely balanced clamping devices.
- If in doubt contact the manufacturer.

Ensure the following points prior to each installation and start-up of the clamping device:

- All cylindrical screws of the clamping device must be present and tightened with the proper tightening torque.
- The balance screws of the clamping device must all be present and undamaged.

All rubber segments must be intact; this means that they are neither torn, nor are they porous at any point.

- All edges and bearing surfaces are intact; this means that they are neither broken nor do they show any signs of wear.
- The set speed of the machine tool should not exceed the maximum permissible speed of the clamping device.
- The maximum draw tube force specified on the perimeter of the clamping device must not be exceeded.
- The clamping pressure of the machine must be sufficiently high.

- All mounting tools must be removed from the interior of the machine.
- Clamping device and work piece must be compatible – check the clamping diameter regularly.
- The work piece must be clamped into the clamping device with sufficient work piece tension.
- Do a pressure loss test and a measurement of clamping force.

6.6 Control of the stroke position



WARNING!

Crushing danger from moving parts!

Crushing danger from moving parts during controlling the stroke position!

Gaps, caused while controlling the stroke position, can cause severe injury.

- Only do the controlling of the stroke position with assembled changing parts.
- Only run the machine in set-up mode or jog mode.
- Do not reach into moving parts or handle moving parts during operation.
- Note the gap dimensions of moving parts.
- Wearing of gloves / [PSA] is required!

6.7 Activities after production is concluded

1. Move the clamping device into unclamped position.
2. Switch off the machine tool and safeguard it from being switched on again.
3. Open the protective door or hood.
4. Clean the clamping device and a possibly mounted adaptation clamping device and adapter of chips and production residues using a soft, lint-free cloth and oil them lightly.
5. Close the protective door or hood.

7 Disassembly, subsequent storage, disposal

If there is break in production that lasts longer than 3 days, the clamping device must be disassembled and properly stored in accordance with the manufacturer's specifications [see section »Transport, packaging, storage«].

Prior to disassembling:

- Put the machine in set-up mode.
- Remove fuels and auxiliary materials, as well as residual processing materials and dispose of these items in an environmentally-responsible manner.

7.1 Safety

Safeguarding against restart



DANGER!

Life-threatening danger if restarted without authorization

When disassembling there is danger of the energy supply being switched on inadvertently. This poses a life-threatening hazard for persons in the danger zone.

- Prior to starting the tasks switch off all energy supplies and safeguard them from being switched on again.



WARNING!

Danger of injury due to falling components!

When mounting components can fall and cause severe injury and material damage.

- Two people are always required for this task.
- Use a crane.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

**DANGER!****Risk of injury by released energy!**

Risk of injury during the disassembling of the balance weight due to released energy.

- Pay attention to the safety instruction during the disassembly of the stroke limit screw.

**WARNING****Risk of injury due to stored energy!**

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

**WARNING!****Danger of injury due to vertical suspended spindle!**

Bending into the machine work area when assembling overhead can cause severe head injuries.

- Secure components prior to overhead assembly.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

7.2 Disassembling the clamping device

7.2.1 Disassembly of the segmented clamping bushing

Special tools required:

- Wrench

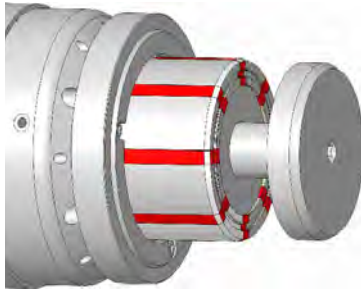


Fig. 28

1. Put the machine tool in set up mode.
2. Remove all tool from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.
5. Loosen the draw bolt by using a wrench [not in scope of delivery] and remove it.

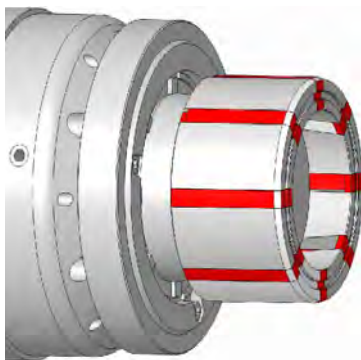


Fig. 29

6. Remove the segmented clamping bushing from the segmented mandrel.

7.2.2 Disassembling the work piece end-stop

Special tools required:

- Allen wrench

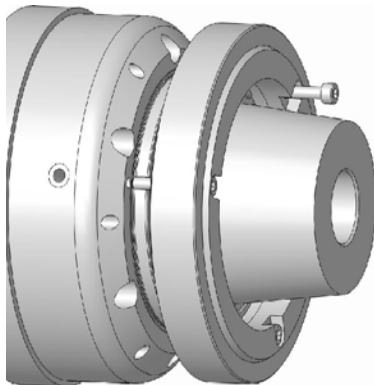


Fig. 30

1. Put the machine tool in set up mode.
2. Remove all tool from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.
5. Loosen, unscrew and remove the cylindrical screws.
6. Remove the work piece end-stop from the segmented mandrel.

7.2.3 Disassembly of the segmented mandrel

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts

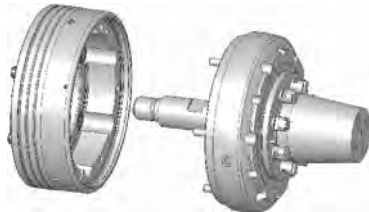


Fig. 31

1. Put the machine tool in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.
5. Loosen, unscrew and remove the allen screws.



WARNING!

Danger of injury due to falling components!

When mounting components can fall and cause severe injury and material damage.

- Two people are always required for this task.
- Use a crane.
- For assembly on a vertically suspended spindle always use a suitable mounting aid.

6. Unscrew the segmented mandrel and the threaded adapter from the draw tube of the machine.
7. Screw in the eye bolts and secure the clamping device with a crane.
8. Remove the segmented mandrel from the flange by using a crane.

7.2.4 Disassembly of the segmented mandrel [bayonet]

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts

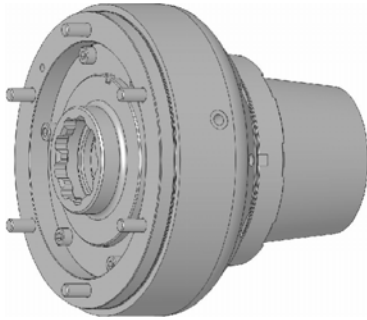


Fig. 32

1. Put the machine tool in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the m
5. Loosen, unscrew and remove the cylindrical screws.
6. Screw in the eye bolts and secure the clamping device with a crane.
7. Unlock the clamping device by turning it in the bayonet.
8. Remove the segmented mandrel from the flange by using a crane.

7.2.5 Disassembling the segmented mandrel by clamping mechanism

Two people are required for this task!

Special tools required:

- Allen wrench
- Crane
- Eye bolts

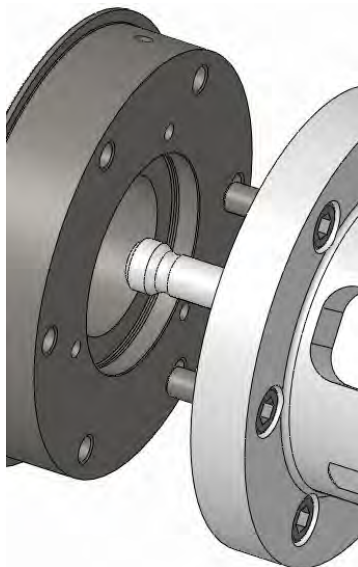


Fig. 33

1. Put the machine tool in set up mode.
2. Remove all tools from the interior of the machine.
3. Set the clamping pressure of the machine tool on the lowest setting.
4. Move the draw tube of the machine tool into the front stop position.
5. Loosen, unscrew and remove the cylindrical screws.
6. Loosen the clamping mechanism of the machine.
7. Remove the segmented mandrel from the flange by using a crane.

7.2.6 Disassembly of the segmented mandrel [quick-change interface]

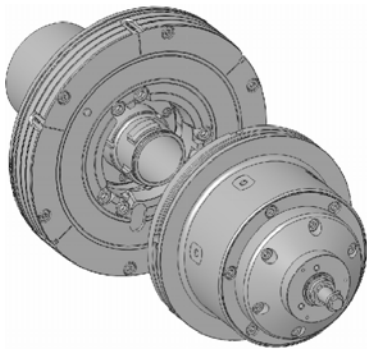


Fig. 34

The disassembly of the segmented mandrel from the quick-change machine adapter is described in the manual of the machine adapter.

7.2.7 Disassembling the flange [optional]

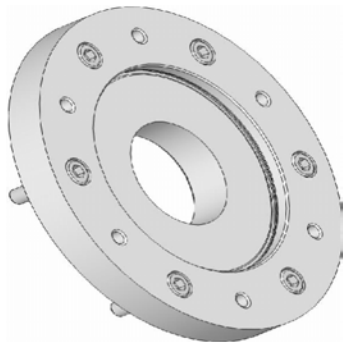


Fig. 35

1. Put the machine tool in set up mode.
2. Loosen, unscrew and remove the cylindrical screws.
3. Remove the flange by hand from the machine spindle.
4. Wipe off the mating surfaces at the machine spindle with a soft, lint-free cloth and remove all oil and grease residues.

7.2.8 Disassembly of the quick-change machine adapter [optional]

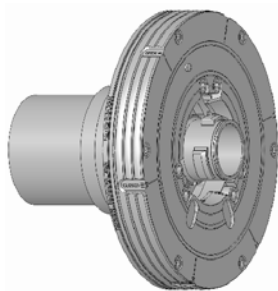


Fig. 36

The disassembly of the quick change machine adapter is described in the manual of the machine adapter.

7.3 Subsequent storage of the clamping device

The clamping device must be cleaned and treated with corrosion protection for subsequent storage [see section »Cleaning«].

**NOTE!**

The storage conditions are specified in the section »Transport, packaging and storage«.

7.4 Disposal

If a return or disposal agreement has not been concluded, then recycle disassembled components.

**CAUTION!****Risk of injury due to leaking fluids!**

Hydraulically or pneumatically operated clamping devices may contain residues of liquids. Uncontrolled leakage of fluids can lead to severe injuries.

- Open the pressure relief screw and drain remaining liquid.
- Discard the liquid.

**NOTE!****Improper disposal causes environmental damage!**

Lubricants and other auxiliary materials are subject to treatment as special waste, and should only be disposed of by approved specialist companies!

**NOTE!****Composite materials!**

For disposal clamping devices which include composite materials [mineral cast, CFK] must be returned at HAINBUCH!

Local municipal authorities or specialized disposal companies provide information on environmentally-responsible disposal.

8 Maintenance

Environmental protection

Comply with the following instructions for environmental protection when performing maintenance work:

- At all lubricating points where lubricant is applied by hand, remove escaping, used, or excess grease, and dispose of it in accordance with applicable local regulations.
- Collect used oil in suitable containers and dispose of it in accordance with applicable local regulations.

8.1 General

Cleanliness of the appropriate end-stop as well as the guidance diameters are conditions for reaching the concentricity and perpendicularity tolerances. Clean these surfaces with an appropriate cleaner.



CAUTION

Danger of injury due to improper handling of cleaners!

Improper handling of cleaners can cause health impairments.

- Always comply with the safety data sheets and guidelines provided by the manufacturer of the cleaning agent for handling/using the cleaners.



CAUTION

Danger of injury due to loss of clamping force!

Fouling of the clamping device can cause the clamping device to lose considerable clamping force.

- Always comply with the maintenance and cleaning intervals specified in this manual.
- In conjunction with the maintenance intervals, regularly check the maintenance status of the clamping device through clamping force measurements.

**NOTE!****Material damage due to use of the wrong cleaning agent/cleaner!**

Seals and clamping elements can be damaged due to use of the wrong seals and clamping elements.

- Do not use any solvents that contain ester or polar solvents for cleaning purposes.

**Risk of injury!**

Slipping while the lubricating with a grease gun can lead to severe cuts!

**WARNING****Risk of injury due to stored energy!**

The clamping device can be designed with disc springs. These disc springs are under permanent tension! The release of the stored energy can cause injuries!

- By loosening the corresponding screws they have to be operated continuously alternately to reduce the clamping pressure to a minimum!
- Particularly cautious approach is required!
- For cleaning and maintenance disassemble the clamping device from the machine!
- Always wear personal protective equipment!

8.2 Cleaning

**NOTE!****Material damage if cleaned with compressed air!**

Cleaning the clamping device with compressed air can force metal chips into thread and grooves. This can damage or even destroy the clamping device.

- Never clean the clamping device with compressed air!

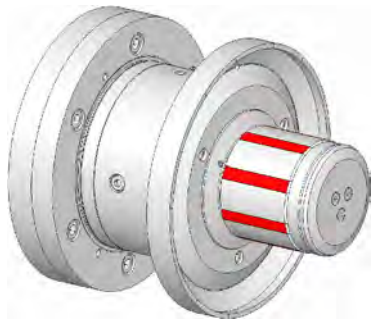


Fig. 37

- Auxiliary material required:
 - Ester-free, non-polar cleaning agent
 - Soft, lint-free cloth
1. Disassemble the clamping device [see section »Disassembling the clamping device«].
 2. Clean all components listed below with cleaning agent and a cloth; remove all oil and grease residues:
 - Flange
 - Clamping unit
 - Taper of the segmented mandrel
 - Reception and inner thread for the clamping unit in the segmented mandrel
 - Work piece end-stop
 - Cylindrical screws

8.3 Preservation

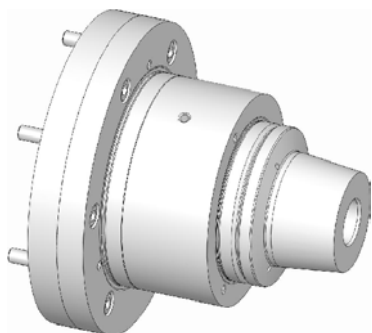


Fig. 38

- Special tools required:
 - Universal grease 2085/0003
 - Grease gun
 - Oil stone
 - Soft, lint-free cloth
1. Disassemble the clamping device [see section »Disassembling the clamping device«].
 2. Hone all the bearing surfaces of the clamping device with an oil stone.
 3. Lightly grease all cylindrical screws. Remove excess grease with a cloth.
 4. Remount the clamping device.
 5. Screw all cylindrical screws into the clamping device again and tighten them finger-tight.



For subsequent storage tightening the cylindrical screws finger-tight suffices. This facilitates re-commissioning and protect the cylindrical screws.

6. Lightly grease all interior and outer surfaces of the clamping device. Remove excess grease with a cloth.
7. Pack the clamping device airtight in foil. Place it on a level, impact-free storage location and safeguard it from falling.

8.4 Use of lubricant

With the usage of lubricant you may only use grease that corresponds to the requirements concerning bond, pressure-stability and solubility in lubricating coolant. In addition no dirt particles may be in the grease; they cause run errors if they come in in-between two mating surfaces.

We recommend for this the following lubricant:

HAINBUCH grease

see product information

Alternatives:

Lubricant	Manufacturer	Product
Universal grease	MicroGleit	GP 355
	Klüber	QNB 50
	Zeller & Gmelin	DIVINOL SD24440
	Bremer & Leguill	RIVOLTA W.A.P.
Special grease	Klüber	MICROLUBE GL 261

8.5 Maintenance schedule

Maintenance tasks are described in the sections above that are required for optimal and trouble-free operation.

If increased wear is detected during regular inspections, then reduce the required maintenance intervals according to the actual indications of wear.

Contact the manufacturer, [see the service address on the back] if you have questions concerning maintenance tasks and intervals.

Interval	Maintenance task
Daily	Visual inspection and complete cleaning in case of heavy contamination [see section »Cleaning«], especially at the clamping and end-stop face to avoid damages at the clamping device and the clamping elements early.
Each 36 operating hour	Clean the clamping device and the clamping unit [see section »Cleaning«].
	Clean the clamping taper [see section »Cleaning«].
	Grease the clamping device [see section »Preservation«].
Every 6 months	Completely disassemble and clean the clamping unit [see section »Cleaning«].



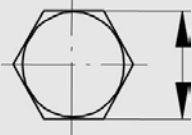
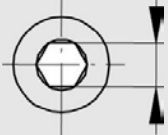
For proper operation of the coolant feed a prefiltering with duplex filter (mesh size 100 µm, PI 3754) is necessary. The duplex filter is mounted on the coolant cleaning system.

8.6 Bolt torque

Metric ISO thread

The guide values for bolt tightening torque for achieving the highest permissible pre-tension for metric ISO thread are specified in Nm in the table.

- Total friction coefficient $\mu_{\text{tot}} = 0,12$

Diameter	 [mm]	 [mm]	Torque for screw quality 10.9 [Nm]
M 4	7	3	4
M 5	8	4	7
M 6	10	5	12
M 8	13	6	25
M 10	17	8	50
M 12	19	10	100
M 16	24	14	220
M 20	30	17	400
M 24	36	19	600

The table shows the prescribed values.

Knowledge of the applicable guidelines and configuration criteria are the prerequisites.

9 Trouble shooting

Possible fault causes and the tasks to correct these faults are described in the following section.

If faults occur more frequently, the maintenance intervals must be shortened to correspond to the actual system load.

Contact the manufacturer if there are faults that cannot be corrected by following the instructions below; see the service address on the back of this operating instruction.

9.1 Safety

Trouble shooting

The following always applies:

1. For faults that pose a direct danger for personnel and or property immediately execute the emergency-stop function of the machine.
2. Determine the cause of the fault.
3. If correction of the fault requires work in the danger zone, put the machine in set-up mode.
4. Immediately inform the responsible parties at the installation site of the fault.
5. Depending on the type of fault, either have authorized specialized personnel correct the fault, or correct it yourself.



The trouble shooting table provided below lists personnel who are authorized to correct the fault.

6. If there is a fault that was not caused by the clamping device the cause of the fault may be in the machine area. See the operating manual for the machine in this regard.

9.2 Trouble shooting table

Fault	Possible cause	Fault correction	Corrected by
Clamping unit cannot be changed	Safety screw not loosened.	Unscrew the safety screw a bit [see section »Disassemble the clamping unit«].	Specialist
Clamping device does not open or release stroke is insufficient	Fouling between the draw mechanism and the clamping unit	Remove the clamping unite, move the draw tube back and clean the coupling area [see section »Disassembling the clamping unit«].	Specialist
	Dimensional deviation of the draw tube adapter	Check the dimensions of the draw tube adapter and correct them if necessary.	Specialist
Clamping force is too low	Work piece is over-dimensioned	Replace with a suitable clamping unit	Specialist
	Insufficient hydraulic pressure on the clamping cylinder	Check the machine side hydraulic aggregate	Hydraulic specialist
	Defective clamping cylinder or blocked draw tube	Contact the machine manufacturer	Machine manufacturer
Eccentric dimensional deviation on the work piece	Concentricity error of the segmented mandrel	Check the concentricity at the taper of the segmented mandrel, correct if necessary [see section »Checking and adjusting the face run and the concentricity«].	Specialist

Fault	Possible cause	Fault correction	Corrected by
Dimensional deviation on the work piece	Contaminated coupling area	Clean the coupling area of the clamping device [see section »Cleaning«].	Specialist
	Contaminated clamping taper	Disassemble the clamping unit and clean the clamping taper [see section »Cleaning«].	Specialist
Formal defect on the work piece	Elastic deformation of feedstock that is subject to formal defects. After machining the workpiece returns to its original form.	Use feedstock with fewer formal defects. If technically justifiably reduce the clamping pressure.	Specialist
Marks on the clamping surface	Point or linear work piece clamping	Replace with a clamping unit that has a smoother clamping surface	Specialist
	Excessive dimensional difference between the work piece diameter and the clamping bore	Replace with a clamping unit that has a suitable clamping bore	Specialist

9.3 Start-up after corrected fault

After correcting the fault execute the following steps to start up again:

1. Reset the emergency-stop device
2. Acknowledge the fault on the machine tool controller
3. Ensure that no one is in the danger zone
4. Start the machine tool

10 Appendix

10.1 Service Hotline

Order Hotline

Quickly ordered and delivered. A call is all it takes:
+49 7144. 907-333

Schedule Hotline

Current status of your order? Just call:
+49 7144. 907-222

24h emergency call

Has there been a crash or other technical emergency?
Our experts are at your service around the clock:
+49 7144. 907-444

10.2 Representatives

The sales partners and service employees listed below
are available for further consultation or support.

10.2.1 Europe

Austria

HAINBUCH in Austria GmbH
SPANNENDE TECHNIK
Pillweinstr. 16
5020 Salzburg
Phone +43 662 825309
E-mail: verkauf@hainbuch.at
Internet: www.hainbuch.com

Belgium

BIS Technics bvba/sprl
Zevenputtenstraat 20
3690 Zutendaal
Phone +32 89518890
Fax +32 89518899
E-mail: info@bistechnics.com
Internet: www.bistechnics.com

Austria

GGW Gruber & Co. GmbH
Kolingasse 6
1090 Vienna
Phone +43 13107596-0
Fax +43 13107596-31
E-Mail: office@ggwgruber.com
Internet: www.ggwgruber.com

Czech Republic,

TMC CR s.r.o.
Masná 27/9
60200 Brno
Phone +420 533433722
Fax +420 548217219
E-mail: info@tmccr.cz
Internet: www.tmccr.cz

Denmark

Jørn B. Herringe A/S
Ramsømagle
Syvvejen 31
4621 Gadstrup
Phone +45 46170000
Fax +45 46170001
E-mail: sales@jhb-tools.dk
Internet: www.jbh-tools.dk

Finland

Oy Maantera Ab
PL 70 Keinumäenkuja 2
01510 Vantaa
Phone +358 29006130
Fax +358 290061130
E-mail: maantera@maantera.fi
Internet: www.maantera.fi

France

Representative for: Haute Savoie
Utilis France Sarl
597, Avenue du Mont Blanc
74460 Marnaz
Phone +33 450963630
Fax +33 450963793
E-mail: contact@utilis.com
Internet: www.utilis.com

Greece

PAPET Papadopoulos GbR
Martinstrasse 68
DE-73061 Ebersbach/Fils
Phone +49 71635858/530668
Fax +49 716352265
E-mail: paris@papet-technologies.de

Estonia, Latvia, Lithuania

DV-Tools OÜ
Peterburi tee 34/4
11415 Tallinn
Phone +372 6030508
Fax +372 6030508
E-mail: info@dv-tools.ee
Internet: www.dv-tools.ee

France

HAINBUCH France SNC
Equipements de machines-outils
ZI Lons-Perrigny
1600, Route de la Lième
39570 Lons-le-Saunier
Phone +33 384876666
Fax +33 384876677
E-mail: info@hainbuch.fr
Internet: www.hainbuch.com

Great Britain

HAINBUCH UK Ltd.
WORKHOLDING TECHNOLOGY
6 Newmarket
Keys Business Village, Keys Park Road
Hednesford, Staffordshire
WS12 2HA
Phone +44 1543 478710
Fax +44 1543 478711
Mobile +44 7980212784
E-mail: nick.peter@hainbuch.co.uk
Internet: www.hainbuch.com

Hungary

GIMEX Hydraulik GmbH
Selyem utca 1.
9025 Györ
Phone +36 96525588
Fax +36 96427239
E-mail: info@gimex.hu
Internet: www.gimex.hut

Ireland

HAINBUCH UK Ltd.
WORKHOLDING TECHNOLOGY
 6 Newmarket
 Keys Business Village, Keys Park Road
 Hednesford, Staffordshire
 WS12 2HA
 Phone +44 1543 478710
 Fax +44 1543 478711
 Mobile +44 7980212784
 E-mail: nick.peter@hainbuch.co.uk
 Internet: www.hainbuch.com

Netherlands

BIS Specials
 [Brandenburg Industry Service Dongen BV]
 Dreef 7
 6996 BA Drempt
 Phone +31 313482566
 Fax +31 313482569
 E-mail: info@bisspecials.com
 Internet: www.bisspecials.com

Poland

BIM Sp.z.o.o.
 ul. Wysogotowska 9
 62081 Przemierowo
 Phone +48 616232041
 Fax +48 616232040
 E-mail: bim@bazafirm.pl

Russia

ROSNA Engineering LLC
 Sveaborgskaya street, 12, Letter »A«, office
 20N,
 196105 Saint-Petersburg
 Phone +7 812 4016767
 Fax +7 812 4016767
 E-mail: rosna@rosna.spb.ru
 Internet: www.rosna.spb.ru

Slovenia

Elmetool d.o.o.
 Prvomajska ulica 62
 5000 Nova Gorica
 Phone +386 53303300
 Fax +386 53303304
 E-mail: info@elmetool.si

Italy

HAINBUCH Italia srl
 Via Caduti di Nassiriya 5
 22036 Cantu [Co]
 Phone +39 0313355351
 Fax +39 031611570
 E-mail: info@hainbuchitalia.it
 Internet: www.hainbuchitalia.it

Norway

Onstad Maskin A/S
 Chr. H. Blomsgt. 13
 3717 Skien
 Phone +47 35532373/74
 Fax +47 35532375
 E-mail: postmaster@onstadmaskin.no
 Internet: www.onstadmaskin.no

Romania

Banatech srl. – connecting technologies
 Ep. Miron Cristea 26
 325400 Caransebes, Caras Severin
 Phone +40 255517175
 Fax +40 355814125
 Mobile +40 749220553
 E-mail: office@banatech.ro
 Internet: www.banatech.ro

Slovakia

NS s.r.o.
 Vácka ulica 4109/10
 01841 Dubnica N/V
 Phone +421 424450873
 Fax +421 424440406
 E-mail: tns@tnssro.sk
 Internet: www.tnssro.eu

Spain, Portugal

ATM S.L
 C/. Gran Bretanya, 16
 Pol. Ind. Pla de Llerona
 08520 Les Franqueses del Vallès
 [Barcelona]
 Phone +34 938700885
 Fax +34 938791689
 E-mail: atm.sl@atmbarcelona.com

Sweden

HAINBUCH Svenska AB
SPÄNNANDE TEKNIK
 Kemistvägen 17
 18379 Täby
 Phone +46 87327550
 Fax +46 87327650
 E-mail: hainbuch@hainbuch.se
 Internet: www.hainbuch.com

Turkey

Hidkom
 Organize Sanayi Bölgesi
 75. Yil CD. Demirciler Sit. B Blok No.2
 16159 Nilüfer / Bursa
 Phone +90 2242438292
 Fax +90 2242436365
 E-mail: hidkom@tr.net
 Internet: www.hidkom.com

Switzerland

Utilis Müllheim AG
 Präzisionswerkzeuge
 Kreuzlinger Strasse 22
 CH-8555 Müllheim
 Phone +41 527626262
 Fax +41 527626200
 E-mail: info@utilis.com
 Internet: www.utilis.com

10.2.2 America**Argentina**

HAINBUCH America Corp.
WORKHOLDING TECHNOLOGY
 W129N10980 Washington Dr.
 Germantown, WI 53022
 U.S.A
 Phone +1 4143589550
 Fax +1 4143589560
 E-mail: sales@hainbuchamerica.com
 Internet: www.hainbuchamerica.com

Canada

HAINBUCH America Corp.
WORKHOLDING TECHNOLOGY
 W129 N10980 Washington Dr.
 Germantown, WI 53022
 U.S.A
 Phone +1 4143589550
 Fax +1 4143589560
 E-mail: sales@hainbuchamerica.com
 Internet: www.hainbuch.com

Brasil

SSanposs Tecnologia
 Suprimentos e Consultoria Internacional Ltda.
 Rua Cândia n° 65 - Jardim do Mar
 CEP: 09726-220
 São Bernardo do Campo - São Paulo
 Phone +55 11 41266711
 Fax +55 11 41266710
 E-mail: tsci@sanposs.com.br
 Internet: www.sanposs.com.br

Canada

Representative for: Ontario, Québec
J.Winkel & Associates Inc.
 6516 Warbler Lane
 L5N 6E1 Mississauga, Ontario
 U.S.A
 Phone +1 4143589550
 Fax + 1 4143589560
 E-mail: sales@hainbuchamerica.com
 Internet: www.hainbuch.com

Mexico

HAINBUCH America Corp.
 WORKHOLDING TECHNOLOGY
 W129 N10980 Washington Dr.
 Germantown, WI 53022
 Phone +1 4143589550
 Fax +1 4143589560
 E-mail: sales@hainbuchamerica.com
 Internet: www.hainbuch.com

USA

HAINBUCH America Corp.
 WORKHOLDING TECHNOLOGY
 W129 N10980 Washington Dr.
 Germantown, WI 53022
 Phone +1 4143589550
 Fax +1 4143589560
Se habla español:
 Tel +1 2143268081
 E-mail: sales@hainbuchamerica.com
 Internet: www.hainbuch.com

10.2.3 Asia

China

HAINBUCH Shanghai Co. Ltd.
 WORKHOLDING TECHNOLOGY
 Room 611-612 BaoHong Center
 No. 7755 Zhongchun Road
 Minhang District, Shanghai 201101
 Phone +86 2120916384
 Fax +86 2120916383
 E-mail: sales@hainbuch.cn
 Internet: www.hainbuch.cn

India

M'la Sales Corporation
 5, Yeshwantnagar
 Telco-Century Enka Road
 Pimpri, Pune 411018
 Phone +91 20 27477405
 Fax +91 20 27464249
 E-mail: info@m-la-sales.com
 Internet: www.m-la-sales.com

India

A.H. Rao
 Technical Consultant to HAINBUCH
 Ground Floor, # 4157, 14th Main
 HAL 2nd Stage, Indiranagar
 Bangalore 560 008
 Phone +91 8041463972
 Mobile +91 9986997959
 E-Mail: ahr.rao@gmail.com

Indonesia

PT. STAHL ARBEIT
 WTC Mangga Dua 2nd Floor A-6
 Jl. Mangga Dua Raya No. 8
 Level 2 Blok C No. 41-45
 Jakarta 14430
 Phone +62 21 3777 6622
 Fax. +62 21 3001 8070
 E-mail: info@stahl-arbeit.com
 Internet: www.stahl-arbeit.com

Israel

M.T.M. Machine Tools Marketing Ltd.
 26 Hakishor St.
 Holon 58867
 Phone +972 36479560
 Fax +972 36479578
 E-mail: sales@mtm.co.il
 Internet: www.mtm.co.il

Japan

NK Works Co LTD
 2-17-17 Iwamoto-cho, Chiyoda-ku
 Tokyo, 101-0032
 Phone +81 338645411
 Fax +81 338646752
 E-mail: info@nk-works.co.jp
 Internet: www.nk-works.co.jp

Korea

Kimi Co.
B-101 98 Okgucheondongro Siheung-Si
429-925 Gyeonggi-Do
Phone +82 24137911
Fax +82 24137910
E-Mail: kimi@kimigroup.co.kr

Taiwan

GSTC Technology Co., Ltd.
No. 418, Youn-Chun East 1st Rd
Taichung City 40877, Taiwan'
Phone +88 6423805678
Fax +88 6423805511
E-mail: gstc@seed.net.tw
Internet: www.gstctech.com.tw

Malaysia, Singapore & Vietnam

Jebsen & Jessen Technology [S] Pte Ltd.
Process Engineering Division
18 Enterprise Road
Singapore 629824
Phone +65 63053692
Fax +65 63053699
E-mail: phillip_lee@jjsea.com
Internet: www.jjsea.com

Thailand

HAINBUCH [Thailand] Co. Ltd
WORKHOLDING SOLUTIONS
2/25 Sukhapiban 2 Road Prawet,
Prawet, Bangkok 10250
Phone +662329 0622/23
Fax +662329 0624
E-Mail: info@hainbuch.co.th
Internet: www.hainbuch.com

10.2.4 Australia**Australia**

Romheld Automation Pty Ltd
Unit 30 115 Woodpark Road
Smithfield . NSW. 2164
Phone +61 297211799
Fax +61 297211766
E-mail: sales@romheld.com.au
Internet: www.romheld.com.au

10.2.5 Africa**South Africa**

South Africa Retecon [PTY] Ltd.
P.O. Box 1472
1620 Kempton Park
Phone +27 119768600
Fax +27 113942471
E-mail: tools@retecon.co.za
Internet: www.retecon.co.za



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SPANNENDE TECHNIK

HAINBUCH GMBH
SPANNENDE TECHNIK
PO Box 1262 · DE-71667 Marbach
Erdmannhäuser Straße 57 · DE-71672 Marbach
Phone +49 [0]7144. 907-0
Fax +49 [0]7144. 18826
verkauf@hainbuch.de
www.hainbuch.com
24h-Emergency call +49 [0]7144. 907-444