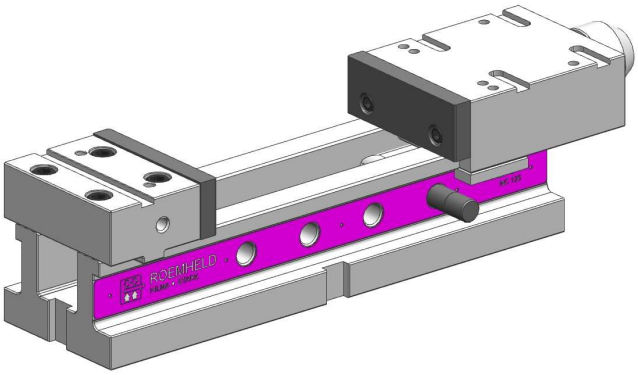
Machine vices

Jaw width 100 mm, 125 mm, 160 mm, hydraulic



Contents

1 Description of the product

Description

The products are intended for universal workpiece clamping on machine tools. They are fitted with hydraulic clamping slides.

The hydraulic power stroke is generated by an external pressure transmitter. The return spring ensures the clamping slide can open quickly. After the cotter pin is pulled, the clamping slide can be pushed into another clamping range or pulled out completely. The hand crank can be used to fine tune the clamping range.

Intended use

The products are intended for processing dimensionally stable workpieces in single or multiple clamping devices.

The products are suitable both for serial production and for individual production on 3-axle devices.

2 Validity of documentation

This documentation is valid for the products:

Products listed on catalogue page WS 13080. This includes the types/order numbers:

- 3080,

3 Target groups

Specialists, technicians and machine and system fitters who have specialist knowledge of hydro-mechanical equipment.

Personnel qualifications

Specialist means personnel must:

- be able to read and fully understand technical specifications such as wiring diagrams and product-specific drawings,
- have specialist knowledge about the function and structure of the relevant components.

A person is considered to be a **specialist** if they have sufficient knowledge because of their specialist training and experience, and are sufficiently familiar with the applicable regulations, that they:

- can assess work that they are assigned,
- can recognise potential dangers,
- can take the necessary measures to eliminate dangers,
- know the generally accepted standards, regulations and guidelines in their industry,
- have the required repair and assembly skills.

4 Symbols and signal words

⚠ WARNING

Personal injuries

Marks a situation that could be dangerous.

If this situation is not avoided, it could result in death or serious injury.

⚠ CAUTION

Minor injuries/damage to objects

Marks a situation that could be dangerous.

If this situation is not avoided, it could result in minor injury or damage to property.

Dangerous to the environment

This symbol marks important information for the proper handling of materials that pose a danger to the environment.
Ignoring this information could result in serious environmental damage.

Mandatory sign

This symbol marks important information about required equipment, such as protective equipment.

NOTE

- This symbol marks user tips or especially useful information. This is not a signal word for a dangerous or potentially harmful situation.

5 For your safety

5.1 Basic information

The operating manual is to inform users and to help in the avoidance of danger when fitting the products in the machine, as well as provide information on transport, storage and maintenance.
Accidents and property damage can only be avoided and the proper functioning of the products can only be ensured if this manual is strictly observed.
Following the operating manual will also:

- help avoid injuries,
- reduce downtime and repair costs,
- increase the service life of the products.

5.2 Safety information

The product has been manufactured in accordance with the generally accepted standards of engineering.
Comply with the safety information and descriptions of operations in this manual to avoid personal injury and property damage.

- Read this manual thoroughly and in full before working with the product.
- Store the manual in a place that is accessible to all users at all times.
- Observe all valid safety, accident prevention and environmental protection regulations in the country in which the product is used.
- Use the Roemheld product only when it is in a technically flawless condition.
- Observe all information printed on the product itself.
- Use only accessories and replacement parts authorised by the manufacturer to rule out the possibility of unsuitable replacement parts placing personnel at risk.
- Comply with the general principles of proper use.
- You must only switch the product on after ascertaining that the incomplete machine, or the machine in which the product is to be fitted, complies with the country-specific provisions, safety regulations and standards.
- Carry out a risk assessment for the (incomplete) machine. Because of the ways in which the product might interact with the machine/device and with the environment, risks may arise that can only be determined and minimised by the user, e.g.:
  - forces generated,
  - movements generated,
  - the influence of hydraulic and electrical control,
  - etc.
- During all work steps, the personal protective device must be used.

6 Usage

6.1 Proper use

The products are intended for tensioning workpieces in industrial contexts only. It must only be operated using hydraulic oil.
Proper use also implies the following:

- The product must be used within the nominal performance limits given in the technical data (see catalogue page).
- The product must be used in the manner described the operating manual.
- The maintenance intervals must be observed.
- Personnel must be qualified or trained in a manner appropriate for their activities.
- Replacement parts that are fitted must have the same specifications as the original parts.
- Only HLP hydraulic oils must be used.
- Only clamping jaws must be moved.

6.2 Improper use

⚠ WARNING

Potential for injury, property damage or malfunction!

- Do not modify the product!

The product must not be used:

- In domestic environments.
- On palettes or tool tables in forming/reforming machines.
- If it could cause damage to the product or the seals because of physical/chemical effects (vibrations, welding currents etc.).
- In machines, palettes or tool tables that are used to change material properties (e.g. magnetising, radiating, photochemical processes etc.).
- In areas in which special regulations apply, especially for devices and machines:
  - For use in fairgrounds and amusement parks.
  - In food processing or in areas with special hygiene provisions.
  - For military purposes.
  - In mines.
  - In explosive and aggressive environments (e.g. ATEX environments).
  - In medical engineering environments.
  - In air and aerospace travel.
  - In passenger transport.
- In different operating and environmental conditions, e.g.:
  - At greater operating pressures than specified in the catalogue page or in the installation drawing.
  - With pressure fluids that do not comply with the specifications.
  - With volume flow rates greater than those specified in the catalogue page or installation drawing.

Special solutions are available on request!

7 Assembly

⚠ WARNING

Risk of injury from high-pressure injection (spraying hydraulic oil under high pressure)!

- Improper connection can result in oil escaping at the connections under high pressure.
- Assemble/disassemble the element only when the hydraulic system is depressurised.
- The hydraulic line must be connected in accordance with DIN 3852/ISO 1179.
- Close off unused connections properly.
- Use all drill holes for fastening.

Risk of injury from high-pressure injection (spraying hydraulic oil under high pressure)!

Wear, damage to the seals, age and incorrect installation of the seal set by the operator can result in oil escaping under high pressure.

- Carry out a visual inspection before using the product.

Risk of injury from falling parts!

- Keep hands and other body parts away from the working area.
- Wear personal protective equipment!

Poisoning from contact with hydraulic oil!

Wear, damage to the seals, age and incorrect assembly of the seal set by the operator can result in oil escaping.

Improper connection can result in oil escaping at the connections.

- When dealing with hydraulic oil, take note of the information in the safety data sheet.
- Wear personal protective equipment.

⚠ CAUTION

Danger of heavy weights falling

- Some product types are quite heavy. These must be secured against falling during transport.
- Weight information can be found in the chapter “Technical Data”.

NOTE

Abrasive media

If there is any possibility that abrasive cutting and cooling fluids with shavings could get into the interior of the clamping slide, the interior of the clamping slide must be cleaned by the customer.

Ease of movement

Pay attention to ease of movement during assembly!

7.1 Structure

The hydraulic power stroke is generated by an external pressure transmitter. The return spring ensures the slide can open quickly. After the locking pin is pulled, the clamping slide can be pushed into another clamping range or pulled out completely. The hand crank can be used to fine tune the clamping range.

NC Series

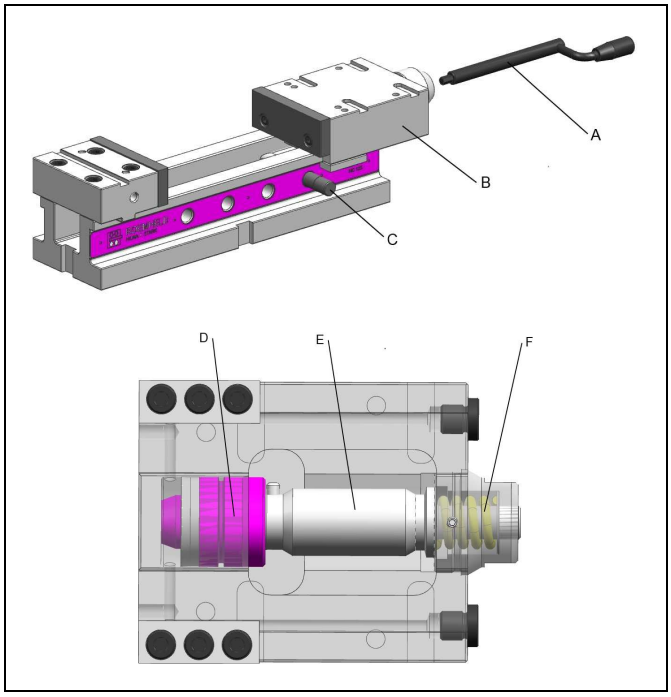


Fig. 1: Components for NC series

A	Hand crank	D	Piston
B	Clamping slide	E	Spindle
C	Cotter pin	F	Return spring

7.2 Types of installation

⚠ WARNING

Danger of injury if product is improperly fastened!

Fastening the product improperly can result in the product being loosened from or damaged by the machine bench when it is tightened or worked on.

- Mount the product in accordance with the instructions in this operating manual.
- Before mounting the product, ensure that the mounting surface of the product base and the machine bench are clean.
- The mounting surface of the product base must be level and at least 75% of it must be in contact with the machine bench when it is lying on it.
- Mount the product using the torque specified in the operating manual.
- Fix the product in place so that it cannot be moved by the forces produced while working with the product.

Risk of crushing, burns and broken bones from falling workpieces!

Workpieces may fall during work and cause injury.

- Wear protective shoes with at least safety level 1 (S1) while working.

Danger of injury from improperly inserted hand crank/pinned torque spanner!

An improperly inserted hand crank/pinned torque spanner might slip when cranking or tightening and injure the operator.

- Check that the hand crank/torque spanner are fitted correctly.

Danger of injury from limited hand crank/torque spanner range of motion!

When cranking/tightening, limbs or objects in the hand crank's or torque spanner's range of motion might be crushed between the hand crank or the torque spanner.

- The entire range of motion of the hand crank and the torque spanner must be kept freely accessible.

NC Series

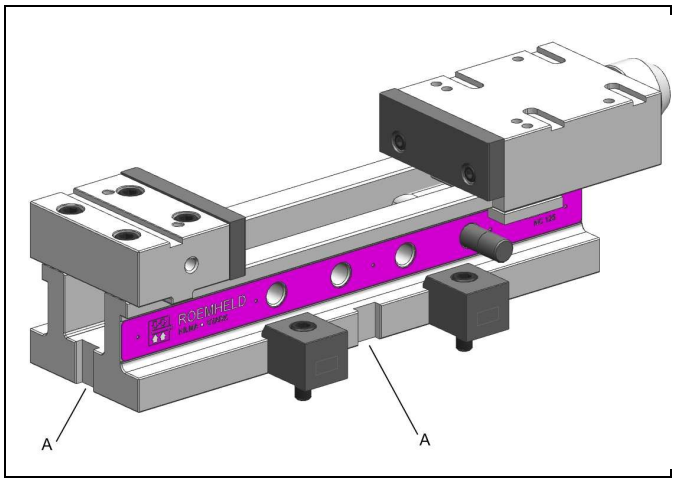


Fig. 2: Types of installation for NC series with aligning grooves (A)

Fastening to machine bench:

1. Remove bumps and shavings between the plating and the base area.
2. Align
   - with the dial gauge,
   - with slot nuts.
3. Fasten
   - with screws,
   - clamping jaws.

Special fastening sets can be ordered for each series.

8 Commissioning

⚠ WARNING

Poisoning from contact with hydraulic oil!

Wear, damage to the seals, age and incorrect assembly of the seal set by the operator can result in oil escaping.

Improper connection can result in oil escaping at the connections.

- When dealing with hydraulic oil, take note of the information in the safety data sheet.
- Wear personal protective equipment.

Danger of injury from high-pressure injection if product is improperly handled!

If the hydraulic system is improperly handled, liquids may spray out of the hydraulic system and injure personnel.

- Work on hydraulic equipment must only be carried out by qualified personnel with the appropriate skills in this field.

NOTE

Oil before commissioning

The elements are supplied with a minimal level of lubrication.

Before commissioning, sliding surfaces must be lightly oiled with slideway oil ISO VG 220.

- Check for proper fit (check fastening screw tightening torques).

NOTE

Operating the product on grinding machines

When using the product on grinding machines, more dirt will accumulate on the product.

- Remove dirt from the product at regular intervals.

Take note of clamping force and temperature difference

The product must be used in such a way that the temperatures produced do not result in unduly high clamping forces. Note the following points in particular:

- The resistance of the seals.
- The expansion of media.
- The product's permitted temperature difference when under tension is maximum +/- 10 °C.

⚠ WARNING

Danger of injury or damage to objects caused by collision with system parts!

Personnel within the range of motion of system parts may be injured by collision with the parts or objects may be damaged through collision with system parts.

- Check the range of motion of the system parts for collisions before commissioning.

9 Operation

⚠ WARNING

Vibrations will loosen the product!

Vibrations will adversely affect the workpiece fastenings and will result in an improperly fastened workpiece. An improperly fastened workpiece may be ejected from the product during work and injure personnel or cause damage to objects.

- Avoid vibrations affecting the product as far as possible.

Danger of burning from hot workpieces!

Hot workpieces may cause burns to parts of the body.

- Wear heat-resistant protective clothing.

Danger of injury when tightening the workpiece!

The properties of the workpiece can cause injuries to personnel during the clamping process if the workpiece is not properly clamped.

- Remove any dirt from the clamp surfaces before clamping.
- Take note of the workpiece's material properties when clamping.
- Take note of the workpiece's shape when clamping.
- Take note of the workpiece's clamping surface when clamping.
- Take note of the workpiece's mass inertia when clamping.

Danger of injury from improperly secured locking pin!

If the locking pin is not properly secured, it may slip out of its safety mechanism. An unsecured locking pin in the product may cause the clamping slide to slip from the base and cause injuries.

- Check the locking pins before clamping to ensure that they are properly secured.

⚠ CAUTION

Danger of injury from limbs being crushed during clamping

The product must be used in such a way that the operator's own, or other people's, limbs cannot be crushed during clamping.

- Keep the clamping area free of your own and others' limbs during clamping.

Danger of injury from physical exertion when clamping and releasing the product

When unclamping the product, greater forces must be overcome at first. This physical exertion may cause persons to slip when unclamping the product and be injured.

- Loosen the clamp slowly and carefully.

NOTE

Working with the crank or torque spanner still attached is not permitted

The crank and torque spanner must not still be attached to the product during work.

- Before working with a workpiece, remove the crank and torque spanner from the product.

9.1 Setting the clamp range

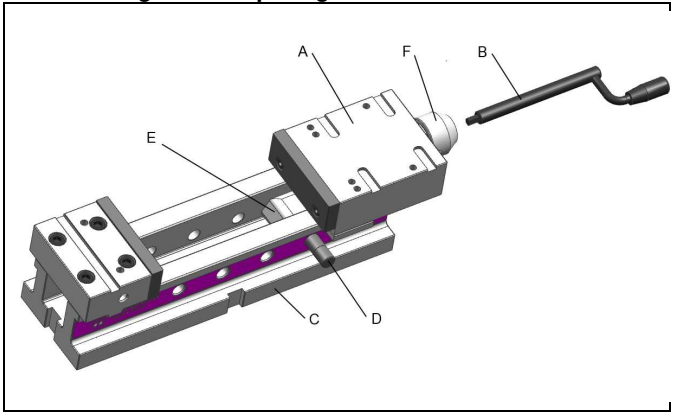


Fig. 3: Setting the clamp range

A Clamping slide	D Cotter pin
B Hand crank	E Bracket nut
C Base	F Rotation lock

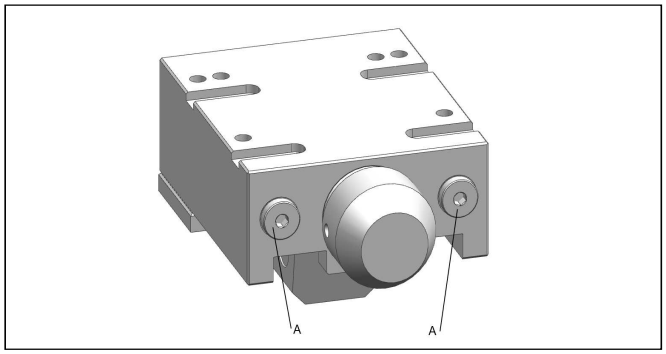
- Pull out the cotter pin and push the clamping slide far enough that the workpiece can be inserted.
- Push the clamping slide against the workpiece.
- Turn the hand crank until the bracket nut has moved in the base so that the cotter pin can be inserted through the base and the bracket nut until it stops.
- Insert the cotter pin.
- Set the amount of play during the insertion by turning the hand crank. BB100 = 3 mm, BB125 = 3 mm, BB160 = 5 mm
- Remove the hand crank and push the rotation lock onto the clamping slide bearing cap.

The entire power stroke must not be used as play during insertion because the clamping slide will then hit the interior stop in the machine when clamping and the workpiece will not be clamped. When working with soft components, the slide must be closed before clamping using the hand crank where necessary.

9.2 Pressurised oil connection

The clamping slide will be connected to the hydraulic unit using a high-pressure hose at one of the two oil connections G1/4. The second connection will be used at a lower unit pressure setting to vent the system without bubbles.
Oil recommendation: HLP32 or HLP46 as described in DIN 51524

The pressure gauge should work intermittently and be fitted with a means of monitoring pressure and a machine safety device. The pressure monitoring device will switch the pump back on after a brief period once the pressure has fallen by 10%. If the pressure falls by 15%, the machine will be shut down by the machine safety device.



A	Pressurised oil connection G1/4

9.3 Clamping and releasing

⚠ WARNING

Danger of injury from flexible workpieces or workpieces clamped with insufficient force!

Flexible workpieces or workpieces clamped with insufficient force may slip from the machine or fall and injure a person during work.

- Only use the product to clamp rigid workpieces.
- Clamp the workpiece with sufficient force before beginning work.

Danger of injury from insufficient clamping force on the workpiece!

Insufficient clamping force being set on the product or workpieces clamped with insufficient force may cause slippage from the machine or a fall, injuring a person during work.

- After a long period out of commission, after maintenance and at regular intervals, have the product checked by a qualified professional for operational safety.
- Have the product checked by a qualified professional for the defined clamping force.
- Have the product checked by a qualified professional for visible damage or wear.
- Before commissioning the product, check whether it is properly fastened in place.
- Before commissioning the product, check whether the workpiece is securely clamped.

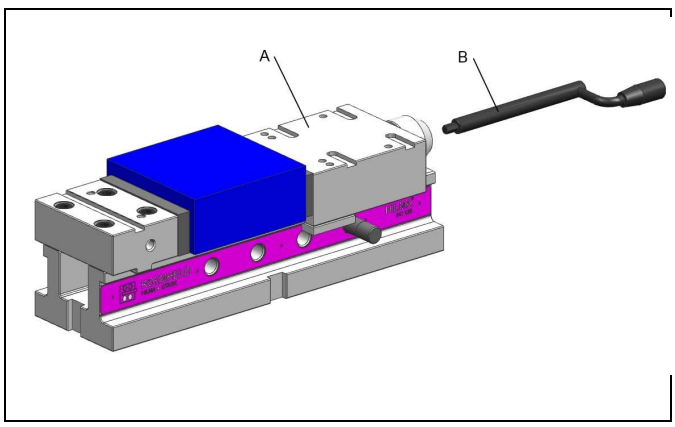


Fig. 4: Clamping and releasing

A	Clamping slide
B	Hand crank

Switching on the hydraulic unit will clamp the workpiece proportionately to the pressure that is set, see technical data 12. To release the workpiece, activate a way valve so that the integrated spring pushes the slide back into the starting position.

9.4 Clamping and releasing with the gripper

To compensate for the plastic deformation of the workpiece during clamping with the gripper, the clamp must be applied twice as described in the chapter Clamping and Releasing, 9.2.

NOTE

Loss of clamping force around the gripper

The first time the workpiece is clamped with the gripper, there will be deformation on the workpiece around the gripper. This deformation means the workpiece will no longer be clamped with sufficient force and must be clamped again in a second clamping procedure.

- After the workpiece is clamped for the first time, do not move it. Clamp it again.

9.4.1 Brake for clamping slide (as accessory for NC series)

⚠ CAUTION

Danger of crushing by falling clamping slide without brake

When the product is used vertically with the cotter pin pulled out, the clamping slide will not stay in position without the brake being mounted. Without the brake being mounted, the clamping slide will fall down along the base and could crush limbs.

- Mount the brake before using the product vertically.

Danger of crushing by falling clamping slide without pneumatic spring

When the product is used vertically with the cotter pin pulled out, the clamping slide will not stay in position without the pneumatic spring being mounted. Without the pneumatic spring being mounted, the clamping slide will fall down along the base and could crush limbs.

- Mount the pneumatic spring before using the product vertically.

Danger of injury because of damage to the pneumatic spring!

The pneumatic spring is under high pressure. If you try to open or overheat the pneumatic spring, pressure will escape from the pneumatic spring and could injure personnel.

- Do not open the pneumatic spring.
- Do not heat the pneumatic spring to above 80 °C.
- After it has been stored for a long period, check that the pneumatic spring is functioning properly.

Danger of crushing - clamping slide will push back automatically!

When set up vertically and when the cotter pin has been pulled out, the pneumatic spring will push the clamping slide backwards and may crush limbs in the process.

- Keep the clamping slide's range of motion clear of body parts and objects before pulling out the cotter pin.

NOTE

Vertical set-up with brake

Only products BB 100 and BB 125 are suitable for vertical set-ups.
The brake must be retrofitted if you wish to use a vertical set-up.

9.4.2 Brake for clamping slide BB 100 and BB 125

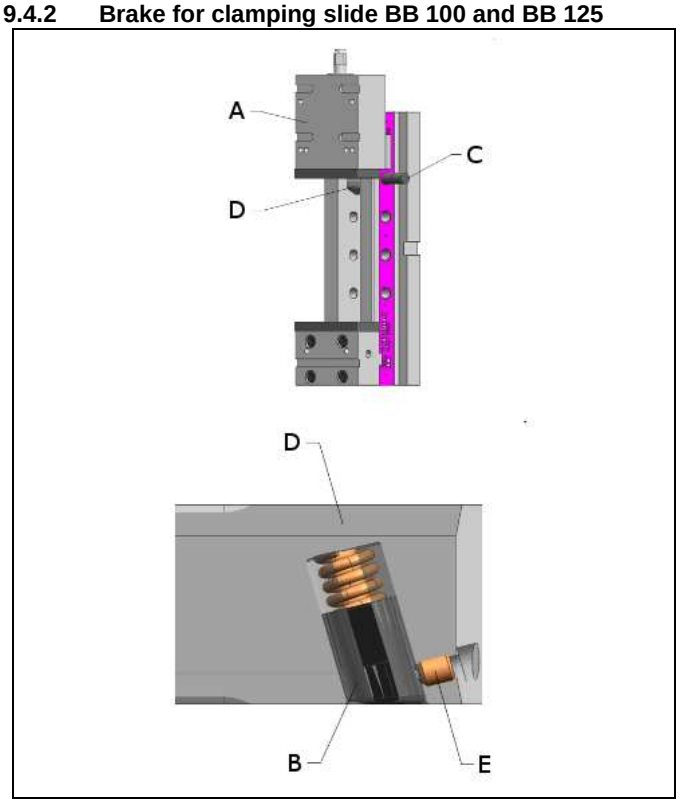


Fig. 5: Brake for clamping slide BB 100 and BB 125

A Clamping slide	D Bracket nut
B Brake	E Clamping screw
C Cotter pin	

The brake is not fitted as standard upon delivery. This allows the clamping range to be set easily if a horizontal set-up is used.

Fitting the brake

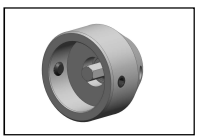
- Pull out the cotter pin.
- Pull the clamping slide to the end of the guide.
- Insert the pressure piece, pressure spring and clamping screw into the bracket nut.

Release the brake

- Push the brake into the bracket nut.
- Tighten the clamping screw.

9.4.3 Rotation lock for clamping slide

After the clamping range is set, push the rotation lock onto the clamping slide bearing cap. To do this, align the hex socket on the spindles with the hex key on the rotation lock (beware of play during insertion). Then, secure using the threaded pin. This will secure the spindles against turning when the clamping force is applied.



10 Maintenance

⚠ WARNING

Hot surface, danger of burning!

- During operation, the surface temperature of the product may be over 70 °C.
- Do not carry out maintenance and repair work until the product has cooled down, or use protective gloves.

Danger of injury if pieces of the product break!

During operation, parts of the product may break and this may result in injuries to personnel.

- Observe the maintenance intervals of the parts as specified in the operating manual.

Danger of injury from high-pressure injection if product is improperly handled!

If the hydraulic system is improperly handled, liquids may spray out of the hydraulic system and injure personnel.

- Work on hydraulic equipment must only be carried out by qualified personnel with the appropriate skills in this field.

10.1 Maintenance plan

Maintenance work	Interval	Person
Cleaning	As required	Operator
Regular checks	Daily	Operator
Regular lubrication	After 500 clamping operations at the latest.	⚠ **Caution!** If the product is not lubricated, the device tensioner could fail.
Repair		Specialist personnel

10.2 Cleaning

⚠ CAUTION

Damage to moving parts

Avoid damage to moving parts (rods, plunger, bolts etc.) as well as the wiper and seal.

Abrasive cleaning agents

The product must not be cleaned with:

- corrosive or caustic components or
- organic solvents, such as halogenated or aromatic hydrocarbons or ketones (cellulose thinner, acetone etc.) because these can destroy the seals.

The element must be cleaned at regular intervals. In particular, the area around the clamping slide and the housing must be cleaned of shavings and any liquids.

If the product becomes very dirty, it must be cleaned at shorter intervals.

10.3 Regular checks

1. Hydraulic connections for leaks (visual check).
2. Leakage check on housing and clamping slide.
3. Clamping force check using pressure control.
4. Check compliance with the maintenance intervals.

10.4 Change seal set

The seal set must be changed if there are exterior leaks. If they are readily available, the seals should be changed after 1 000 000 cycles or 2 years.
The seal set is available as a replacement part set. Instructions on how to change the seal set is available on request.

NOTE

Seal sets

- Do not fit seal sets that have been exposed to light for a long period.
- Take note of storage conditions (see chapter “Technical data”).
- Use only original seals.

10.5 Maintenance and care

Dismantle clamping slide

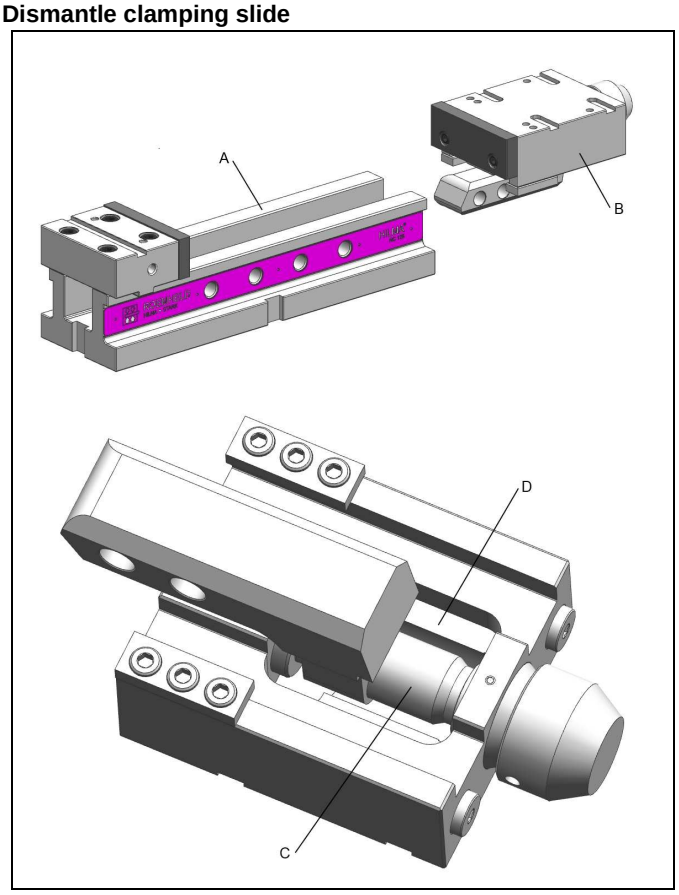


Fig. 6: Dismantle clamping slide

A Base B Clamping slide	C Spindle thread D Spindle chamber

The following maintenance and care work should be carried out as required, but at least once per month:

1. Remove clamping slides from the base, clean them, pull out the sliding surfaces if necessary and oil them with slideway oil.
2. Oil the spindle thread with slideway oil.
3. Oil the spindle chamber with slideway oil.

10.6 Maintenance service

1. In Germany
   Repair at manufacturer factory:
   Please send in the machine clamp carriage paid.

   Repair at customer workshop:
   Please request maintenance service - for information, see 12.3011.
   Service telephone: 02733 – 2810

2. Outside Germany
   Please refer to the HILMA-RÖMHELD general importer or to your local distributor.

11 Troubleshooting

Problem	Cause	Solution
Workpiece is not clamped or is clamped with insufficient force	Slide is hitting the interior stop	Reduce insertion play, see 9.1
	Soft workpiece	Brace the workpiece or close slide manually before clamping
	Operating pressure too low	Set higher pressure on the pressure gauge
	Spindle has loosened	Push rotation lock onto the sliding clamp bearing cap, see 9.3.3
Clamping slide does not return to the starting position, or returns very slowly to the starting position, when pressure has been relieved	Too much resistance in the return line	Increase line cross section diameter or reduce length of line
	Way valve dirty or faulty	Clean way valve and change if necessary
	Hydraulic oil too viscous	Use HLP 32 or HLP 46 hydraulic oil as specified in DIN 51524
	Return spring faulty	Change return spring
	Clamping slide jams because it is very dirty	Pull out cotter pin and remove clamping slide from the base. Clean the guideway, and remove it and oil it if necessary
Cotter pin is stiff	Dirt between base and bracket nut.	Remove clamping slide and clean guide.
Clamping range is difficult to set	Brake in effect.	See chapter “Brake for clamping slide BB 100 and BB 125”

12 Technical data

Parameters

Type 3080			
Jaw width [mm]	100	125	160
Clamping force max. [kN]	25	40	63
Operating pressure [bar]	350	350	350
Hydraulic power stroke [mm]	5	5	7
Oil required per power stroke [cm³]	5	7	14

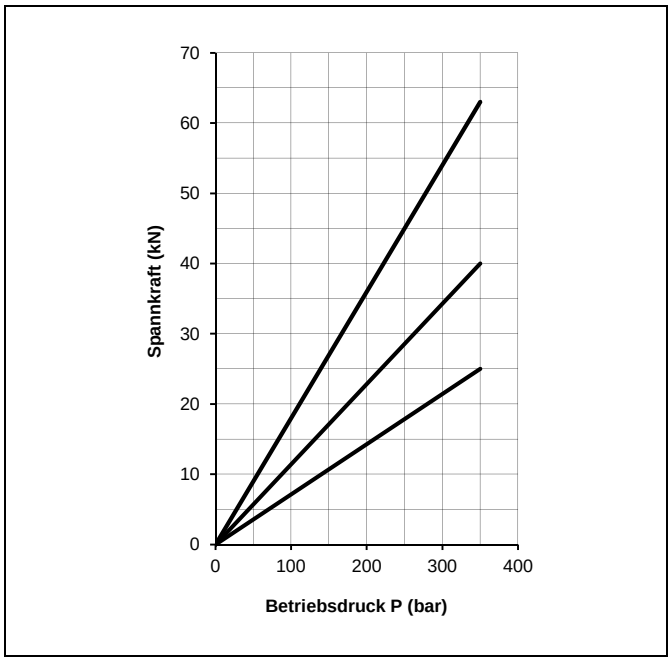


Fig. 7: Clamping force ratios

NOTE

Further information

- Further technical information can be found on the catalogue page.

Recommended tightening torques for screws in strength class 8.8: 10.9, 12.9

NOTE

- The specified values should be seen as a guide and should be adjusted by the user depending on their individual circumstances. See note.

Thread	Tightening torques (MA) [Nm]		
	8.8	**10.9**	**12.9**
M6	10	15	18
M8	25	36	45
M10	49	72	84
M12	85	125	145
M14	135	200	235
M16	210	310	365
M20	425	610	710

Note: Applies to workpieces and shaft screws made of steel with a metric thread and head dimensions as specified in DIN 912, 931, 933, 934 / ISO 4762, 4014, 4017, 4032
The following are assumed in the tightening torques (MA) in the table:
Construction: steel/steel, coefficient of friction μges = 0.14 - unlubricated, use of minimum yield strength = 90%.

12.1 Storage

⚠ CAUTION

Storage of components

- The product must not be exposed to direct sunlight because UV light can destroy the seals.
- Storage in conditions that do not adhere to these storage conditions is not permitted.
- Improper storage may cause seals to become brittle and corrosion-protective oil to become resinous, as well as causing corrosion on the element.

ROEMHELD products are tested with mineral oil as standard. The outside of the products is treated with a corrosion inhibitor. The oily film that remains after the test provides six months of interior corrosion protection during storage in dry spaces kept at a consistent temperature.
If the products are to be stored for longer periods, the product must be filled with a non-resinous corrosion inhibitor and the exterior surfaces must be treated.

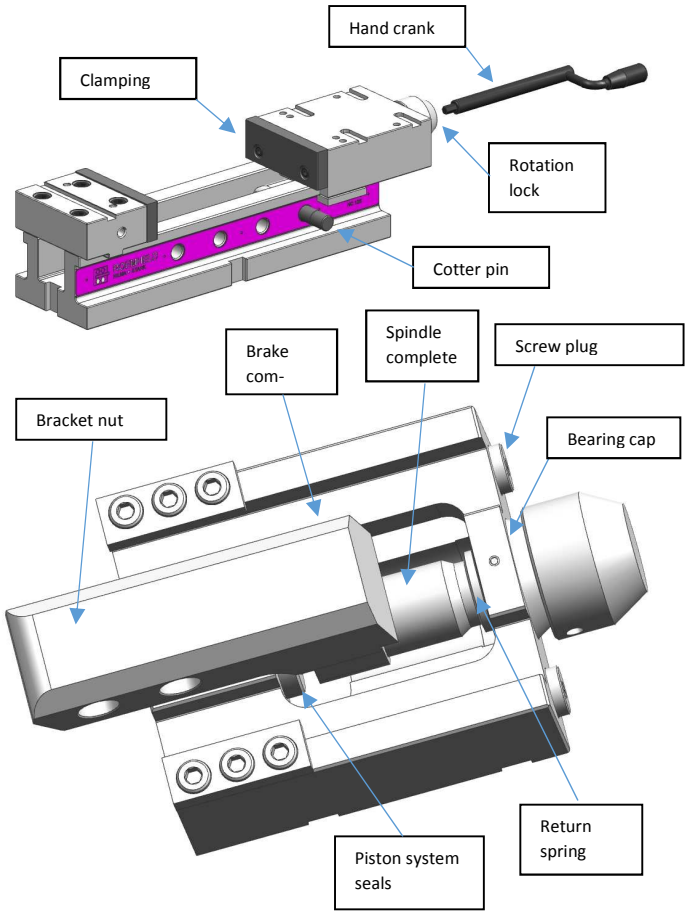
12.2 Accessories

NOTE

Accessories

- See catalogue page.

12.3 Replacement parts



Name	Pcs.	Replacement part no.		
		BB 100	BB 125	BB 160
Cotter pin	1	7.3072.0006	7.3073.0006	7.3074.0006
Hand crank	1	4.2056.0022	4.2056.0022	4.2056.0023
Screw plug	1	1.0908.1009	1.0908.1009	1.0908.1009
Return spring	1	1.2098.0364	1.2098.0366	1.2098.0365
Bracket nut	1	5.2053.0075	5.2053.0073	5.2053.0074
Spindle complete	1	9.3082.0513	9.3083.0513	9.3084.0513
Bearing cap	1	9.3082.0521	9.3083.0521	9.3084.0521
Clamping strip	2	9.3022.0512	9.3023.0512	9.3024.0512
Piston	1	5.1010.1064	5.1010.1049	5.1010.1065
Seals	1	9.3082.0520	9.3083.0520	9.3084.0520
Rotation lock	1	9.3765.1204	9.3765.1304	9.3765.1404
Brake complete (accessory)	1	9.3122.0551 in bracket nut	9.3123.0551 in bracket nut	9.3769.0401 Pneumatic spring

Subject to modifications

13 Waste disposal

Dangerous to the environment

If there is any risk of environmental contamination, each component must be disposed of by a licensed specialist company.

The individual materials must be disposed of in accordance with the regulations and provisions that are in effect, as well as the environmental conditions.
Special attention must be paid to the disposal of components with pressurised fluid residue. The information on waste disposal in the safety data sheet must be used.
When disposing of electrical components (e.g. position sensor systems, proximity switches, etc.), compliance with the country-specific legal regulations and provisions must be ensured.

14 Declaration of incorporation

Manufacturer

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Products listed on catalogue page WS 13080. This includes the types/order numbers:

- 3080

They are designed and manufactured in accordance with the Directive **2006/42/EC** (EC-MD) in the version currently valid and with the technical rules that also apply.
In accordance with EC-MD and DIN EN ISO 4412, these products are components that are provided not in a ready-to-use state and are intended only for fitting in a machine, device or system.

Under the Pressure Equipment Directive, the products are not classified as pressurised containers, but instead as a hydraulic control device, because the pressure is not the crucial factor for their construction; instead, this factor is its strength, rigidity and stability against static and dynamic operational loads.

The product may only be switched on after it is ascertained that the incomplete machine, or the machine in which the product is to be fitted, complies with the provisions of the Machinery Directive (2006/42/EC).

The manufacturer is obliged to send the special documentation for the products to national authorities on request.
The technical documentation specified in Annex VII Part B has been produced for the products.

15 List of applied standards

Product Safety Act - ProdSG; November 2011

DIN EN ISO 12100, 2011-03, Safety of machinery; Basic concepts, general principles for design (replacement for parts 1 and 2)

DIN EN ISO 13857; 2008-06, Safety of machinery; Safety distances to prevent lower and upper limbs reaching dangerous areas. (replaced: DIN EN 294)

DIN EN 349, 2008-09, Safety of machinery, minimum distances to avoid body parts being crushed

DIN EN 81714-2, 2007-08, Design of graphical symbols to use in technical product documentation

DIN EN ISO 4413, 2011-04, Fluid technology - General rules and technical safety requirements of hydraulic systems and their components

DIN EN 82079; 2010-10, Preparation of instructions; structuring, content and presentation - Part 1

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Hilchenbach, 21.11.20177