



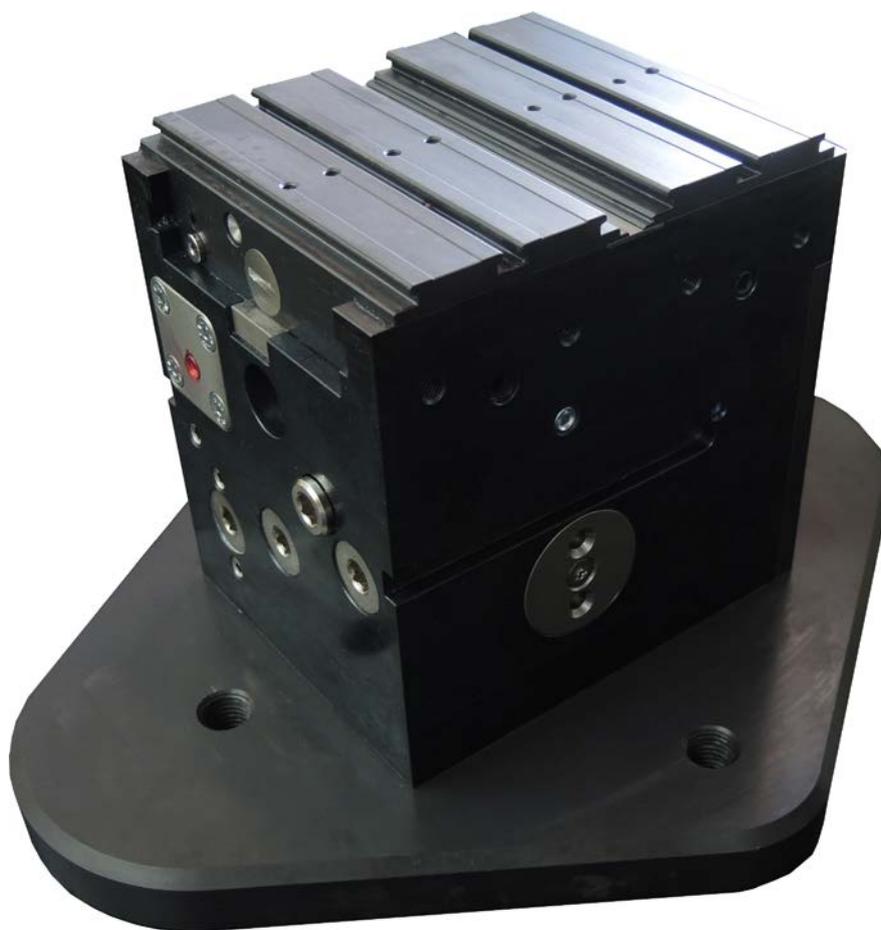
ZERO CLAMP®

Experience precision

O r i g i n a l

**I n s t a l l a t i o n a n d O p e r a t i n g
I n s t r u c t i o n s**

P n e u m a t i c - D r i v e – 2 5 5 9 4 - 1



Copyright

ZEROCLAMP® Centering Clamping Fixture 25594-1 Installation and Operating Instructions.

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D-82057 Icking

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Issue: 3/8/2017

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1. General matters

1.1 Use of the installation and operating instructions

Dear customer,

Many thanks for deciding to purchase our products. These installation and operating instructions contain useful information allowing you to familiarize yourself with your clamping system before starting to use it for its intended purpose under the specified operating conditions. They contain important instructions to ensure functionally correct and cost-effective installation and operation.

The operating instructions have been created for use by installation, operating and maintenance staff, and must always be kept to hand at the place of use of the clamping system.

You have chosen a high-quality clamping system which operates at extremely high precision.

In the interests of product improvement we reserve the right to make changes in respect of versions, dimensions and materials.

Of course, we remain available to you at all times for after-sales service.

Please contact us using the information set out below.

1.2 Customer Service contact information

ZeroClamp GmbH
Wadlhausen 14
D-82057 Icking

Tel. +49 (0) 8178-90998-0
info@zeroclamp.com

1.3 Warranty

The warranty is 12 months from the date of delivery from the works, provided the system is used for its intended purpose in 1-shift operation.

These operating instructions supersede any previous versions. The current version of operating instructions is available for download at www.zeroclamp.com

1.4 Scope of supply

The scope of supply includes:

- Pneumatic-Drive

1.5 Declaration of conformity

The manufacturer: ZeroClamp GmbH
 Wadlhausen 14
 D-82057 Icking

hereby declares that the following products:
Product designation: Centering clamping fixture
Type designation: 25594-1

Build year: 2016

comply with the following essential requirements of the **Machines Directive (2006/42/EC)**:

The following standards were applied:

DIN EN ISO 12100	Safety of machinery - General principles for design, risk assessment and risk reduction
ISO 16156	Safety Machine tools safety – Safety requirements for the design and construction of work holding chucks
ISO 19719	Machine tools — Work holding chucks — Vocabulary

The incomplete machine may not be brought into use until it has been incorporated into a machine and the machine into which it has been incorporated satisfies the provisions of the Machines Directive (2006/42/EC).

The manufacturer undertakes on request to communicate by electronic means the special documents relating to the incomplete machine.

The special technical documents relating to the machine were created in accordance with Appendix VII Part B.

Name of the authorized person for documentation: Klaus Hofmann

Address of the authorized person for documentation: see manufacturer's address

Icking,
May 2, 2013
Date

Klaus Hofmann, Managing Director
Signatory and details of signatory


Unterschrift

2. Safety

2.1 General safety instructions

	<p><i>Warning! For use on zero point clamping system</i></p> <p>If the forces acting on the centering clamping fixture become too great due to machining of a workpiece, the clamping stud might be torn from the clamping pot even in the clamped state.</p> <p>Do not overload the zero point clamping system.</p> <p>Make an estimate of the forces to be expected.</p> <p>Use additional safety devices, e.g., monitoring devices, feeder devices and safety guards.</p>
	<p><i>Warning! For use on zero point clamping system</i></p> <p>The zero point clamping system will only clamp the centering clamping fixture reliably if the clamping stud and the clamping pot lie flat against each other. Even slight impurities between the contact surfaces, or a tilted position will compromise the clamping effect. Always clamp the centering clamping fixture by means of at least two clamping points in order to ensure safe operation.</p> <p>Furthermore, surface inaccuracies caused by wear will also compromise the clamping effect.</p> <p>Before clamping the pieces, always thoroughly clean the contact surfaces between clamping stud and clamping pot!</p> <p>Verify the exact concentric alignment of clamping stud and clamping pot.</p> <p>Regularly check the clamping force of the zero point clamping system, using a pull-out force tester.</p> <p>Use the subsidiary zero point clamping system for a maximum of 1,000,000 clamping cycles.</p>
	<p><i>Warning!</i></p> <p>When the centering clamping fixture is actuated, the skin of the fingers or the fingers might be crushed at the clamping jaws.</p> <p>During the clamping operation, do not reach between the clamping jaws, or between the clamping jaw and the workpiece.</p>

	<p><i>Warning!</i></p> <p>The centering clamping fixture is designed for automated operation. However, it can also be operated with a compressed air gun.</p> <p>When the centering clamping fixture is actuated, workpieces might become loose, or the hands or parts of skin might be crushed. Always make sure to operate the clamping device in a safe manner.</p>
	<p><i>Warning! For use on zero point clamping system</i></p> <p>Accidental actuation of the subsidiary zero point clamping system might lead to unintentional releasing of the clamping assembly.</p> <p>Before undertaking installation, adjustment, maintenance or set-up work, disconnect the subsidiary zero point clamping system from the compressed air supply.</p> <p>During operation, secure the subsidiary zero point clamping system against unintentional releasing by using suitable safety devices for the compressed air supply.</p>
	<p><i>Warning!</i></p> <p>When you build your own clamping assemblies, make sure that they can be fastened in a suitable way in order to be lifted with handling devices or cranes.</p> <p>Give particular attention to this point if the clamping systems weigh 20 kg and more.</p>
	<p><i>Warning!</i></p> <p>Risk of injury due to the motor starting up on its own. In order to shut down the motor safely, disconnect it from all sources of compressed air. Secure the shut-off device against accidental reopening.</p>
	<p><i>Warning!</i></p> <p>A complete functional test is always carried out before use. This also includes checking the clamping forces.</p> <p>Regular maintenance ensures smooth and safe operation.</p>

2.2 Use for the intended purpose

The clamping system must only be used for clamping workpieces, and must only be operated with lubricated compressed air. When operating the centering clamping fixture in a vertical or lateral position, make sure it will not fill up with cooling lubricant. Before operating the clamping mechanism, it is recommended to move the clamping device into a horizontal position.

Use for the intended purpose includes compliance with the conditions specified by the manufacturer in respect of installation, commissioning, operation, ambient conditions and maintenance.

Any use that is not within these conditions ranks as improper use. The manufacturer accepts no responsibility for damage resulting from improper use.

Before using the clamping system in an environment with abrasive dusts, caustic or aggressive vapors or liquids, you must obtain approval by ZeroClamp®.

2.3 Period of use of the centering clamping fixture

The centering clamping fixture is designed for a maximum life span of 1,000,000 clamping cycles. After every 100,000 clamping cycles, the mechanism needs a factory overhaul.

Have your clamping device overhauled regularly in order to prevent breakdown and damages.

2.4 Structural modifications

For reasons of safety, unauthorized changes and modifications of the centering clamping fixture are prohibited. When exchanging defective parts, use only original parts or standard parts that are approved by the manufacturer.

2.5 Training the operators

The operators must have received instruction on the following topics:

- Functionality and operation of the centering clamping fixture
- Servicing and cleaning work

All persons responsible for the installation, commissioning and maintenance of the tester must have read and understood the complete operating instructions, especially Section 2 "Safety". We recommend that the operating company obtains signatures to this effect.

Installation, removal, connection and commissioning may be performed only by authorized personnel. Do not use operating techniques which adversely affect the functionality and operational safety of the clamping system.

2.6 Operational environment and compressed air specification

The centering clamping fixture is not suitable for the following operational environments:

- Abrasive dusts,
- Caustic or aggressive liquids and vapors.

For smooth operation, the compressed air must meet the following specifications:

- Filtered compressed air (filtering of solid particles > 15 µm and 90% of liquid water). A separate air filter is recommended. Installation located as near as possible to the air treatment unit (lubrication).
- Lubricated compressed air (1 drop for every clamping cycle / double stroke). For specifications see 9.3.
- Maximum permitted hose length after air treatment: 5 meters. Minimum line diameter: NW 6 mm.
- Compressed air supply 5 bar.
- Air consumption 300 l/min.
 - per clamping operation approx. 40 l
 - per mm clamping stroke approx. 10 l



Note!

If an increased noise is noticeable during operation, this is most likely the triggering of the overload valve. Check the air pressure.

3. Overview

3.1 View

The centering clamping fixture is a complete clamping system, similar to a vise. As the name suggests, it always clamps workpieces concentrically to their center bore. It can be used on the zero point clamping system by using suitable clamping studs (M16 18k6). Always clamp the centering clamping fixture by means of at least 2 clamping points. Alternatively, it can be screw-mounted on a T-slot machine table. Top jaws, available as accessories, can be mounted on the base jaws in different positions. The jaws are operated either automatically via the machine table / base unit, or manually via the lateral compressed air connection.

3.2 System accuracy

The system attains a global repeat accuracy of ± 0.02 mm. This applies to all positioning options, both on the zero point clamping system and on a T-slot machine table.

3.3 Compressed air and resulting clamping force

The clamping vise is operated by an air motor. Do not apply a dynamic pressure of more than 5 bar to the motor (after motor standstill). This corresponds to a system pressure of approx. 6 bar. This results in a clamping force of 40 kN \pm 10%. However, the clamping force might also be greater, depending on tolerances and friction within the system. The clamping force is dependent on the applied air pressure, in linear proportion. For trouble-free operation, a minimum dynamic pressure of 3 bar is required. A complete functional test is always carried out before use. This corresponds to a clamping force of approx. 20 kN. If lower clamping forces are required, different transmission versions are available as an option, and can be retrofitted by the customer. The air pressure can be measured with a suitable manometer, directly at the centering clamping fixture (see pictures). The centering clamping fixture has been factory-tested.



Warning!

A complete functional test is always carried out before use. This also includes checking the clamping forces.

Regular maintenance ensures smooth and safe operation.

3.4 Adjusting the jaws to center

During operation it might become necessary to readjust the clamping device, or to reduce the play further. The position of the jaws can be adjusted precisely in relation to the center. For adjusting the centering clamping fixture, you need a probe with dial gauge of sufficient resolution. You also need an Allen key size SW 4, a pin puller M4 and a torque wrench with suitable scaling.



Maximum tightening torque: 1 – 2 Nm. One rotation corresponds to a center shift of $\approx 0,33$ mm. If the center is to be shifted, remove the screw in the opposite position and pull out the pin behind the screw, e.g., with a pin puller M4. If only an excessive play is to be reduced, it is enough to retighten the screws accordingly. For this purpose, it is recommended to open the clamping vise as far as it will go.

3.5 Required tools for adjustment and maintenance work

Allen key SW 4

Allen key SW 8

Allen key SW 10 length min. 80 mm

Torx screwdriver TX 15

Flat-head screwdriver for filter change

Manometer G3/8"

Pin puller M4

Snap ring pliers

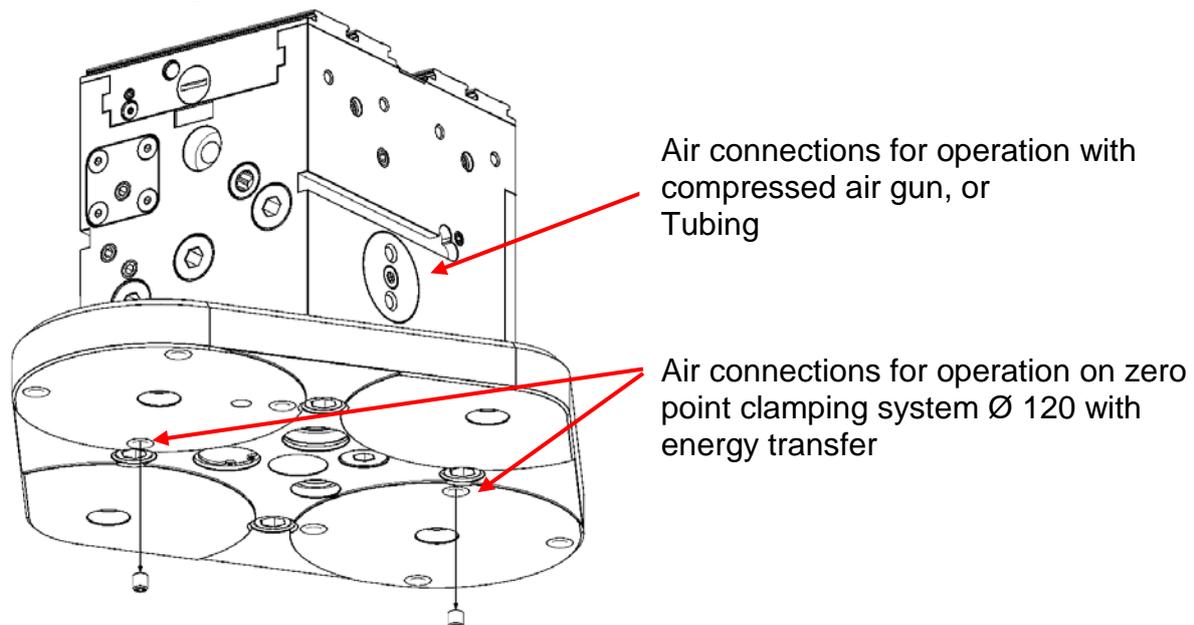
Grease gun with special grease

Torque wrench

4. Ways of operation

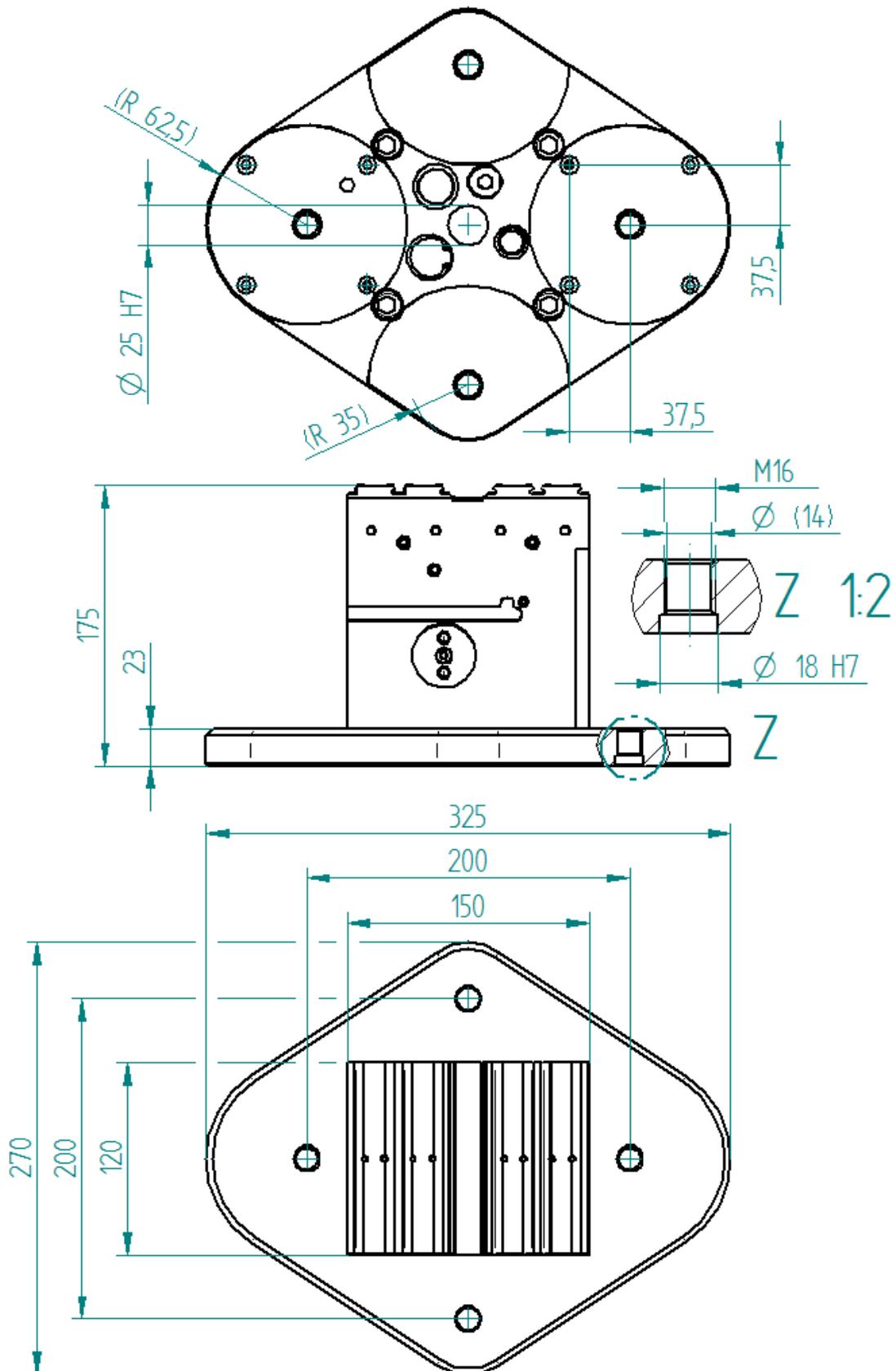
The centering clamping fixture can be operated both automatically and manually with a compressed air gun.

Before applying compressed air to the centering clamping fixture, make sure that the corresponding outlet line is vented.



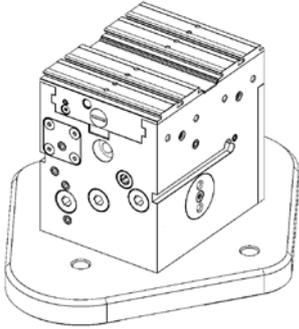
Opened air connection

4.1 Dimensions



4.2 Versions

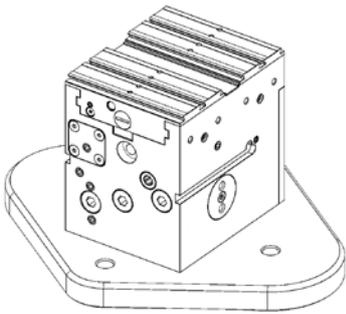
The pneumatic centering clamping fixture is operated with compressed air. The manufacturer recommends to use only lubricated compressed air (see 2.6).



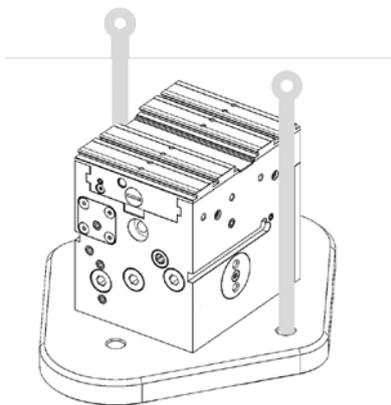
Standard version

The clamping device is supplied in this configuration.

As an option, the centering clamping fixture is also available in a version rotated by 90°. When ordering, please specify the desired clamping direction.



If required for operation, the clamping device can also be rotated subsequently by 90°. For this purpose, please contact the manufacturer.



To lift the centering clamping fixture, always use suitable lifting devices. Required for lifting: Two threaded rods M16 (length min. 250 mm), eyelets, and round slings or similar. Always use two lifting points located at opposite sides.

4.3 Operation mode

The Pneumatic-Drive can be operated over 4 channel clamping pots or over the air connection on the side by air pistol or supply lines.

4.3.1 Automated operation (recommended mode)

The Pneumatic Drive must be clamped by at least two clamping pots with 200 mm pitch. These clamping pots must have an air passage (zero point clamping system \varnothing 120 mm) for automated operation. To achieve this, remove the two screw plugs below the centering clamping fixture. Always make sure that contact surfaces are clean. Before commissioning, perform a complete function test.

4.3.2 Manual operation

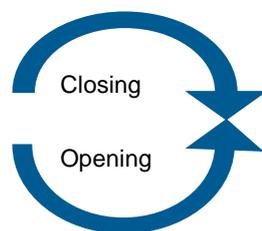
The Pneumatic Drive must be clamped by at least two clamping pots with 200 mm pitch. The clamping vise can be operated via the lateral compressed air connections. For this purpose, a compressed air gun or tubing is required. First, insert and tighten the two screw plugs (see 4.1). Always make sure that contact surfaces are clean. Before commissioning, perform a complete function test. During machining of a workpiece, the lateral connection must be closed.

4.4 Operation on a T-slot machine table

The centering clamping fixture has one \varnothing 25 mm central bore and four \varnothing 14 mm bores in a 200 mm pitch circle for mounting on the T-slot machine table (see 4). The air connections (see 4.1) must be closed. The clamping vise can be operated via the lateral compressed air connections. For this purpose, a compressed air gun or tubing is required. First, insert and tighten the two screw plugs (see 4.1). Always make sure that contact surfaces are clean. Before commissioning, perform a complete function test. During machining of a workpiece, the lateral connection must be closed.

4.5 Emergency opening

In an emergency, the centering clamping fixture can also be opened by hand, but only in exceptional cases. First, disconnect the centering clamping fixture from the compressed air supply.



Open the screw plug with an Allen key size SW 8. Then operate the centering clamping fixture with an Allen key size SW 10 (minimum length 80 mm) and a ratchet. Re-insert and tighten the screw plug before re-applying compressed air to the centering clamping fixture.

	<p><i>Warning!</i></p> <p>Risk of injury due to the motor starting up on its own. Before emergency operation, make sure that the compressed air supply is disconnected. Secure the shut-off device against accidental reopening.</p>
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5. Available accessories

5.1 Optional clamping stud



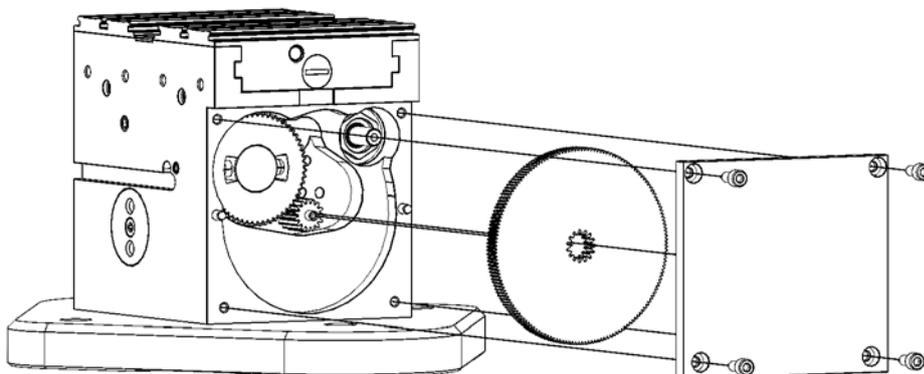
Size: 18M16

This bolt is essential for operation on a base unit.

5.2 Optional gear unit

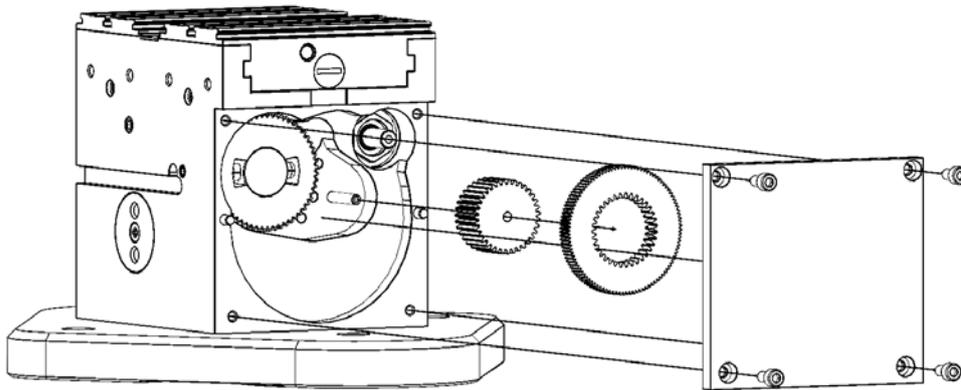
The center clamp can be varied by the air in the clamping force of 20 - 40 kN. For all additional clamping forces of 5 - 20 kN, the optional gear options are required.

	<p><i>Warning!</i></p> <p>Always ensure sufficient lubrication of the mechanism. After the side cover has been opened, replace the grease if necessary, or replace it.</p>
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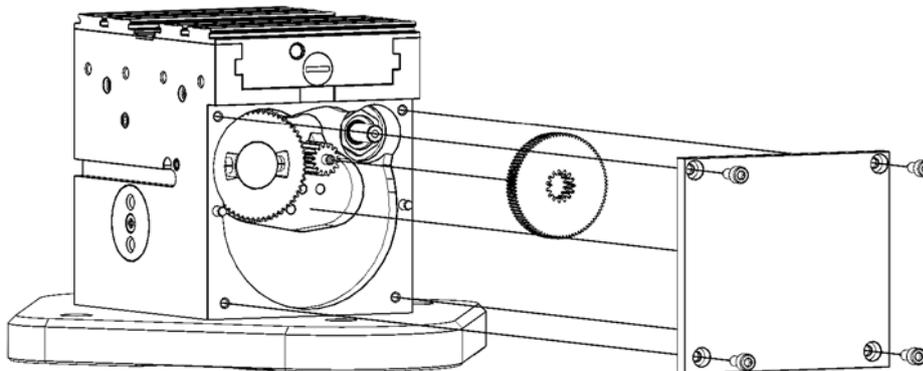
Standard gears

- 5 - 10 kN Article no. 29048



Gearbox variant 5 –10 kN

- 10 – 20 kN Article no. 29047



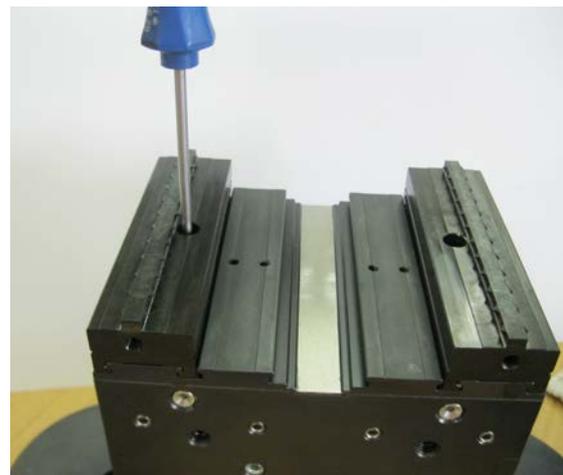
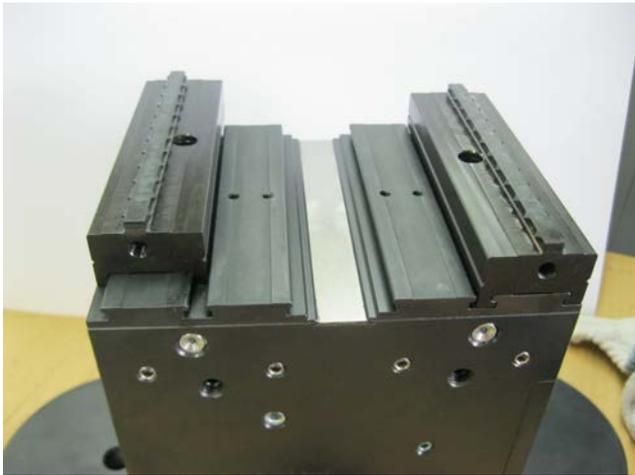
Gearbox 10 – 20 kN

5.3 Top jaws

The jaw stroke of the Pneumatic Drive is 14 mm.

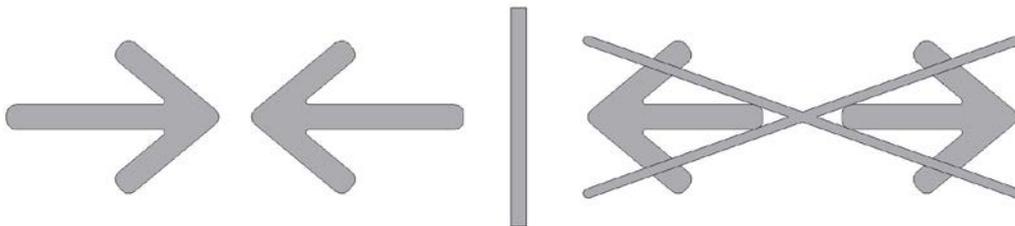
The clamping device can be fitted with a number of top jaws, which can be inserted into the base jaws in many different positions. All jaws are secured with the same standard Torx screw TX 15 - M4x8.

The required tool is a Torx screwdriver size TX 15.



Many top jaw types can also be used in reverse, which further increases the variability.

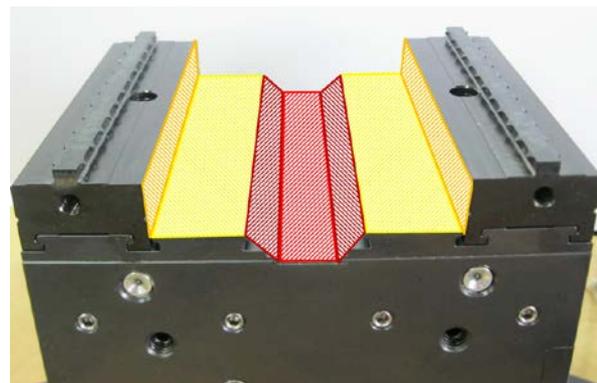
Always observe the permissible clamping direction:



Jaws that allow clamping of workpieces from inside to outside are available on request. Correct clamping surfaces for workpieces:



Permissible **contact surface** and **clamping surface** for the workpiece.



Not recommended **clamping / contact surfaces** (higher risk of wear at the clamping device). Prohibited **contact / clamping surfaces** for the workpiece.

5.3.1 Grip jaws

Order No.:	Description
24697	Grip jaw set Width 120, height 15, clamping range 10 – 130
24830	Grip jaw pair Width 120, height 15, clamping range: 10 – 20, 60 – 70, 70 – 80, 120 – 130
24831	Grip jaw pair Width 120, height 15, clamping range: 20 – 30, 50 – 60, 80 – 90, 110 – 120
24832	Grip jaw pair Width 120, height 15, clamping range: 30 – 40, 40 – 50, 90 – 100, 100 – 110
23517	Grip jaw set Width 80, height 40, clamping range 10 – 130
23489	Grip jaw pair Width 80, height 40, clamping range: 10 – 20, 120 – 130
23494	Grip jaw pair Width 80, height 40, clamping range: 20 – 30, 110 – 120
23495	Grip jaw pair Width 80, height 40, clamping range: 30 – 40, 100 - 110
23496	Grip jaw pair Width 80, height 40, clamping range: 40 – 50, 90 – 100
23497	Grip jaw pair Width 80, height 40, clamping range: 50 – 60, 80 - 90
23516	Grip jaw pair Width 80, height 40, clamping range: 60 – 70, 70 – 80

Other sizes available on request.

5.3.2 Carbide top jaws

Order No.:	Description
25371	Carbide jaw set Width 120, height 15, clamping range 10 – 130
25818	Carbide jaw pair Width 120, height 15, clamping range: 10 – 20, 60 – 70, 70 – 80, 120 – 130
25833	Carbide jaw pair Width 120, height 15, clamping range: 20 – 30, 50 – 60, 80 – 90, 110 – 120
25834	Carbide jaw pair Width 120, height 15, clamping range: 30 – 40, 40 – 50, 90 – 100, 100 - 110

Other sizes available on request.

5.3.3 Soft top jaws

Order No.:	Description
26093	Steel jaw pair 148 Width 120, height 44
25315	Steel jaw pair 168 Width 120, height 44

Steel jaws made of Toolox 33 allow the manufacturing of individual jaws for machining.

External dimension of jaws when fully open:

- 26093 148 mm
- 25315 168 mm

5.3.4 Base jaw

Order No.:	Description
25320	Base jaw pair 148 Width 120, height 15

Base jaw pair, used as a base jaw for top jaws made of aluminum (Order No.: 20768) or steel (Order No.: 20769) for manufacturing of individual jaws for machining.

External dimension of jaw pair when fully open: 148 mm.

	<p><i>Warning!</i></p> <p>Keep the weight and the height of your clamping assembly as low as possible. For greater clamping heights, reduce the operating pressure. Keep the clamping jaws as low as possible. Maximum height of clamping jaw assembly: 44 mm above vise.</p>
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5.4 Workpiece stops

The centering clamping fixture has a total of 8 threaded bores, and each pair of jaws has 4 threaded bores of size M6 each. These bores can be used for stops or other positioning aids.



Order No.:14120



Order No.:14119



Order No.:14116

Order No.:	Description	Note:
14120	Adjustable	
14119	Fixed	Can only be used in the jaws
14116	Magnetic	Magnetic means they can be used everywhere

6. Spare parts

The use of spare and wearing parts from third-party manufacturers can lead to hazards. Use only original parts that are either from the manufacturer or approved by him.

Filter disc set	2 x Order No.: 26456
Screw-in filter set	2 x Order No.: 26457

Spare parts can be changed by the user.

7. Spare parts requiring repair at factory

All other parts in the assembly parts list are defined as spare parts. However, changing these parts requires a damage assessment followed by a factory repair at ZeroClamp GmbH. Such repairs require special tools and factory know-how. After every 100,000 clamping cycles, the mechanism needs an overhaul.

8. Installation

	<p><i>Warning! For use on zero point clamping system</i></p> <p>The clamping system will only clamp workpieces reliably if the clamping stud and the clamping pot lie flat against each other. Even slight impurities between the contact surfaces, or a tilted position will compromise the clamping effect. Always clamp the centering clamping fixture by means of at least two clamping points in order to ensure safe operation.</p> <p>Before clamping the pieces, always thoroughly clean the contact surfaces between clamping stud and clamping pot!</p> <p>Verify the exact concentric alignment of clamping stud and clamping pot.</p>
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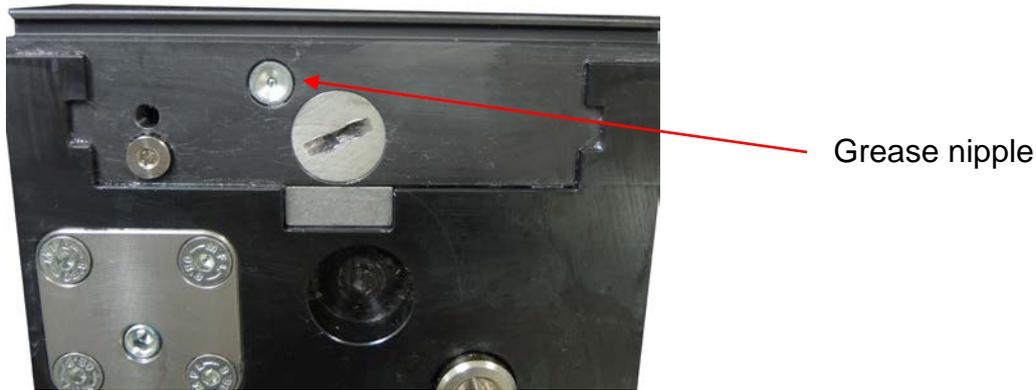
	<p><i>Warning!</i></p> <p>When the clamping system is actuated, the skin of the fingers or the fingers might be crushed at the clamping jaws.</p> <p>During the clamping operation, do not reach between the clamping jaws, or between the clamping jaw and the workpiece.</p>
	<p><i>Warning! For use on zero point clamping system</i></p> <p>Accidental actuation of the subsidiary zero point clamping system might lead to unintentional releasing of the clamping assembly.</p> <p>Before undertaking installation, adjustment, maintenance or set-up work, disconnect the subsidiary zero point clamping system from the compressed air supply.</p> <p>During operation, secure the zero point clamping system against unintentional release by using suitable safety devices for the compressed air supply.</p>
	<p><i>Warning!</i></p> <p>When you build your own clamping assemblies, make sure that they can be fastened in a suitable way in order to be lifted with handling devices or cranes.</p> <p>Give particular attention to this point if the clamping systems weigh 20 kg and more.</p>
	<p><i>Warning!</i></p> <p>To lift the centering clamping fixture, use only the points provided (see 4). Use only suitable lifting devices.</p>

9. Maintenance operations

	<p><i>Warning!</i></p> <p>Before any maintenance or cleaning work, make sure there is no pressure in the system.</p>
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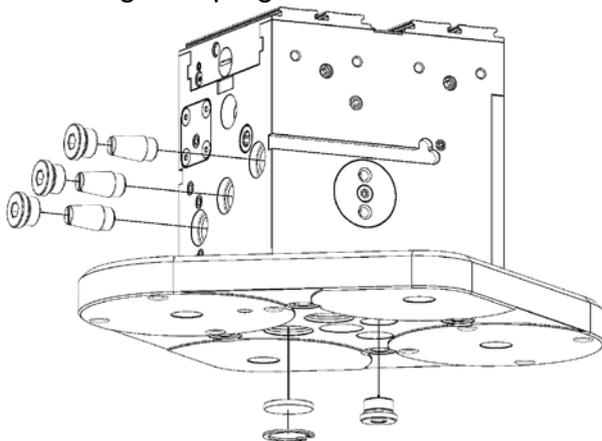
9.1 Maintenance schedule

Activity	daily	weekly	monthly	Note
Visual check oil lubrication	X			Check lubrication of compressed air. If necessary, refill
Extract/drain liquids, including filter cleaning		X		
Grease the mechanism with grease gun and special grease		X*		Grease until resistance is felt, plus one more stroke. Wipe off excessive grease with a cloth. *or every 500 clamping cycles (whichever come first)
Clean filters			X	Replace Filter disks.
Clean completely. Then operate the clamping device several times, adding extra oil via the compressed air.				For storage or prolonged standstill (>14 days).



The clamping device is very easy to maintain. Only once a week, or every 500 clamping cycles, slightly grease the internal mechanism. For this purpose, there are lateral grease nipples. Before greasing, open the centering clamping fixture completely, and slightly close again by about 1 mm in order to prevent tensions during greasing. Grease with a grease gun with special grease (see 9.3). 2 or 3 strokes are sufficient. However, grease at least until a resistance is felt, plus one more stroke.

Wipe off excessive or escaping grease with a cloth. After greasing, operate the centering clamping fixture several times over the entire clamping range.



Also clean all filters regularly. For this purpose, remove the screw plugs or locking rings. Only clean filters with approved cleaning agents. Make sure not to soil the openings. If filters are heavily soiled, the manufacturer recommends replacing them.



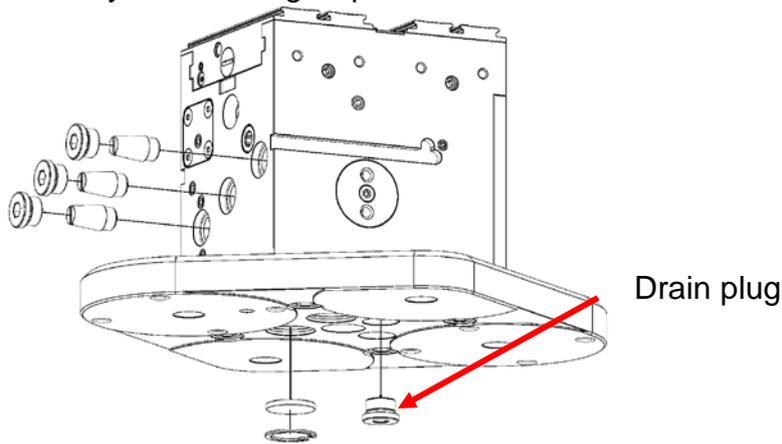
Note:

Carefully avoid soiling the openings. Make sure that no liquids or solid particles will enter the opening.

9.2 Extracting liquids

For extracting liquids, you can use commercially available extraction devices.

However, once a week, drain the accumulated liquids from the centering clamping fixture. For this purpose, open the screw plugs on the underside, and set the clamping device upright again. Then remove and clean the internal filter. If grease has accumulated behind the filter, this is normal and is due to the weekly greasing. Carefully remove larger quantities.



9.3 Cleaning and care

Approved cleaning agents:

- WD 40
- Ballistol
- hebro Multiplus

Approved consumables:

- Special grease for lubrication (Order No.: 26458):

Manufacturer	Designation
Castrol	Optimol Paste PL

- Oil for compressed air:

Manufacturer	Designation
hebro	CLP base 32
Mobil	Almo Oil 525
Shell	Torcula 32

Prohibited cleaning agents:

- Acids
- Lyes
- aggressive media

9.4 Storage

Before storage, the manufacturer recommends to clean the clamping device thoroughly, and to oil or grease all surfaces and the clamping mechanism. Before storage, perform several clamping cycles in a dry environment. This is done to remove any remaining liquid from the clamping device. For this purpose, it is recommended to increase the oil quantity in the compressed air.

9.5 Recommissioning

After longer storage periods, grease the clamping device thoroughly (see 9.1). For the repeated operation and complete function test of the centering clamping fixture, it is recommended to increase the oil quantity in the compressed air.

10. Residual risks

	Description of risk	Minimization of risk
	Disregard of safety instructions	Training the staff about the hazards

11. Concluding remarks

The product is subject to continuous further development, and ZeroClamp GmbH reserves the right to make technical changes for the sake of product improvement. Wherever possible, these will be compatible with previous versions. The portfolio of accessories is also being constantly expanded and complemented.

	<p><i>General instruction</i></p> <p>When using the centering clamping fixture on the zero point clamping system, observe in addition all safety instructions and other instructions regarding the zero point clamping system.</p> <p>The installation and operating instructions of the subsidiary zero point clamping system are available for download. www.zeroclamp.com</p>
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