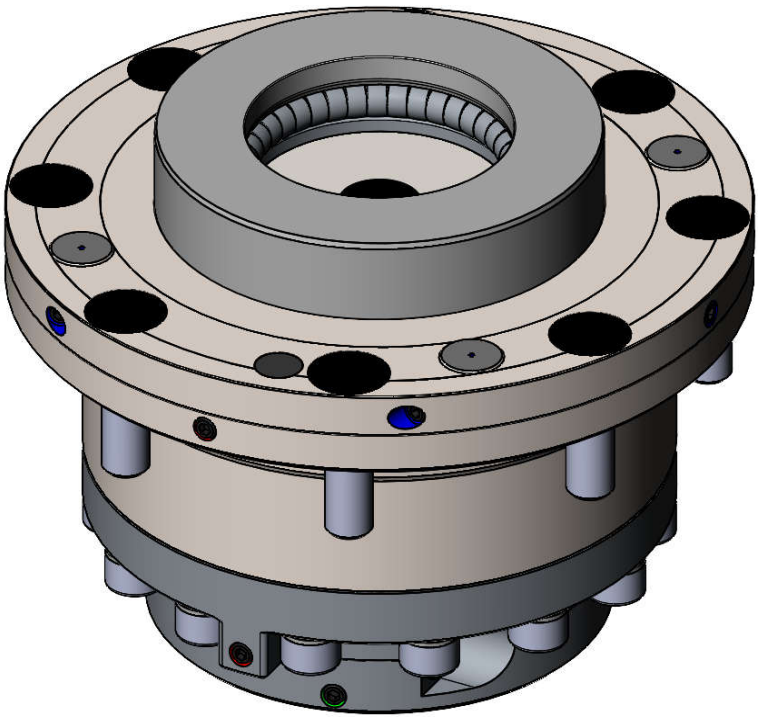
STARK.plaintec.M zero point clamping system

Translation of the original operating manual
WM-020-309-11-en BA STARK.plaintec.M



STARK.plaintec.M

Art. no.: S3000-850, S3000-851, S3000-852,
S3000-853, S3000-854, S3000-855, S04408-01

Manufacturer:

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1. Table of contents

2. Identification of the partly completed machinery

Product:	Fast closing clamp
Function:	Clamping and centring of workpieces and workpiece pallets
Options:	Blow-off, seat check, clamping and release check, non-return valve, floor connections, shims
Product group:	STARK.plaintec.M
Article number	S3000-850, S3000-851, S3000-852, S3000-853, S3000-854, S3000-855, S04408-01
Trade name:	Corresponds to product group, see above

3. User instructions

3.1. Purpose of the document

This operating manual

- describes the function, operation and maintenance of the fast clamping device
- gives important instructions for safe and efficient use of the fast clamping device

3.2. Revision history

Date	Version	Revision	Name
09/11/2012	WM-020-309-00	Creation of the operating manual	reeg
30/08/2017	WM-020-309-01	Addition and revision	reeg
16/10/2018	WM-020-309-10	Product variants and technical data added	mafr
17/03/2025	WM-020-309-11	Revision of the fast closing clamp	pamä

3.3. Referenced documents

Document	Version	Author
Dimension sheets and assembly drawings with parts lists	S059-017-01 – S3000-850 S059-019-01 – S3000-852 S059-020-01 – S3000-851 S059-021-01 – S3000-853 S059-022-01 – S3000-854 S059-023-01 – S3000-855 S059-024-01 – S04408-01	Stark Spannsysteme GmbH
Installation data sheet for fast closing clamp	D092	Stark Spannsysteme GmbH
Installation data sheet for retaining rings with clamping spigot	D093	Stark Spannsysteme GmbH
OM Mechanical Insertion Force Tester	WM-020-133-xx-xx	Stark Spannsysteme GmbH

3.4. Presentation of safety instructions

Safety instructions are identified by a pictogram. The illustration of the pictograms with signal word is shown. The signal word describes the severity of the impending risk.

DANGER Immediate imminent risk to life and health of persons (serious injury or death).
Be sure to follow these notes and procedures!

CAUTION Potentially dangerous situation (minor injuries or damage to property).
Be sure to follow these notes and procedures!

INFORMATION Tips for use and particularly useful information.

INSTRUCTION Obligation for special conduct or an activity for the safe handling of the machine.

4. Essential safety instructions

4.1. Intended use

The fast closing clamp is used for clamping pallets with mounting devices for workpieces. The workpieces are intended for processing, installation, transporting and measuring.

The intended use also presupposes:

- compliance with all the instructions in the operating manual
- observance of the inspection and maintenance intervals
- use of only OEM parts.

4.2. Foreseeable misuse

Any use other than or beyond the use specified in chapter "4.1 Intended use" is considered improper use!

Risks may occur if the product is not used as intended. Examples of improper use include:

- exceeding the technical values specified for normal operation
- application for hoist operation and load transportation
- use as tool holder
- use as pressing tool
- disregard of the safety guidelines according to EC Machinery Directive 2006/42/EC

The operating company bears sole responsibility for any injury or damage resulting from such improper use. The manufacturer assumes no liability.

4.3. When using rotating machine tools

For rotating applications, the fast closing clamp may only be operated if it is ensured that it is securely clamped. We recommend using the clamping control. It must also be ensured that the forces occurring do not exceed the permissible forces of the fast clamping lock according to the technical data.

The danger zone must be secured by suitable measures.

Suitable specialists must be consulted for the calculation and design of the fast closing clamps for rotating applications.
Stark provides this service.

4.4. Modifications or alterations

Unauthorised modifications or alterations of the fast clamping device will void any liability and warranty on the part of the manufacturer!

Therefore do not make any modifications or alterations to the fast closing clamp without consultation with and the written approval of the manufacturer.

4.5. Conduct in the event of faults

- Stop operation immediately
- Report fault to the responsible personnel
- Have the fault rectified only by qualified personnel
- Check products and machine for safe operation

4.6. Spare and wear parts and auxiliary materials

The pallets with the clamping devices are built by the operating company itself or on its behalf. Only retractable nipples from STARK may be used on the pallet and must be installed according to the appropriate data sheet of STARK.

The use of spare and wear parts from third-party manufacturers can result in risks. Use only OEM parts or parts approved by the manufacturer. The manufacturer will assume no liability for any injury or damage resulting from the use of spare and wear parts and auxiliary materials not approved by the manufacturer.

4.7. Obligation of the operating company

The operating company is obliged to allow only persons to work on the fast clamping device who

- are familiar with the fundamental occupational health and safety and accident prevention regulations.
- have been instructed in the use of the fast clamping device and have read and understood this operating manual.

The requirements of EC Directive 2007/30/EC on the use of work equipment must be observed.

4.8. Residual risks

Attention must be paid to the existence of mechanical, hydraulic and pneumatic residual energies at the fast clamping device and the pressure in the cylinders and valves after switching off the fast clamping device!

For example:

- preloaded springs
- pressure locked in by non-return valve
- pressure locked in by valve lock position
- etc.

4.8.1. Design for the pallet and fast closing plate

To ensure safe positioning on the fast closing clamp, make sure there is a grip point for a hand on the pallet. If this grip point is not structurally possible, care must be taken when fitting so that hand/fingers are never between the fast closing plate and the pallet.

DIN EN 349 Safety of machinery
Minimum gaps to avoid crushing of parts of the human body must be observed.

When clamping, do not reach with your fingers into the gap between the fast closing plate and the pallet.

4.8.2. Hydraulic system malfunction

During operation, a malfunction in the hydraulics may cause an unintentional decrease or increase in pressure and consequently release the fast closing clamp. Particularly in rotating applications, this can result in an extremely hazardous situation.

Possible measures to prevent accidental release:

- Mechanically disconnecting the hydraulic release line (uncoupling). This means that a pressure increase is no longer possible during operation.
- Pressure monitoring in the release circuit of the fast closing clamp. This causes the emergency stop to be triggered when the pressure rises, resulting in an immediate stop of the machine.

4.8.3. Hazard due to incorrect assembly of the fast closing clamp

Insufficient strength of the fixing screws and improper tightening of the screws as well as insufficient strength of the plate material or insufficient thread screw-in depth (e.g. aluminium, cast iron, etc.) could cause the pallet to come loose.

The risk potential is even higher for rotating applications.

Measures:
The mounting instructions for arrangement, strength class and tightening torque must be observed.
If necessary, use longer screws.
The product-related data is shown on the respective enclosed drawing with parts list and in chapter "6 Assembly and installation".

4.8.4. Hazard due to changes in rotational speed

Excessive rotational speed, weight, unbalance and machining forces can cause the fast closing clamp to break, resulting in the pallet being catapulted away.

Measure:

Observe the information and regulations regarding the maximum values of Stark.

(see chapter "9 Technical data")

4.8.5. Excess pressure hazards

Clamping locks, valves, burst pipes or hoses damaged or destroyed by excess pressure can endanger people and the environment.

Measure:

- Protect hydraulic lines with suitable overpressure safety valves.
- Observe the specified pressure limits.

4.8.6. Hazard due to escaping compressed air

Particles such as chips, liquids and the like can be thrown away by the compressed air escaping during blow-off and loud noises can be generated.

Measure: wear the following:

- Face protection
- Safety goggles
- Hearing protection

4.8.7. Influences on service life

Negative influences include:

- Insufficient filtering of the oil; observe filter mesh size < 15 my.
- Damage to components.
- External mechanical damage to functional components.
- Undefined forces or defined forces exceeded.
- Insufficient ventilation of the hydraulic circuits.
- Overloading due to sudden pressure peaks.
- Excessively high piston speed or volume flows due to excessive pump delivery rate or storage operation.
- Heavy contamination of the positioning and clamping areas (e.g. chips, grinding dust, cast iron, etc.).
- Chemically aggressive environment, e.g. Coolant lubricants, condensation water, cleaning agents, etc., which attack the material, seals, wipers, etc.
- Incorrect clamping position or loading position.

5. Description of the fast clamping device

5.1. General

The fast closing clamp and the retaining ring with clamping spigot are the precise interface and connection between the machine and the clamping device or workpiece. Among other things, it is used for fast, precise clamping during set-up, machining, deburring, washing, intermediate measuring and assembly work. While one pallet is being processed, others can be set up at the same time.
The pallet or workpiece can be used quickly and precisely one after the other on several machines with different processing methods and activities.

The STARK.plaintec.M zero point clamping system is ideal for handling large pallets and heavy workpieces. The flush-mounted installation option of the fast closing clamps and the clamping spigots enables automated handling or simple crane loading without interfering contours. By ‘sliding’ the pallet open, as well as the optional support and position query, this fast closing clamp is ideal for use in automation. The necessary pre-positioning and weight-relieved storage of the pallet on the fast closing plate at the start of the clamping process are prerequisites for precise clamping of the pallet. To avoid overdetermination, the retaining rings are available with zero point, with equaliser and without centring.

5.2. Product versions

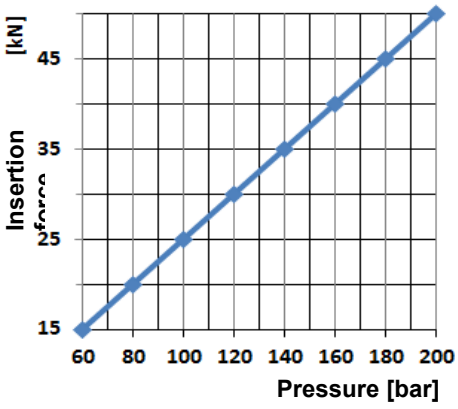
The fast closing clamps are available in various versions. The options for each version are shown in the table: The detailed data can be found in chapter "9 Technical data".

Order. no.: / Drawing no. / Version	S3000-850 S059-017-01 Tornado	S3000-851 S059-020-01 Tornado	S3000-852 S059-019-01	S3000-853 S059-021-01	S3000-854 S059-022-01 Tornado	S3000-855 S059-023-01 Tornado	S04408-01 S059-024-01
Support islands	X	X			X	X	
Blow-off	X	X			X	X	X
Query pin		X				X	X
Non-return valve					X	X	
Flange oil supply	X	X	X	X	X	X	X
Floor oil supply				X			
Shims possible	X	X			X	X	

The detailed technical data are listed in chapter "9 Technical data".

5.3. Clamping force/lateral force

The clamping force of the fast closing clamps is directly proportional to the hydraulic clamping pressure. The diagram shows the effective clamping force at the corresponding clamping pressure.



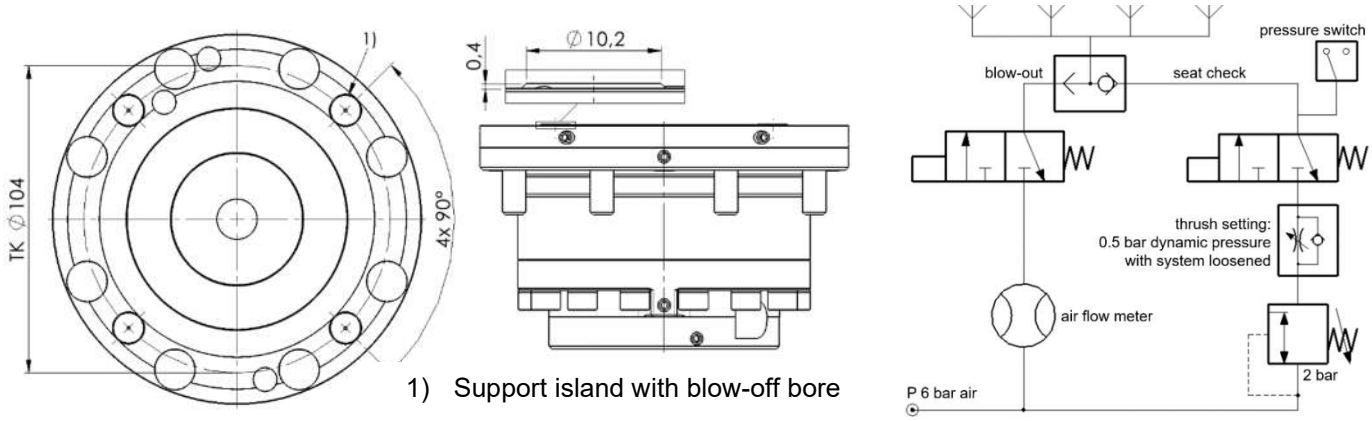
Any lateral or transverse force that occurs can only be absorbed via the frictional force, as the clamping system creates a pure frictional connection. The surface quality and the contact pressure due to the clamping force and, if applicable, the pallet weight must be taken into account.

If the frictional force is exceeded, the pallet leaves the zero point position, resulting in impermissible deformation of components.

CAUTION: This can lead to breakage of these components.

5.4. Support islands option (Tornado)

In the Tornado version, the housing is designed with 4 support islands. In the centre of each island is a bore for blow-off and seat check. During the pallet change, the blow-off is carried out at high pressure to clean the support surfaces. After the pallet has been clamped, the retaining ring rests on the islands and the seat check is carried out for quality assurance with reduced pressure.



1) Support island with blow-off bore

It is not possible to slide the pallet onto the STARK.plaintec.M Tornado. The pallet must be raised by at least 0.3 mm and positioned from above.

Shims can be used with the STARK.plaintec.M Tornado and the clamping spigots to compensate for manufacturing tolerances and achieve optimised system accuracy.

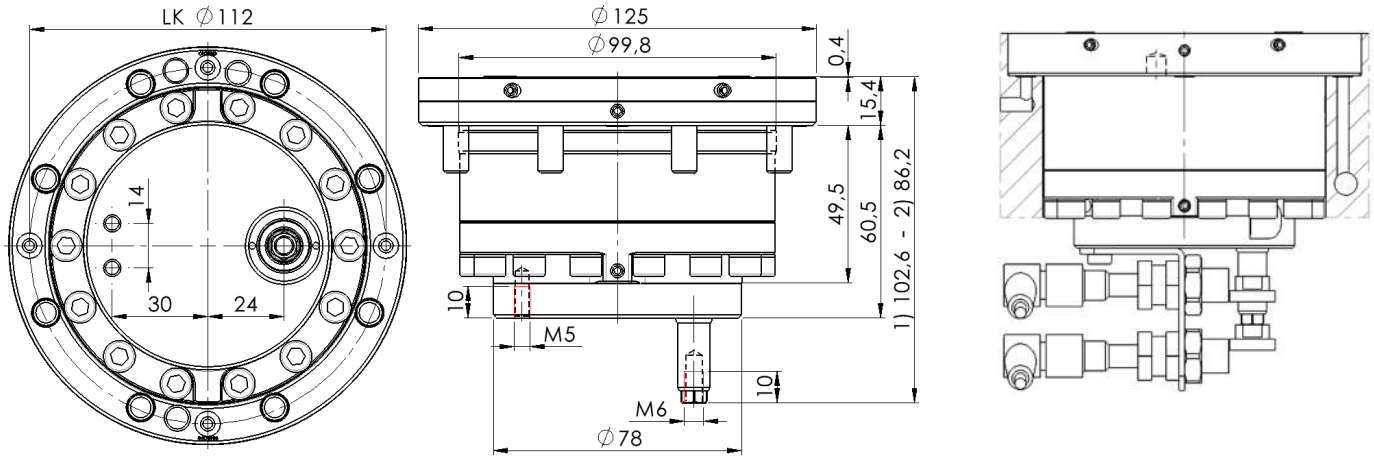
The support islands of all fast closing clamps can be ground over when installed to achieve maximum flatness. A maximum removal of 0.1 mm must not be exceeded.

CAUTION: The fast closing clamps can then no longer be replaced.

5.5. Query pin option

In the version with query, there is a query pin on the back of the fast closing clamps in the base, which changes its length depending on the clamping status. The respective position of the pin can be queried using suitable sensors, e.g. clamping position, release position. Two holes with M5 threads are provided in the floor for fastening the sensors.

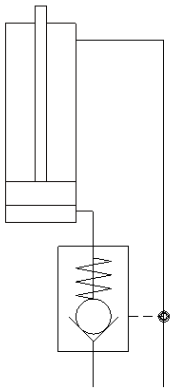
Exemplary representation



Query pin: 1) released 2) clamped

The position query or a ‘clamped/unclamped’ determination is strongly recommended, especially for partially and fully automated applications.

5.6. Non-return valve option



In the version with an integrated non-return valve in the clamping line, the clamping position of each individual fast closing clamp is maintained even if there is a loss of pressure in the clamping supply line.
Only when the release pressure is applied does the unlockable non-return valve open and the clamping pressure can escape, the fast closing clamp moves to the release position and releases the clamping spigot or pallet.

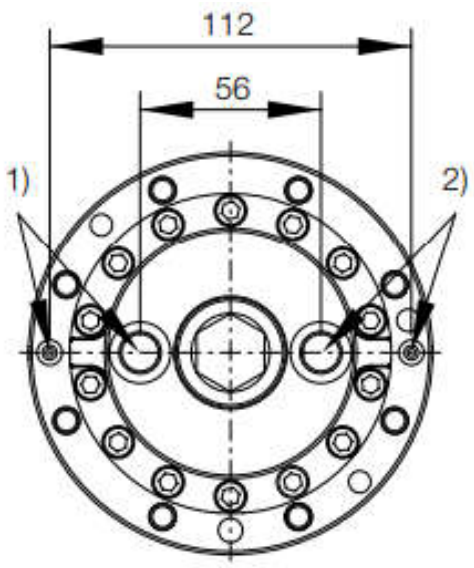
CAUTION: Due to the built-in non-return valve, the fast closing clamps remain pressurised in the clamping area, even if the supply line is depressurised! These fast closing clamps must be loosened before installation or removal. The release position is with the piston retracted.

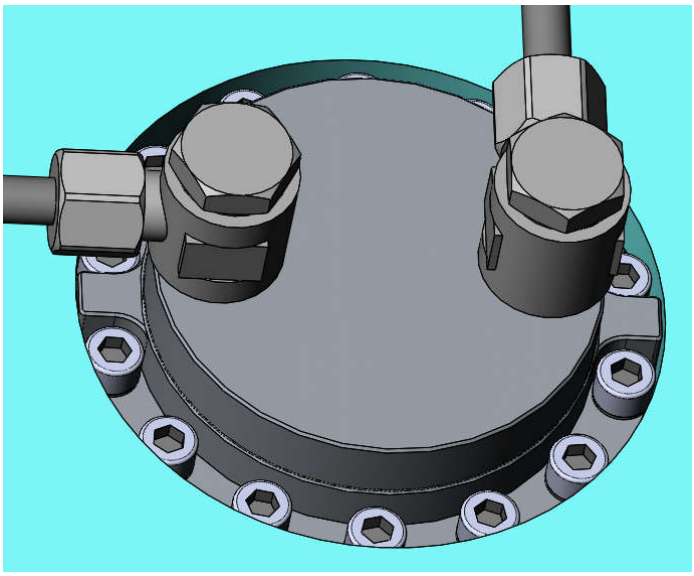
CAUTION: For safety reasons, the clamping pressure in the clamping supply line must be maintained during workpiece machining.

CAUTION: Processing with only the locked-in pressure is not permitted.

5.7. Oil supply through the floor option

In the version with floor connection, in addition to the flange connections in the housing, there is a threaded connection bore on the back of the fast closing clamp in the base for the pipework or tubing of the clamping and release connection.
The floor and flange connections can also be used optionally.
However, the unused connections must be sealed tightly.





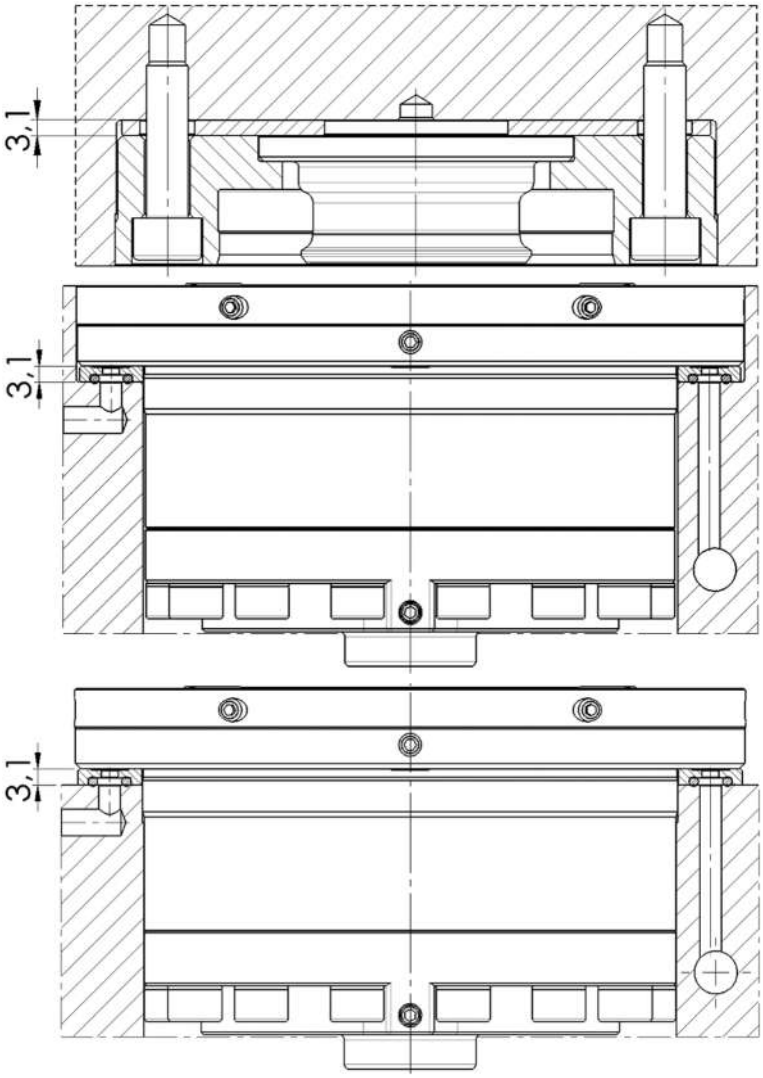
1) Release connection via O-ring or thread G1/4’
2) Clamp connection via O-ring or thread G1/4’

5.8. Shims option

The shims can be used to compensate for the support height of the Tornado fast closing clamps in the fast closing plates and the height of the retaining rings in the pallets. This is often very helpful, for example with high production tolerances, especially with large spacings. Also to achieve optimised system accuracy across several processing and set-up stations and across all pallets.

Important: However, shims can only be used with the STARK.plaintec.M Tornado and the retaining rings in the corresponding pallets. Only in this application do the retaining rings rest on the islands of the Tornados.

Important: Shims cannot be used with the fast closing clamp versions without support islands. These fast closing clamps and the retaining rings are each recessed. The entire surface of the pallet therefore rests on the fast closing plate.



Retaining ring and clamping spigot with shim

Tornado with shim recess-mounted

Tornado with shim surface-mounted

The following shims are available from STARK:

for STARK.plaintec.M Tornado	S059-157-BG shim with O-rings
for retaining rings with clamping spigot	S059-158 shim

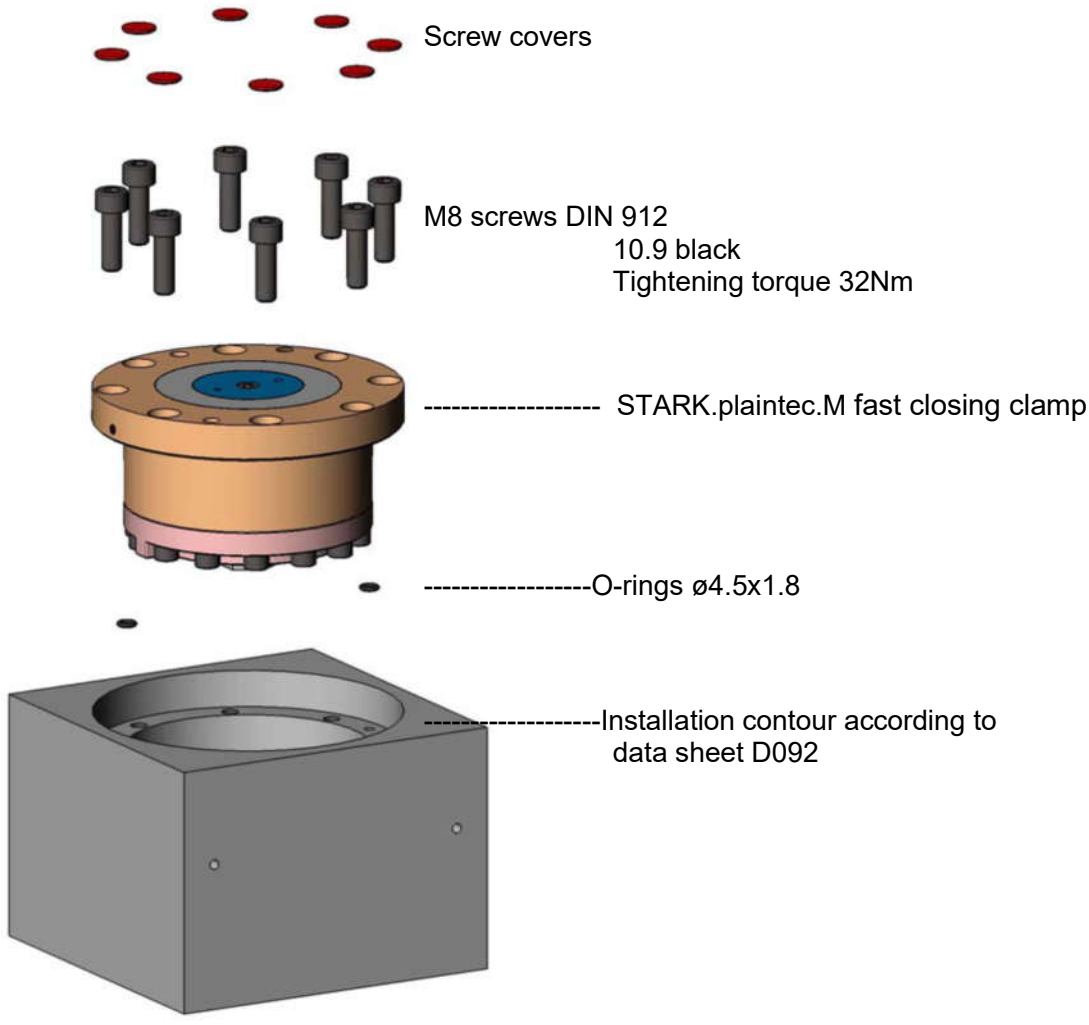
6. Assembly and installation

The installation and removal of the different fast closing clamp versions is largely identical, regardless of the options, so this is described using type S3000-852 as an example.

There are different installation options for the **Tornado fast closing clamp**. These can be recessed or surface-mounted and can be used with or without shims.

For **fast closing clamps with query rod**, a query device for the position query must be provided at the rear after installation. This query device is not included in the STARK scope of delivery.
For **fast closing clamps with floor connections**, the pipework or tubing must be attached at the rear after installation. This connection material is not included in the STARK scope of delivery.

6.1. Fast closing clamp installation



1) Check the installation contour for the fast closing clamps for dimensional accuracy, corresponding surface quality and that all edges are free of burrs, see data sheet D092 for values.
Important: All surfaces and parts must be clean; this also applies to the threads and all supply lines such as hoses, pipes, screw connections, deep-hole bores, couplings, etc. Contamination can cause positioning errors and reduce the service life of components (e.g.: seals) and lead to premature or immediate failure of the fast closing clamps.

2) If shims are used, they must be adjusted to the desired accuracy. The labelling of the installation position and the consecutive numbering of the parts and positions is helpful for correct alignment and allocation.

Important: The parts must be thoroughly deburred and cleaned and, if necessary, the installation bores must be covered. Dirt must not be allowed to enter the system!

3) Grease the O-rings for the media connections on the flange and insert them into the bottom of the housing and, if necessary, into the shims. Then fit the fast closing clamp into the installation contour.
Important: Pay particular attention to the correct positions of the clamping, release and compressed air connections.

4) Pull in the fast closing clamp evenly parallel to the system using the enclosed screws. Use the supplied screws or screws ISO 4762 / DIN 912 with quality 10.9. **Important:** After reaching the flat support, all 8 screws must be tightened to 32 Nm using a torque spanner.

5) In the case of fast closing clamps with a query pin, a suitable query device must be attached to the rear after installation.
Important: The query device must not hinder the movement of the pin.

6) For fast closing clamps with floor connections, suitable pipework or tubing of sufficient nominal width must be attached to the rear after installation. It must not be possible to damage the cables during operation.
Important: Ensure that all components used have sufficient compressive strength.

7) Once all the fast closing clamps connected to the same hydraulic circuit have been correctly installed and tightened to the appropriate tightening torque, the hydraulic pressure generator can be connected to the hydraulic circuit.

8) The clamping system must now be commissioned as described in chapter "7 Commissioning, handling and operation".

9) The screw covers are only fitted after the function of the fast closing clamps has been checked and ensured.

Check the specification dimension A for each fast closing clamp, see chapter "8.1 Specification dimension A". **Important:** Only when the specification dimension is complied with is proper functioning of the fast closing clamp guaranteed. If the specification dimension for one or more fast closing clamps cannot be complied with, the appropriate fast closing clamps must be removed and reinstalled.
Important: In the event of recurrence, the fast closing clamps must be checked.

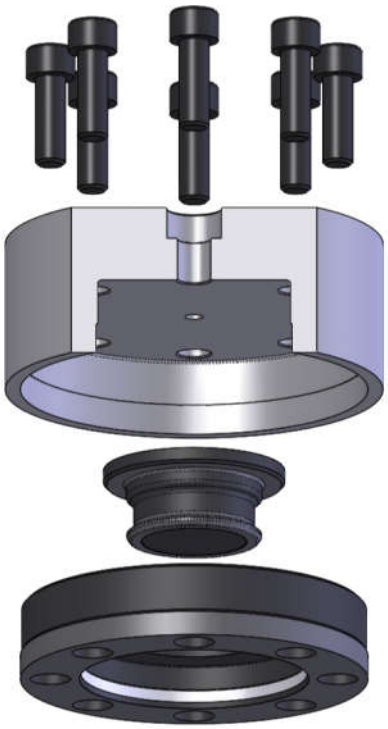
6.2. Installation of clamping spigot

The installation and removal of the clamping spigots with the different retaining rings is almost identical. The retaining rings can be fastened either from the front with M8 screws or from the rear with M10 screws, as required by the installation situation. The M10 threads in the retaining rings are continuous. Ensure correct and sufficient screw length.

Important: When assembling the clamping spigots, pay attention to the arrangement of the various retaining ring versions such as zero point, compensation, without centring. In the event of overdetermination, this can lead to increased lateral forces and thus to increased wear.

Important: When using Tornado, pay attention to the position of the support islands and the screw head countersinks. See the information on data sheet D093, sheet 3.

Screws ISO 4762 / DIN 912 M10 8.8
Tightening torque 40Nm



Installation contour according to data sheet D093

Clamping spigot

Retaining ring
with zero point
with equaliser
without centring

Screws ISO 4762 /
DIN 912, M8 10.9
Tightening torque 32Nm

1) Check the installation contour for the retaining ring with clamping spigot for dimensional accuracy, corresponding surface quality and that all edges are free of burrs, see data sheet D093 for values.
Important: All surfaces and parts must be clean, this also applies to threaded bores. Contamination can cause assembly and positioning errors.

2) If shims are used, adjust them to the desired accuracy. The consecutive numbering of the parts and items is helpful for correct allocation. **Important:** The parts must be thoroughly deburred and cleaned and, if necessary, the installation bores must be covered. Dirt must not be allowed to enter the system!

3) Pull in the clamping spigot and the retaining ring with the selected screws evenly parallel up to the contact. Only use screws of the appropriate quality (10.9 or 8.8).
All 8 screws must be tightened accordingly using a torque spanner.
Important: Ensure correct alignment of the retaining ring with equaliser.

After installation, check the radial movement of the clamping spigot in the retaining ring. The clamping spigot must be easy to move and turn regardless of the retaining ring design (zero point, equalisation, without centring). The pallet positioning is determined by the retaining rings in combination with the pistons of the fast closing clamps.

6.3. Removing the fast closing clamp

1) The system must be completely depressurised before disassembly is started. Only remove fast closing clamps with non-return valve in the release position. Disconnect the power supply from or to the pressure generator.

2) For fast closing clamps with floor connection, loosen and/or remove the connection lines.
For fast closing clamps with query, loosen and/or remove the rear query attachments.

3) Remove the screw covers and loosen all 8 screws evenly.

4) Remove all screws and then screw 2 screws into the two M8 pull-off threads to push the fast closing clamp evenly parallel out of the locating bore of the clamping plate. Then remove the fast closing clamp and the O-rings.

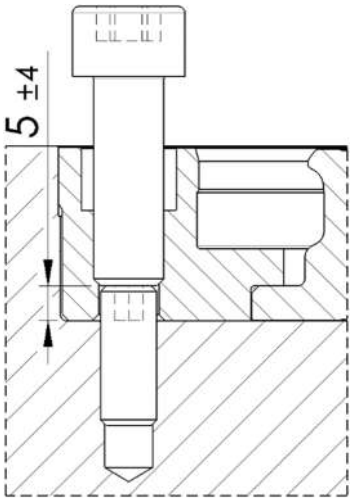
If the fast closing clamps have been ‘ground over’ after installation (see "5.4 Support islands option (Tornado)"), the ACTUAL height of the respective disc can be determined using the two pull-off threads in the disc before replacing the fast closing clamps.

Collect any leaking oil and reuse it if possible or dispose of it properly.

6.4. Removal of clamping spigot

1) **For retaining rings with fastening from behind with M10 screws:**
Loosen all 8 screws evenly and then remove every second one. Unscrew the remaining 4 screws by approx. 5mm each. Use a plastic hammer to hit the protruding screw heads evenly so that the retaining ring is pressed out of the locating bore in the pallet as parallel as possible. Unscrew the 4 screws again by approx. 5 mm each and repeat the hammer blows. If the retaining ring is outside the press fit, the screws can be removed and the retaining ring with the clamping spigot can be removed.

2) **For retaining rings with fastening from the front with M8 screws:**
Loosen and remove all 8 screws uniformly. Screw a threaded pin M8×20 (for thread depth 15 mm) into each of 2 M8 threaded holes offset by 180° or 4 threaded holes offset by 90° up to the thread outlet, but do not tighten. For other thread depths, adjust the threaded pin length accordingly so that the threaded pin protrudes beyond the thread from the pallet. Screw an M10 screw into each of the M10 threads above the threaded pins and press the retaining ring evenly parallel out of the locating bore in the pallet. Then remove the retaining ring with the clamping spigot. Then remove the M10 screw and the threaded pins again.



7. Commissioning, handling and operation

7.1. During initial commissioning

- Perform a visual inspection of the entire machine and fast closing clamps.
- Expel any unauthorised persons from the vicinity of the machine.
- When using shims, adjust them to the desired accuracy before hydraulic operation.
- Check that all fast closing clamps are fitted and connected as described in chapter "6.1 Fast closing clamp installation".
- Check the fill level of the hydraulic oil in the hydraulic pressure generator.
- Vent all fast closing clamps and hydraulic lines.
- Set the operating pressures of the fast closing clamps on the hydraulic and pneumatic supply lines. (see chapter "9 Technical data")
- Set the overpressure safety valve in the hydraulic pressure line to max. 5 bar above the max. operating pressure. (see chapter "9 Technical data")
- For fast closing clamps with blow-off, set the required compressed air supply.
- When using the seat check, install and adjust a suitable sensor system.
- For fast closing clamps with query rod, install and adjust a suitable sensor system.
- Check the connection lines for fast closing clamps with floor connections.
- Check all fast closing clamps and lines for hydraulic and pneumatic leaks.
- Check the specification dimension A for all fast closing clamps (see chapter "8.1 Specification dimension A")

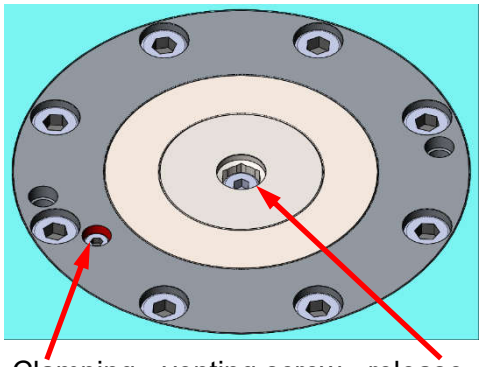
CAUTION: Excessive pressure can permanently damage the fast closing clamp and destroy it! Before using the clamping system, check the operating pressure and the safety valves.
CAUTION: Leaking oil poses a risk to people and the environment. Collect any leaking hydraulic oil and reuse it if possible or dispose of it properly.
CAUTION: Contamination can reduce the service life of components (e.g.: seals) and lead to premature or immediate failure of the fast closing clamps.

7.2. Function check

In principle, only authorised and appropriately trained persons may carry out work on the fast closing clamps. For your own protection, the necessary safety measures must be observed in full and without exception during all activities. Wearing personal protective equipment is recommended during the entire function check!

Once all the fast closing clamps with the O-rings have been installed and the screws have been tightened to the appropriate tightening torque, the hydraulic pressure generator can be connected to the clamping and release circuits.

Venting: Slowly and carefully increase the pressure in the clamping line to max. 20 bar, at which point the pistons extend from the fast closing clamps. Meanwhile, check the entire system and the fast closing clamps for leaks, switch off the pressure generator immediately if necessary and seal the leak. If the entire system is tight, you can start with a fast closing clamp by opening the venting screw of the clamping circuit a maximum of 2 turns until only bubble-free oil escapes. Then tighten the clamping circuit venting screw again to 2.5 Nm. Vent all fast closing clamps of the same clamping circuit one after the other.



Clamping - venting screw - release

CAUTION: Collect any leaking oil and reuse it if possible or dispose of it properly. Check the oil level of the pressure generator continuously.

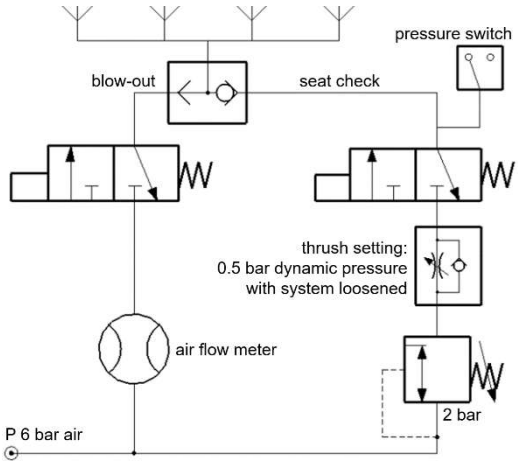
Identical procedure for the release circle. The piston retracts into the fast closing clamp.
For fast closing clamps with a non-return valve, the pressure increases briefly before the piston moves to the release position. Tighten the release circuit venting screw to 6 Nm.
Repeat the bleeding on both pressure sides at least once for all fast closing clamps. Then check the oil level of the pressure generator.

Clamp: Increase the clamping pressure slowly and carefully. Do not exceed the maximum permissible pressure according to chapter "9 Technical data". This causes the piston to extend from the fast closing clamp. Check the entire system and the fast closing clamps for leaks, switch off the pressure generator immediately if necessary and eliminate the leak.
Once the clamping pressure has been reached, the control dimension A must be checked for all fast closing clamps, see chapter "8.1 Specification dimension A". Safe and reliable operation is only guaranteed if all fast closing clamps reach specification dimension A. Then check the entire system and the fast closing clamps again for leaks. Release the clamping pressure.

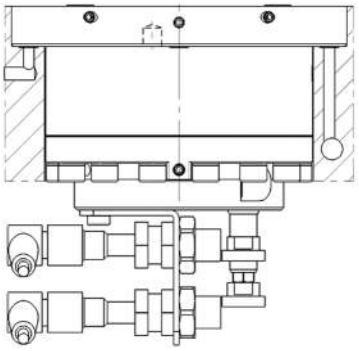
Release: Increase the release pressure slowly and carefully. Do not exceed the maximum permissible pressure according to chapter "9 Technical data". This causes the piston to retract into the fast closing clamp. Check the entire system and the fast closing clamps for leaks, switch off the pressure generator immediately if necessary and eliminate the leak.
When the release pressure is reached, the piston must be fully retracted into the fast closing clamp. Safe and reliable operation is only guaranteed if all pistons are fully retracted into the fast closing clamps. Then check the entire system and the fast closing clamps again for leaks. Release the release pressure.

The clamping and release time must also be checked during commissioning, as changing the clamping state too quickly results in increased wear and therefore has a negative effect on the service life.

Support island / blow-off / seat check option:
Switch on the blow-off air and check that sufficient compressed air is flowing evenly from all blow-off bores at the support islands. At least 50 litres of compressed air / minute must flow from each individual fast closing clamp.
To achieve the most efficient cleaning effect possible, the blow-off should be activated a few seconds before the pallet change and remain active until the new pallet is firmly clamped.
When using the seat check, a sensor system must be set up and adjusted. (see example circuit diagram with dynamic pressure measurement)



Query pin option: Individual attachments can be fitted to the query pin and the housing for the position query of the piston. Both electronic and pneumatic sensors can be used. These are available in different accuracy versions.

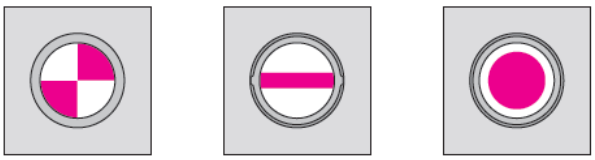


Ensure that there is sufficient clearance to prevent collisions with the surroundings. The movement of the pin or piston must not be restricted.

Unlockable non-return valve option: If the pressure in the clamping line is intentionally or unintentionally released after the clamping process, the fast closing clamps remain in the clamped position with the pistons extended. When pressed in manually, the pistons must remain immobile even after 30 minutes.

If an extended piston can still be moved, the non-return valve on this fast closing clamp must be checked or replaced. The piston may only change to the released position after the release pressure has been applied.

On the pallets, the correct arrangement, alignment and mounting of the retaining rings and the radial movement of the clamping spigot must be checked. The clamping spigot must be easy to move and turn.



1) Retaining ring with zero point
2) Retaining ring with equal-

The necessary pre-positioning of the pallets on the fast closing plate is a prerequisite for a successful, secure clamping process.

For heavy pallets, weight relief must be provided during the clamping process, e.g. air cushions, ball bearings or similar, so that the pistons can move the pallet to the zero point position when extending into the clamping position.

7.3. Operation

After proper installation and commissioning, the clamping system can be used.

Procedure for the change cycle:

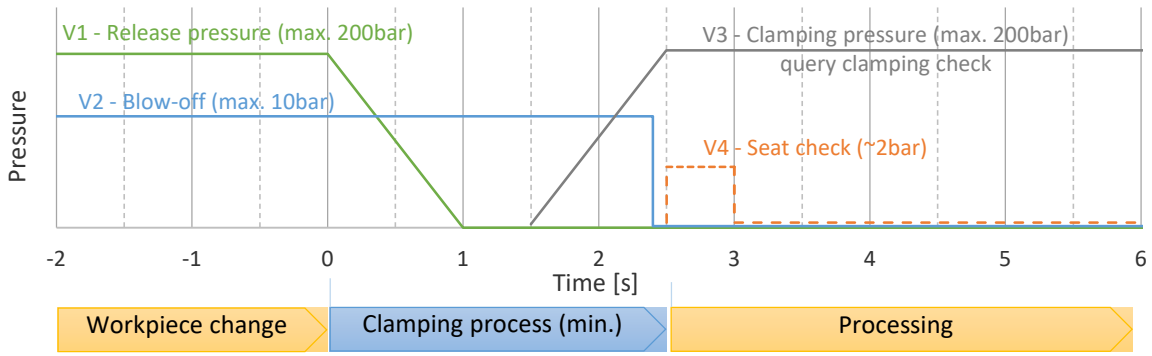
- Switch on the blow-off air approx. 3 seconds before releasing (optional)
- Release the clamping system
- Query the release position (optional)
- Change the pallets
- Clamp the clamping system
- Query the clamping position (optional)
- Switch off the blow-off air (optional)
- Query the seat check (optional)

If a fast closing clamp without blow-off and/or without a query pin is used, the corresponding steps are not required.

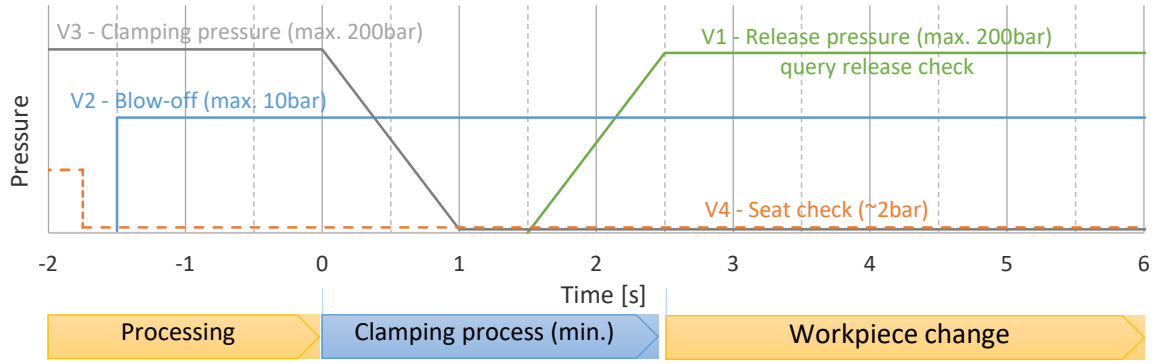
The fast closing clamp consists of many moving parts and is therefore manufactured with corresponding tolerances. It cannot be ruled out that a small amount of oil may escape even with new, fully functional fast closing clamps. This does not constitute a defect! However, if the amount of oil escaping increases over time, the fast closing clamp should be checked.

7.4. Sequence diagram

Time sequence of the clamping process:



Time sequence of the release process:



8. Maintenance and repair

Regular cleaning and service work must be carried out to ensure that the fast closing clamps function correctly in the long term:

Monthly maintenance:

Check the fast clamping system or the fast closing clamps for cleanliness, damage, foreign objects and any leaks. Check the specification dimension A at the clamping position of the fast closing clamps. Check the ball ring according to the instructions "8.3 Checking and replacing the ball ring". In the event of premature wear, such as deformation of the ball surfaces (e.g. due to dirt, incorrect clamping), deformed or damaged round wire ring, corrosion, etc., the ball chain must be replaced with a new one immediately. Check the surface appearance of the contact surfaces, the clamping spigots and the piston surfaces for excessive wear! Check the non-return valve for leaks.

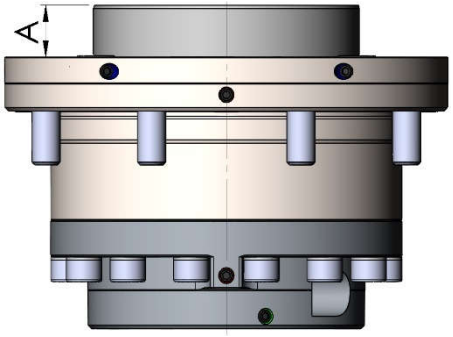
Yearly or after 25,000 clamping cycles:

STARK recommends replacing the ball ring once a year or after 25,000 clamping cycles and sending it to STARK for inspection. Replace the ball ring according to the instructions ""8.3 Checking and replacing the ball ring".

After 500,000 clamping cycles:

When the max. clamping cycles are reached, extensive maintenance of the fast closing clamps must be carried out at STARK or by trained, instructed personnel.

8.1. Specification dimension A



Specification dimension A can be used to check that the fast closing clamps are functioning properly.

In the clamping position, measure dimension A on the outside of the housing. In the Tornado versions, the measuring surface is directly adjacent to the outer piston.

If the specification dimension is not reached, check the oil level of the pressure generator.

S059-002, S059-007, S059-008, S059-010, S059-011, S059-012, S059-013, S059-014, S059-015, S059-016	13.0	±0.1
S059-017, S059-018, S059-019, S059-020, S059-021, S059-022, S059-023, S059-024	14.0	±0.1
S059-017-01, S059-020-01, S059-022-01, S059-023-01	14.4	+0.1 +0.0
S059-019-01, S059-021-01, S059-024-01	14.2	+0.1 +0.0

The fast closing clamps will only function properly if dimension A in the table is observed. If the value falls below dimension A, the fast closing clamp must be serviced immediately by an authorised service person.

If no service is performed, safe clamping of the clamping spigot is not possible.
There is a considerable risk of accidents.

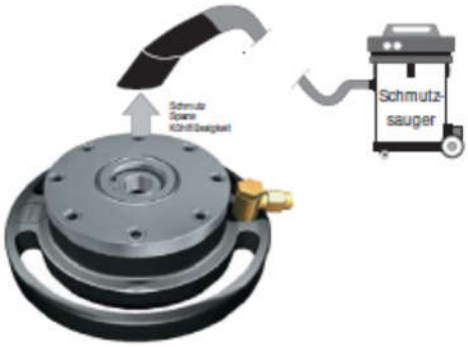
8.2. Surface cleaning

The fast closing clamp must be cleaned at regular intervals. No dirt is permitted on and in the fast closing clamp or on the clamping spigot.
The piston, housing, ball chain, retaining ring and clamping spigot area in particular must be cleaned of chips, encrustations and other liquids. Cleaning should be carried out depending on the application and replacement interval. In case of heavy contamination, cleaning must be carried out at shorter intervals.

Before a longer standstill of the system (e.g.: weekend, holidays, etc.), it is advisable to clean the fast closing clamps and clamping spigots thoroughly and to take corrosion protection measures.

Correct!

The fast closing clamps and the clamping spigots may be blown out and off with compressed air.



Correct and better!

Removal and extraction of chips, dirt and coolant from the fast closing clamps and clamping spigots.

Cleaning agents

The product must not be cleaned with:

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

Lubricants and oils (hydraulic oil)

Unsuitable lubricants and oils can damage the seals and have a significant negative impact on their service life.

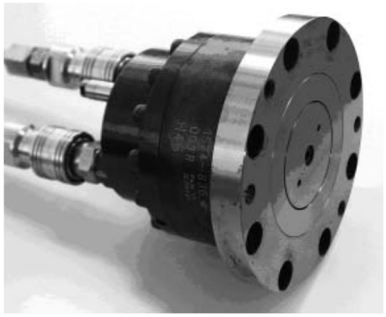
CAUTION: Mixing of oils is not permitted.

Recommendation: Hydraulic oil Castrol Hyspin AWS 32 or Castrol Hyspin AWS 46

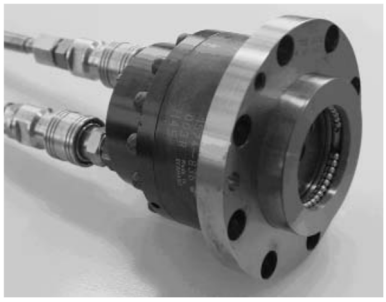
8.3. Checking and replacing the ball ring

In principle, only authorised service personnel or appropriately trained personnel may carry out installation work on the fast closing clamps. For your own protection, the necessary safety measures must be observed in full and without exception during all work.

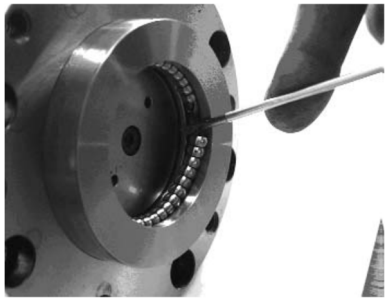
Procedure: **Removal**



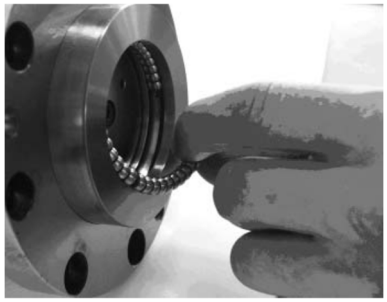
Step 1: Set the fast closing clamp to ‘release’. (without pallet).



Step 2: Set the fast closing clamp to ‘release’. (without pallet).

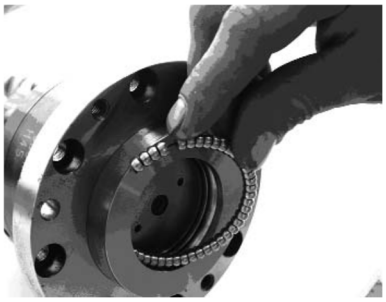


Step 3: Carefully lift the ball ring with a small screwdriver.

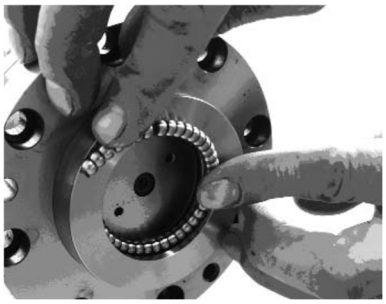


Step 4: Pull off the ball ring with two fingers. If there are loose balls, replace the entire ball ring. Do not bend the round wire ring, there is a risk of breakage.

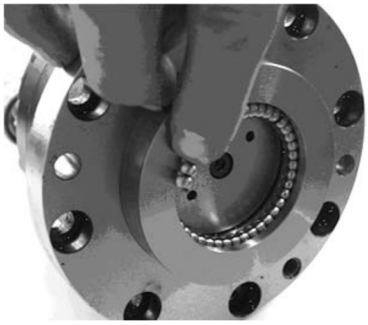
Insertion



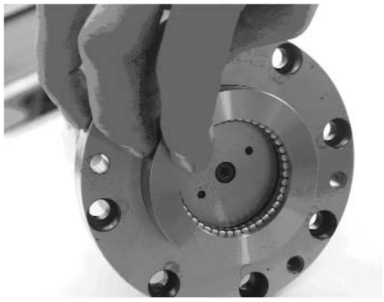
Step 5: Lightly grease the cleaned (replacement) ball ring with SKF LGWA2/1 before inserting it. Position the ball ring with the lower end in the groove.



Step 6: Fix the ball ring in the centre and at the top end.



Step 7: Grasp the upper end.



Step 8: Snap the ball ring into the groove.

8.4. Storage

Until first use:

If you do not use the fast closing clamp immediately, please store it dry and dust-free in its original packaging.

Long period of storage after use:

Before storage, clean the fast closing clamp thoroughly (see chapter "8.2 Surface cleaning"), take measures to protect against corrosion, pack and store in a dry and dust-free place.

After a long period of storage:

After a long period of storage (approx. 3 years), replace the O-rings before use. Then carry out a new function check, see chapter "7.2 Function check".

8.5. Disposal / recycling

All parts, auxiliary materials and process media of the fast clamping device must be separated according to type and disposed of in accordance with the local regulations and directives.

9. Technical data

Art. no.:	S3000-850	S3000-851	S3000-852	S3000-853	S3000-854	S3000-855	S04408-01
Specification dimension A	14.4 mm	14.4 mm	14.2 mm	14.2 mm	14.4 mm	14.4 mm	14.2 mm
Max. clamping force[1]	50 kN at 200 bar (see table, chapter "5.3 Clamping force/lateral force")						
Max. clamping force	200 bar						
Min. release pressure	20 bar	20 bar	20 bar	20 bar	70 bar	70 bar	20 bar
Max. release pressure	200 bar						
Max. lateral force[2]	See chapter "5.3 Clamping force/lateral force"						
Clamping oil volume	65 cm³						
Release oil volume:	22 cm³						
Repeat accuracy[3]	<0.01mm						
Min. blow-off	80 l/min	80 l/min	-	-	80 l/min	80 l/min	80 l/min
Max. blow-off	10 bar	10 bar	-	-	10 bar	10 bar	10 bar
Seat check	2 bar	2 bar	-	-	2 bar	2 bar	2 bar
Min. clamping time	1 sec.	1 sec.	1 sec.	1 sec.	3 sec.	3 sec.	1 sec.
Min. release time	1 sec.	1 sec.	1 sec.	1 sec.	3 sec.	3 sec.	1 sec.
Radial pre-positioning	±0.4 mm (with low-force, moving feed)						
Axial pre-positioning	+0.1 mm						
Temperature range	+10°C to +80°C						
Complete system maintenance	500,000 clamping cycles						
Ball chain maintenance	25,000 clamping cycles						
Weight	3.85 kg	4.25 kg	3.86 kg	4.25 kg	4.2 kg	4.22 kg	4.25 kg
Hydraulic oil	According to DIN 51524 (HLP 32 or HLP 46)						
Filter class	Quality class 4						
Sealing material	NBR; other materials on request						

[1] The clamping force depends on the clamping pressure. It should only be set as high as necessary, as the service life is positively influenced by a lower pressure. This clamping force is the load up to which the zero point is guaranteed.

[2] The maximum lateral force indicates the value until leaving the zero point. The shear force is absorbed exclusively via a frictional connection.

[3] The repeat accuracy depends on the application and the installation situation.

10. Declaration of Incorporation

This document refers to the Declaration of Incorporation according to Machinery Directive 2006/42/EC Annex II No. 1 letter B:

Manufacturer: **STARK Spannsysteme GmbH**
Römergrund 14
A-6830 Rankweil
Austria

Authorised representative to compile the technical documentation:
Mr. Martin Greif, Managing Director, address: See manufacturer.

Product:	Fast closing clamp
Function:	Clamping and centring of workpiece pallets or workpieces
Product group:	STARK.plaintec
Article number:	S3000-850, S3000-851, S3000-852, S3000-853, S3000-854, 3000-855, S04408-01
Trade name/ general designation:	Fast closing clamp

The manufacturer undertakes to provide the specific technical documentation relating to the incomplete machinery to national authorities in electronic or written form upon justified request.

Before it is established that the complete machine complies with the provisions of the Machinery Directive 2006/42/EC, it is prohibited to put the incomplete machinery into service.

If applicable, there are additional guidelines for the machine integrator, among others, to observe and implement completely and correctly before commissioning:
EN ISO 12100; EN ISO 4413
- in the respective valid version of the statutory date.

Stark Spannsysteme GmbH Rankweil, 24/04/2025

Martin Greif
Managing Director

The following part of the Declaration of Incorporation according to the Machinery Directive 2006/42/EC Annex II No. 1 letter B describes which parts of the Machinery Directive 2006/42/EC have already been fulfilled for the system used at the time of handover of the product(s) or still have to be fulfilled subsequently by the integrator of the complete machine. The list is drawn up in accordance with the Machinery Directive 2006/42/EC Annex I.

If a superordinate provision is marked and the sub-items are not indicated, this shall apply collectively to all subordinate provisions which are thus to be fulfilled or have already been fulfilled.

If individual aspects are not relevant to the system described in this document by the manufacturer or distributor, this does NOT necessarily mean that the integrator of the complete machine does not have to consider these aspects in general.

If two columns are marked, this means that parts of the provisions have already been partially or fully complied with, but the integrator is responsible for full compliance.

	To be fulfilled by the system integrator:		↓
	Fulfilled on the part of the system manufacturer:	↓	
	not relevant: ↓		
1.	Essential health and safety requirements		
1.1.	General remarks		
1.1.1.	Definitions		X X
1.1.2.	Principles of safety integration		X X
1.1.3.	Materials and products		X X
1.1.4.	Lighting		X
1.1.5.	Design of machinery to facilitate its handling		X X
1.1.6.	Ergonomics		X
1.1.7.	Operating positions		X
1.1.8.	Seating		X
1.2.	Control systems		X
1.3.	Protection against mechanical hazards		
1.3.1.	Risk of loss of stability		X
1.3.2.	Risk of break-up during operation	X	
1.3.3.	Risks due to falling or ejected objects		X
1.3.4.	Risks due to surfaces, edges or angles	X	
1.3.5.	Risks related to combined machinery		X
1.3.6.	Risks related to variations in operating conditions		X
1.3.7.	Risks related to moving parts		X
1.3.8.	Choice of protection against risks arising from moving parts.		X
1.3.8.1.	Moving transmissions parts		X
1.3.8.2.	Moving parts involved in the process		X
1.3.9.	Risk of uncontrolled movements		X
1.4.	Required characteristics of guards and protective devices		X
1.5.	Risks due to other hazards		
1.5.1.	Electricity supply		X
1.5.2.	Static electricity		X
1.5.3.	Energy supply other than electricity		X
1.5.4.	Errors of fitting	X	X
1.5.5.	Extreme temperatures		X
1.5.6.	Fire	X	
1.5.7.	Explosion	X	

1.5.8.	Noise			X
1.5.9.	Vibrations	X		
1.5.10.	Radiation	X		
1.5.11.	External radiation	X		
1.5.12.	Laser radiation	X		
1.5.13.	Emissions of hazardous materials and substances			X
1.5.14.	Risk of being trapped in a machine			X
1.5.15.	Risk of slipping, tripping or falling			X
1.5.16.	Lightning			X
1.6.	Maintenance			X
1.7.	Information			
1.7.1.	Information and warnings on the machinery		X	X
1.7.1.1.	Information and information devices			X
1.7.1.2.	Warning devices			X
1.7.2.	Warning of residual risks			X
1.7.3.	Machinery marking			X
1.7.4.	Instructions		X	X
1.7.4.1.	General principles for the drafting of instructions		X	X
1.7.4.2.	Content of the instructions		X	X
1.7.4.3.	Sales literature		X	X
2.	Supplementary essential health and safety requirements for certain categories of machinery			X
3.	Supplementary essential health and safety requirements to offset hazards due to the mobility of machinery			X
4.	Supplementary essential health and safety requirements to offset hazards due to lifting operations			X
5.	Supplementary essential health and safety requirements for machinery intended for underground work			X
6.	Supplementary essential health and safety requirements for machinery presenting particular hazards due to the lifting of persons			X

All currently available languages can be found at:
https://www.stark-roemheld.com/download