



**ROEMHELD**  
HILMA ■ STARK

# **SPEEDY zero point clamping system**

Operating manual

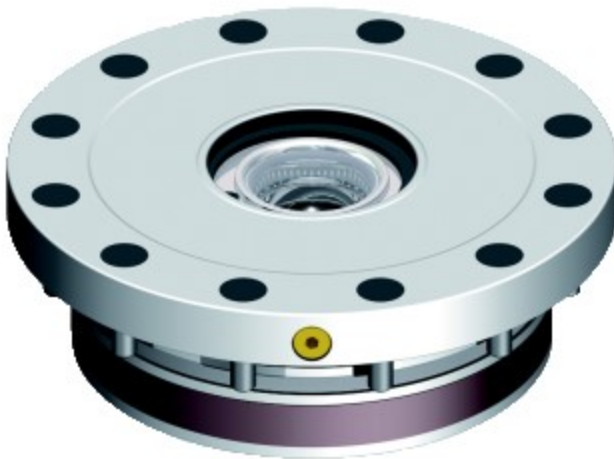
WM-020-332-10-en BA Speedy classic 2+3 NG

**precise, fast and powerful**



## **SPEEDY classic 2 / 3 NG**

Art. no.: 804 ... / 806 ... / 807 ...



## **SPEEDY classic 2 / 3 Twister NG**

Art. no.: 804 ...



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## 2 Identification of the partly completed machinery

Product:	Fast closing clamp
Optional:	With clamp control valve
Function:	Clamping and centring of workpiece pallets or workpieces
Product group:	SPEEDY Flush Mount classic 2 / 3 NG / Twister
Article number:	804 ..., 806 ..., 807 ...,
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 closing clamping device
- gives important instructions for safe and efficient use of the fast closing clamping device

### 3.2 Presentation of safety instructions

Safety instructions are identified by a pictogram and a signal word. 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 instructions.



#### **CAUTION**

**Potentially** hazardous situation (minor injury or material damage). Be sure to follow these instructions and the procedures described!



#### **INFORMATION**

Tips for use and particularly useful information.



#### **INSTRUCTION**

Obligation to follow the described procedure or method for the safe use of the machine.



## 4 Fundamental safety instructions

### 4.1 Intended use



The fast closing clamp is used for clamping pallets with mounting devices for workpieces or workpieces directly. The workpieces are intended for processing, 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 that specified in chapter "4.1 Intended use" or use beyond this is considered improper.

Risks can arise if the device is not for its intended purpose. Improper uses include e.g.:

- exceeding the technical specified for the normal operation.
- application for hoist operation and load transportation.

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 is only allowed to be operated if it has been ensured that it is securely clamped. We recommend the installation of a clamp control valve. For the safety-related link to the clamp control valve see the operating manual "WM-020-255 de BA Spannkontrollventil" (Operating manual clamp control valve). It is also to be ensured that the permissible fast closing clamp forces occurring according to the specifications are not exceeded.

Specialists must be consulted for the calculation and design of the fast closing clamp for rotating applications. STARK Spannsystem GmbH provides this service.

### 4.4 Modifications or alterations



Unauthorised modifications or alterations of the fast closing clamp 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 Spare and wear parts and auxiliary materials



If the pallets are built or purchased by the operating company itself, STARK retractable nipples must be used.

These must be installed according to the STARK data sheets.

The use of spare and wear parts from third-party manufacturer 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.

## 4.6 Obligation of the operating company



The operating company is obliged to allow only persons to work on the fast closing clamp who

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

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

## 4.7 Residual risks



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

### 4.7.1 Spring assembly



If the fast closing clamp is dismantled improperly, material damage or injury may occur due to the internal, pretensioned spring assembly. Assembly work may only be carried out by STARK Spannsysteme GmbH. For exact procedure see section 6 "Mounting and installation"

### 4.7.2 Design of the pallet and fast closing clamp plate



To ensure safe positioning on the fast closing clamp, make sure there is a grip point for a hand on the pallet. If such a point is not possible due to design reasons, make sure that no hand/fingers can get between the fast closing clamp and nipple or between the fast closing clamp plate and the pallet. When changing procedure, only grab the pallet at the front.

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

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

### 4.7.3 Malfunction in the hydraulics



Malfunctions in the hydraulics or pneumatics can lead to an unintentional increase in pressure in the release line and subsequently to the release of the fast closing clamp. Particularly in rotating applications, this can result in a significant hazards situation.

Possible measures to prevent unintentional release:

- Mechanical disconnection of the release pressure line (decouple). This means that



a pressure increase is no longer possible during operation.

- Decoupling the safety valves from the machine hydraulics/pneumatics. This means that a pressure increase is no longer possible during operation.
- When the hydraulic system is decoupled, the temperature in the system/pallet must not increase, e.g. due to hot chips or machine operations.
- With integrated pressure monitoring in the release circuit of the fast closing clamp, the machine can be stopped in the event of an unintentional increase in pressure.

#### 4.7.4 Danger due to incorrect installation of the fast closing clamp



Improper tightening of the fixing bolts or insufficient strength of the bolts may cause the pallet to come loose .

Measure:

The mounting instructions for arrangement, strength class and tightening torque must be observed.

#### 4.7.5 Danger due to changes in the rotational speed



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

Measure:

Observe the specifications and regulations of STARK Spannsystem GmbH.  
(see chapter "9 Technical data")

#### 4.7.6 Pressure hazards



Lines or hoses bursting due to excessive pressure can endanger persons and the environment.

Measure:

- Protect hydraulic or pneumatic lines with pressure relief valves.
- Observe the specified pressure limits.

#### 4.7.7 Influences of service life

Negative influences include:

- Insufficient filtering of the oil or compressed air: a filter fineness of < 15µm must be observed.
- External mechanical damage to functional components.
- Undefined forces or defined forces exceeded.
- Insufficient ventilation of the hydraulic circuit.
- Overloading due to sudden pressure peaks.
- Excessive piston speeds: the specified release and clamping times must not be undercut due to excessive volume flows (note pump delivery rate!).
- Heavy contamination (e.g. chips, casting or grinding dust, etc.).
- Aggressive environment, e.g.: cooling lubricants or cleaning agents which chemically attack seals / wipers.
- Incorrect preload position or loading position.
- Damage due to excessive loading and unloading speed.
- Staying too long in the release position leads to unnecessary loads on the seals and springs.

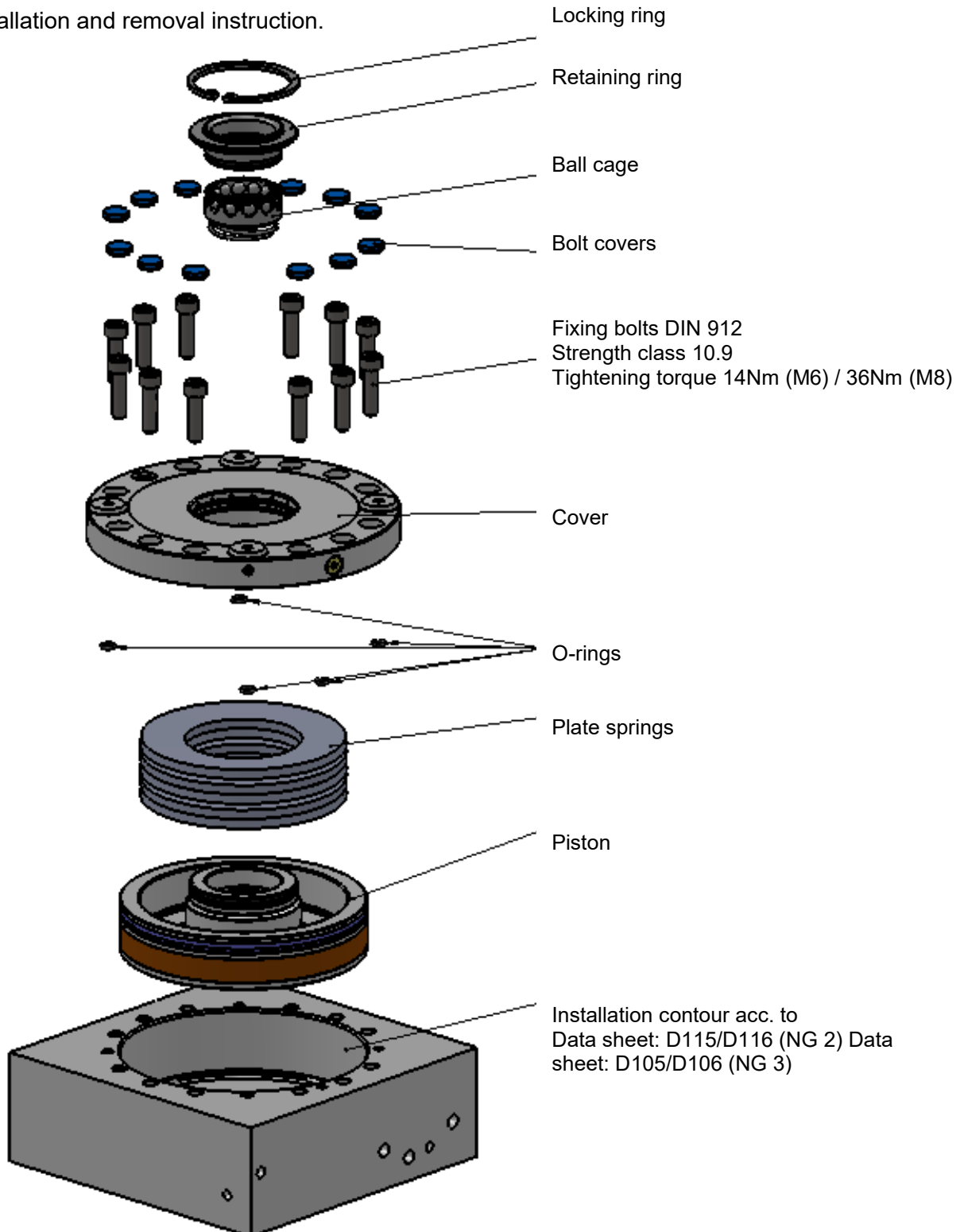


## 5 Description of the fast closing clamp

The products of the SPEEDY classic series are fast closing clamps made of high quality tool steel. It is the connection between machine and clamping device and is used for fast and efficient set-up.

## 6 Assembly and Installation

Installation and removal instruction.





## 6.1 Assembly of fast closing clamp using assembly aid

- Check installation contour for SPEEDY for dimensional accuracy and surface finish. Important: the chamfer  $1.6 +0.2 \times 30^\circ$  on the  $\varnothing 110 / \varnothing 150$  bore must be dimensionally correct. Parts must be clean, this statement also applies to all supply lines. (Deep bores, etc.)
- Thoroughly grease piston and insert in the bore.
- Fit spacer washer and plate springs in the installation cavity, during this process pay attention to the configuration of the springs depending on the insertion force. (Refer to information slip enclosed.) Centre the springs by inserting the centring piece. Insert centring pins in 2 opposing bores, then carefully extract the centring piece. It is to be ensured that the springs do not move during this process. (If an assembly aid is not used the plate springs must be centred by hand.)
- Carefully fit 2 bores on the cover, without retaining ring, over the centring pins and the plate spring package, without moving the springs.
- On the SPEEDY tighten cover evenly until it is contact using the bolts DIN 912 M6 or M8 supplied. Only use the bolts supplied, or bolts DIN 912 with the quality 10.9. Tighten all 12 bolts using a torque wrench to 14Nm (M6) / 36Nm (M8) on the SPEEDY.  
Note: to check the cover is contact all-round, attempt to insert a feeler gauge between the plate and cover. If it is possible to insert a feeler gauge, remove SPEEDY according to removal instructions point 1 – 4 and start again at point 1 of the mounting instructions.
- Mount O-ring, ball cage, retaining ring and locking ring.



**Important:** the balls are loose in the ball cage! All balls must be present and move freely. Ensure the locking ring is correctly seated!

- After fitting all SPEEDY's, pressurise the fast closing clamp plate, during this process pay attention to permissible pressure as per leaflet.



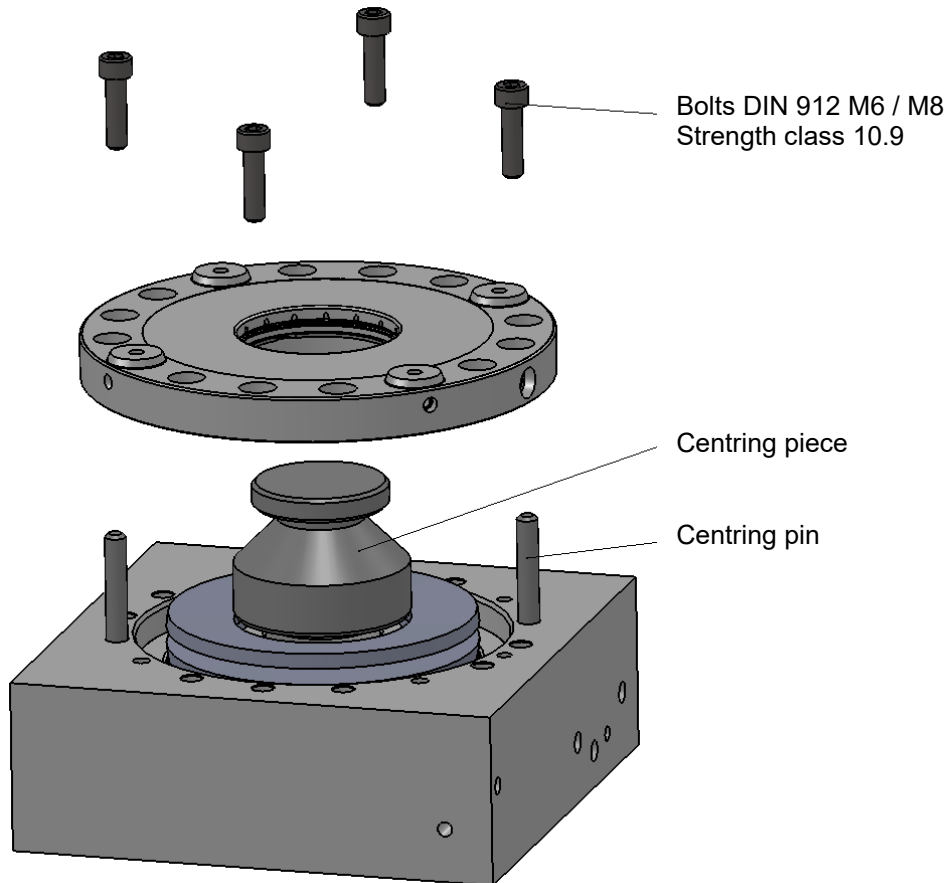
**Important:** only apply pressure to fast closing clamp plate in the assembled state. Check the check dimension A on each SPEEDY as per point 8.1. Only on achieving the check dimension is the correct function of the SPEEDY's ensured. If the check dimension is not achieved on one or more SPEEDYs, the related SPEEDY's must be removed as per the removal instructions point 1 – 4 and the springs re-aligned. Repeat point 3 – 8 of the mounting instructions.





### Assembly aid

Order no.	Description	Items supplied
504 016-01	Assembly aid 2 NG	2 pcs. centring pin, 1 pc. centring piece
504 010-01	Assembly aid 3 NG	2 pcs. centring pin, 1 pc. centring piece
704 224-M	Assembly aid ball cage	1 pc. sleeve for ball cage, 1 pc. clamp for ball cage



You will find all installation data sheets on the SPEEDYs on the web site:

<http://www.stark-roemheld.com>

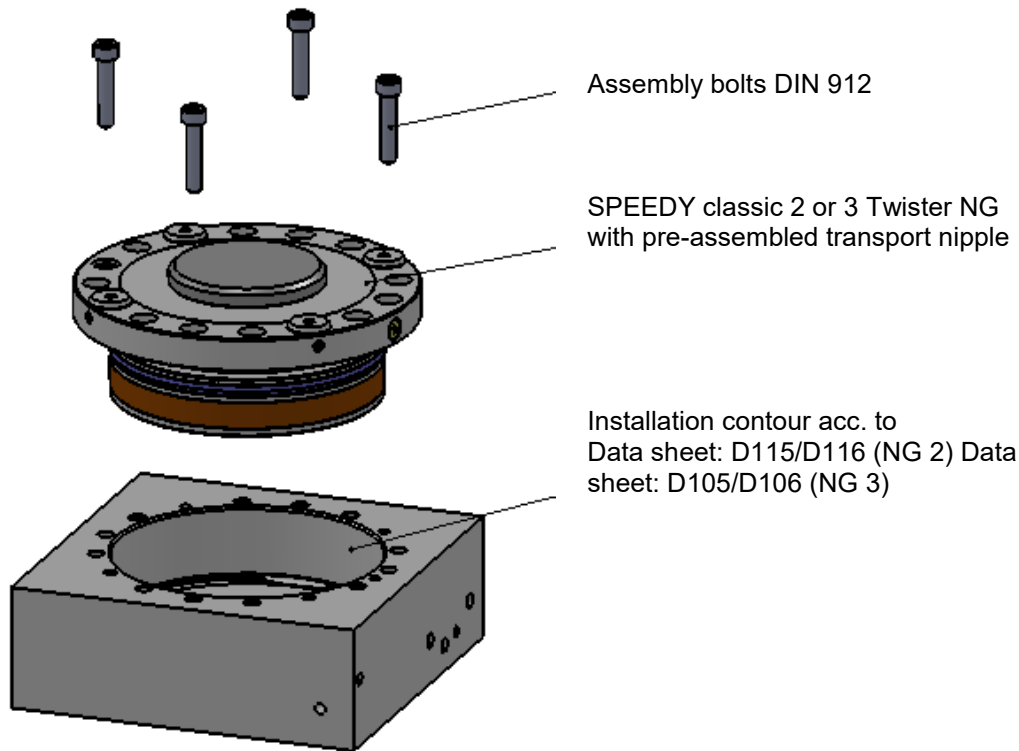
Simply register on the "Build sizes" page and you will quickly receive your user name and password by e-mail.

### Training courses

STARK Spannsysteme GmbH provides training courses to train your operators and service personnel. Training courses are held on site or at STARK Spannsysteme GmbH. Please ask for information, we would be pleased to advise you.



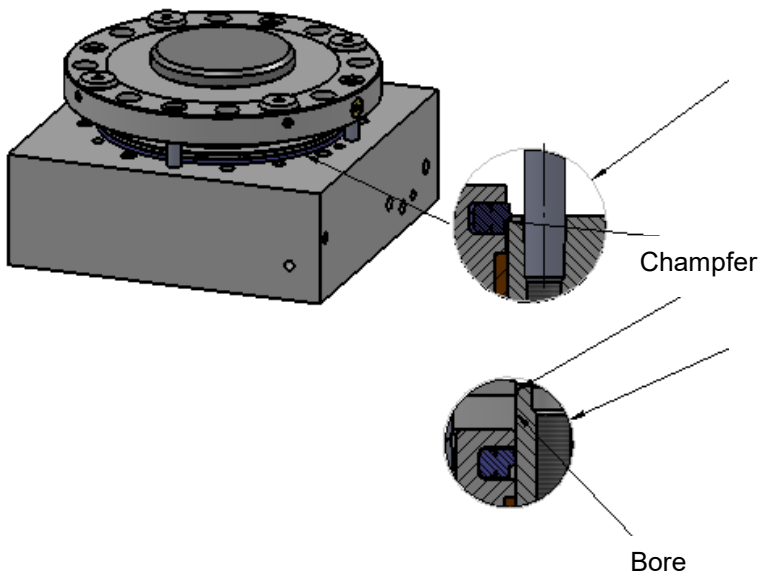
## 6.2 Installation of pre-locked fast closing clamp



Assembly bolts DIN 912


SPEEDY classic 2 or 3 Twister NG  
with pre-assembled transport nipple

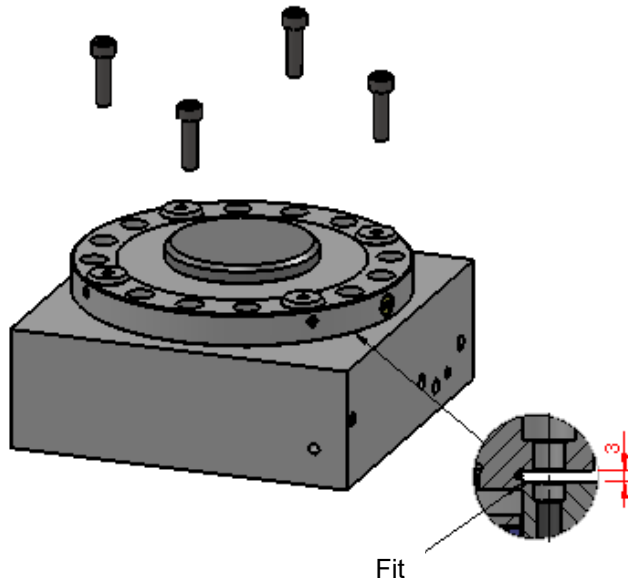
Installation contour acc. to  
Data sheet: D115/D116 (NG 2) Data  
sheet: D105/D106 (NG 3)



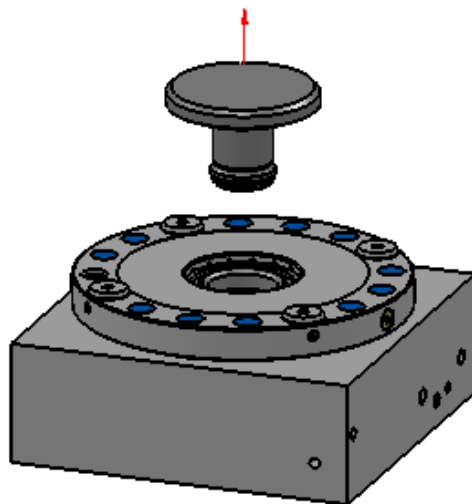
Fit the pre-locked SPEEDY in the greased bore until the piston seal is in contact with the chamfer in the bore (detail -A). Pay attention to the installation position. Only fit by hand.

Screw the pre-locked SPEEDY evenly into the bore using the assembly bolts until the piston seal has entered the bore. Then press the SPEEDY further into the bore by hand

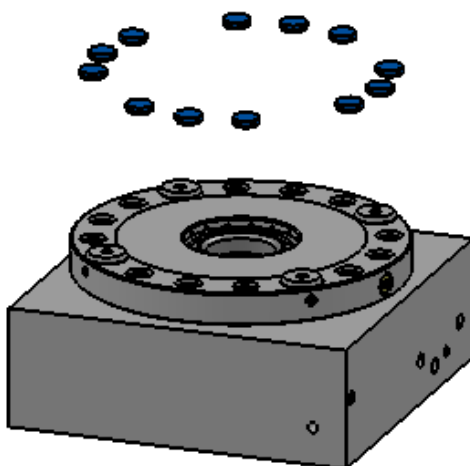
Attention, hazard:   
Under no circumstance drive the SPEEDY into the bore by hitting it with a hammer!  
This could damage the seal or the nipple may also be released and the SPEEDY may spring apart.  
(Plate springs are pre-loaded)



Replace the 4 pcs. assembly bolts with 4 pcs. fastening bolts DIN 912 supplied and evenly fasten the SPEEDY while maintaining it parallel. Fit the remaining 4 bolts and tighten all 12 to 14Nm (M6) or 36Nm (M8) using a torque wrench.



Once all SPEEDY's that are connected to a pressure line have been fitted, switch the system to "release" (on this topic see chapter "7.2 Function check"). The transport nipple can now be removed. After removing the transport nipple, switch the system back to "clamp".



Undertake a function check on the SPEEDY as described in chapter "7 Commissioning and Operation".

Once the correct function of the Speedy is ensured, the bolt covers are placed in the bores. For this purpose place the bolt covers in the bores with the smooth side up. Using a flat aluminium mandrel, lightly tap the bolt covers into the bore with a hammer so they are flush. During this process excess material on the bolt covers will be sheared off.



### 6.3 Removal of fast closing clamp

1. Prior to starting removal, the system must be completely de-pressurised. (Interrupt supply of power to the source of pressure and vent the release line, see point 5).
2. Remove bolt covers, locking ring, retaining ring and ball cage.
3. Evenly loosen all 12 bolts approx. ½ turn each and remove 4 bolts offset by 90°.
4. With the SPEEDY 2 NG, fasten the mounting bolts DIN 912 M6x20 into the 4 empty bores up to the thread outlet (by hand – without tools). Loosen the remaining 8 bolts evenly until the cover/disc is parallel and in contact with the 4 mounting bolts DIN 912 M6x20. Now the 8 bolts can be removed. Now the 4 mounting bolts DIN 912 M6x20 can be loosened evenly and parallel until the spring tension is fully relieved.



With the SPEEDY 3 NG, loosen the remaining 8 bolts evenly and parallel until the spring tension is fully relieved.

5. To remove the piston, the rear of the piston must be vented, otherwise a vacuum will be produced by pulling out the piston.

### 6.4 Removal of pre-locked fast closing clamp

1. The transport nipple must be securely clamped before removal begins. Afterwards, the system must be absolutely de-pressurised. (Interrupt the supply of power to the source of pressure and ventilate the release line, see point 5)
2. Removal is undertaken in the reverse order described in section "6.2 Installation of pre-locked fast closing clamp".
3. Remove bolt covers.
4. Evenly loosen all 12 bolts approx. ½ turn each and check whether the disc is lifted by the springs. If YES, the transport nipple is not properly clamped and the bolts need to be tightened again. If NOT, all 12 bolts can be removed. It is now necessary to screw in two or four setscrews DIN 913 M6 for SPEEDY 2 NG or M8 for SPEEDY 3 NG into the thread under the puller threads. Then the fast closing clamp can be pressed off by evenly fastening in 2 or 4 bolts into the puller threads.
5. To remove the entire unit, the rear of the unit must be vented, otherwise a vacuum will be produced by pulling out the piston.



## 7 Commissioning, handling and operation

### 7.1 During initial commissioning:

- Visually inspect the entire machine and the fast closing clamp.
- Instruct unauthorised personnel to leave the machine.
- Check the hydraulic oil levels.
- Test the correct function of the clamp control valve (if fitted).
- Check the depth dimension A (see section "8.1 Specification dimension A").
- Check the fast closing clamp for hydraulic and pneumatic leaks.

### 7.2 Functional check:

- Once all clamping elements that are connected to the same circuit have been installed as described previously and tightened to the appropriate tightening torque, the source of hydraulic pressure can be connected to the circuit.
- Releasing: slowly and carefully increase the hydraulic pressure to the release pressure. During this process, check the clamping elements for leaks, if necessary switch off source of pressure immediately and rectify leak.

### 7.3 Operation:

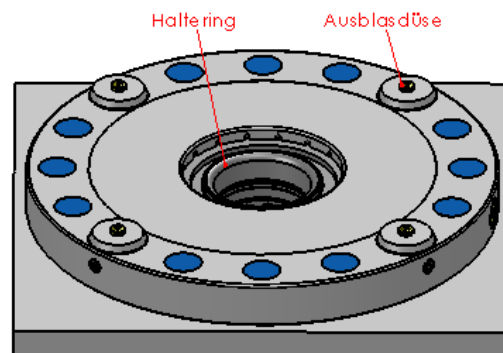
- Only pressurise the fast closing clamp for the changing process.  
 Note: **do not** leave continuously pressurised (released).  
 Set release pressure on the fast closing clamp overpressure safety valve to max. 5 bar above the max. operating pressure (see section "9 Specifications").  
 Set operating pressure for the fast closing clamps (see section "9 Specifications").



### 7.4 Speedy with blow-out function:

- First apply air pressure.
- After approx. 3 s release SPEEDY.
- Change pallet / clamp SPEEDY.
- Only now switch off air.

Ensure an adequate air supply is provided.





## 7.5 Preventing damage to parts:



The insertion velocity of the nipple in the fast closing clamp must be lower than 100 mm/s, otherwise the nipple and fast closing clamp may be damaged.

The product is not allowed to be cleaned with



- Corrosive or caustic constituent elements or
- Organic solvents such as halogenated or aromatic hydrocarbons and ketones (thinners, acetone etc.), as these substances can irreparably damage the seals.

The element must be kept clean and must be cleaned at regular intervals. In particular, the area of the piston or bolt housing must be cleaned of chips and other liquids. In case of heavy contamination, cleaning must be carried out at shorter intervals.

## 7.6 Lubricants and oils (hydraulic oil):



Unsuitable lubricants and oils can damage the seals and very seriously reduce the service life.

**ATTENTION:** it is not allowed to mix oils.

Recommendation: "Castrol Hyspin AWS 32" or "Castrol Hyspin AWS 46" hydraulic oil.



## 8 Maintenance and service

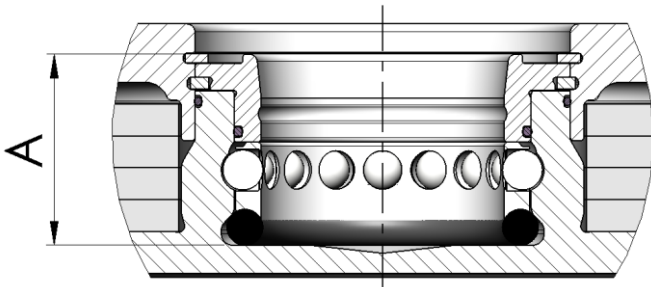
### 8.1 Specification dimension A

The specification dimension A must be checked once a month.



Checking for correct function via the specification dimension A in the released state.  
 On compliance of the depth A with the table the fast closing clamp is functioning correctly.

To measure the specification dimension a check dimension tester is available for each size. The testers can be procured from STARK Spannsysteme GmbH.



	Specification dimension	Dimension tester
SPEEDY classic 2 (SPEEDY 2000)	24.0 ±0,2 mm	order no.: 504 022
SPEEDY classic 3 (SPEEDY 3000)	38.5 ±0,2 mm	order no.: 504 023



If specification dimension A is exceeded, service by an authorised service engineer is required without delay.

If servicing is not undertaken, it will no longer be possible to safely clamp the retractable nipple. There is a risk of accident.

### 8.2 Checking clamping force:

After every 5000 clamping cycles, or at least once a year, the clamping force must be checked. Measure the insertion force on the fast closing clamp. To measure the insertion force a suitable mechanical insertion force tester can be procured (order no. 504 000) from STARK Spannsysteme GmbH.

The permissible deviation of the insertion force is ±15 % (see chapter "9 Specifications").

If the value is below the minimum insertion force, the plate springs must be replaced, see chapter "8.3 Replace plate springs".



### 8.3 Replacing plate springs:

After reaching the clamping cycles or dropping below the minimum insertion force it is necessary to replace the plate springs (see chapter "9 Specifications" the maintenance interval).



The fast closing clamp must be dismantled to replace the plate springs.

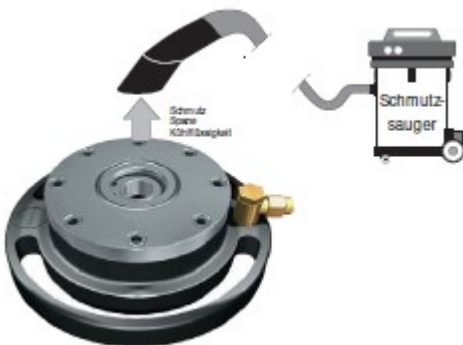
In principle, only an authorised service engineer is allowed to undertake installation work on the fast closing clamps. During all work the necessary safety measures are to be followed without exception and in their entirety.

### 8.4 Cleaning



#### Correct!

The fast closing clamp is allowed to be blown out and blown off using compressed air.



#### Correct and better!

Vacuum cleaning of the swarf, dirt and coolant from the fast closing clamp.

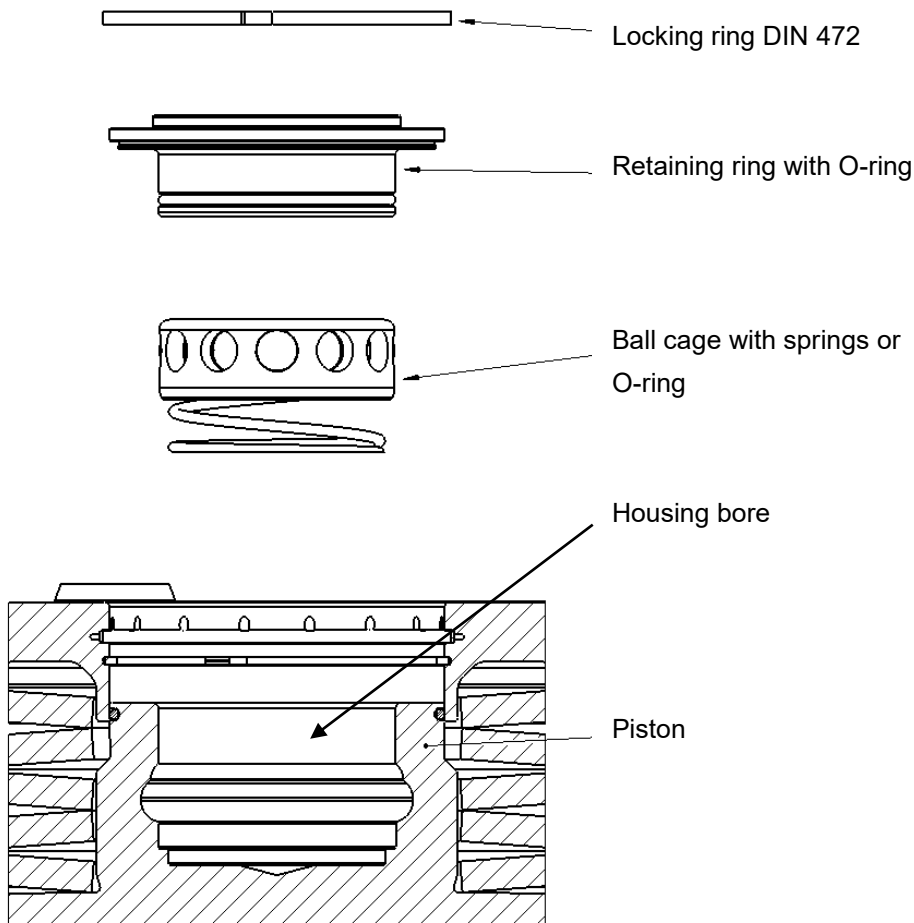
In principle, contamination inside the fast closing clamp is not allowed. Cleaning based on the application and pallet or workpiece change interval. Pay attention to max. clamping cycles, once reached: servicing only by suitably instructed personnel.



## 8.5 Overview of the parts that are removed for the cleaning:

Tools:

- a) Locking ring pliers (order no. 504 006).
- b) Specification dimension tester.
- c) Retractable nipple.



1. Remove locking ring DIN 472
2. Carefully pull off retaining ring
3. Remove ball cage, do not lose any balls
4. Remove O-ring / spring
5. Clean the parts removed incl. housing bore, check for damage and replace if necessary
6. Re-fit all parts in reverse order of removal. Ensure the locking ring DIN 472 is correctly seated!
7. Measure specification dimension A (see chapter "8.1 Specification dimension A").
8. Check function using an individual retractable nipple



## 8.6 General cleaning



For general cleaning the fast closing clamp must be dismantled.

In principle, only an authorised service engineer is allowed to undertake installation work on the fast closing clamps. During all work the necessary safety measures are to be followed without exception and in their entirety.



**Hazard:** the fast closing clamp is permanently under pressure from the springs. Under no circumstances undo the screws on the fast closing clamp!

## 8.7 Storage:

### Until first use:

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

### Long period of storage after use:

Before storage, clean the fast closing clamp (see chapter "8.6 General cleaning") and take suitable measures for corrosion protection.

### After long period of storage:

After long period of storage (approx. 3 years), the seals must be replaced before the fast closing clamp is used again. Seal sets are available from STARK Spannsysteme GmbH on request.

## 8.8 Disposal / recycling:

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



## 9 Specifications

	Classic 2 NG	Classic 3 NG
Article number:	804 ... / 806 ...	804 ... / 807 ...
Description:	SPEEDY classic 2 NG / Twister NG	SPEEDY classic 3 NG / Twister NG
Check dimension:	24 ±0,2mm	38.5 ±0,2mm
Stroke:	1mm	1.5mm
Repeatability:	<0.01mm / <0.005 (804 540-01)	<0.01mm / <0.005 (804 580-01)
Insertion force <sup>1</sup> :	20 kN	30 kN
Retention force:	38 kN	55 kN
Lateral forces max:	9kN	10.5kN
Lifting force:	15 kN at release pressure	30 kN at release pressure
Max. operating pressure:	80 bar	80 bar
Release pressure <sup>2 3</sup> :	40 bar	50 bar
Clearing device min.:	80 l/min	100 l/min
Specified clamping time:	approx. 2 sec.	approx. 2 sec.
Specified release time:	approx. 2 sec.	approx. 2 sec.
Nipple radial pre-positioning <sup>4</sup> :	±2.5mm	±4mm
Nipple axial pre-positioning:	-0.3mm (pay attention to retraction distance)	-0.3mm (pay attention to retraction distance)
Temperature range:	+10°C to +80°C	
Maintenance interval <sup>5</sup> :	40,000	40,000
Oil capacity:	40cm <sup>3</sup>	124cm <sup>3</sup>
Hydraulic oil:	In accordance with DIN 51524 (HLP32 or HLP 46)	
Filter class:	Quality class 4	
Seal material:	NBR / other materials on request	

### Note:

Spacing tolerance: ±0,01mm for SPEEDY side and retractable nipple side.

Procedure for SPEEDY with blow-out: first apply air, after approx. 3 sec. release SPEEDY/change pallet/clamp SPEEDY, switch off air. Ensure pallets are clean (retractable nipple). Ensure an adequate air supply is provided.

1 Insertion force will drop below this value with increasing clamping cycles

2 Set overpressure safety valve to max. 5 bar above the max. operating pressure

3 Only place fast closing clamp under pressure for the changing process – do not leave under pressure for an extended period.

4 The clamping element Speedy 3000 permits a radial offset on the nipple: with rigid feed ±0.3mm; with low-force, moveable feed ±2,5mm / ±4mm.

5 Only with optimal operating conditions

