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SPEEDY hydratec zero point clamping system

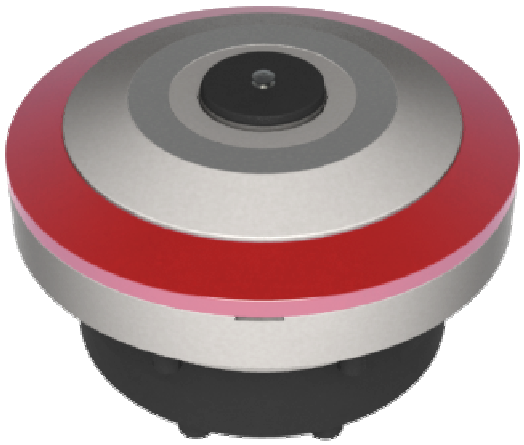
Operating Manual

WM-020-205-10-en BA SPEEDY hydratec

precise, fast and powerful

SPEEDY hydratec

Art. no.: 6000 …



WM-020-205-10-en BA SPEEDY hydratec

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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
Product group:	SPEEDY hydratec (1)
Article numbers:	6000 001, …….. 6000 XXX,
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 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 and the procedures described!

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.
The workpieces are intended for machining, 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 under “Intended use” or use beyond this is considered improper.

Risks may occur if the product is not used as intended. Improper uses include e.g.:
- exceeding the technical values specified for 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 may only be operated if it is ensured that it is securely clamped.
It must also be ensured that the permissible forces acting on the fast closing clamp are not exceeded according to the technical data.
Specialists must be consulted for the calculation and design of the fast closing clamps for rotating applications. STARK Spannsysteme GmbH 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 Spare and wear parts and auxiliary materials

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

4.6 Obligations 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 & 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.

4.7 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.

4.7.1 Design for the pallet and fast closing plate

To ensure safe positioning on the fast closing clamp, make sure there is a grip point on the pallet. If such a grip point is not possible due to design reasons, make sure that no hands/fingers can get between the fast closing clamp and nipple or between the fast closing plate and the pallet. Only grab the pallet at the front during change procedures.

When clamping, do not reach with your fingers into the gap between the fast closing plate and the pallet. If possible, create a gap of 2 to 4 mm or 20 mm and larger.
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.

4.7.2 Hydraulic system malfunction

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

Possible measures to prevent accidental release:

- Mechanically disconnecting the hydraulic line (uncoupling). This means that a pressure increase is no longer possible during operation.
- Disconnecting the safety valves from the machine hydraulics. 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.

4.7.3 Danger due to incorrect installation of the fast closing clamp

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

Measure:

Observe the mounting instructions for strength class, tightening torque and arrangement.

The product-related data is shown on the enclosed drawing with parts list and in chapter "6 Assembly and installation".

4.7.4 Danger due to changes in rotational speed

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

Measure:

Observe the specifications and regulations of STARK Spannsysteme GmbH regarding maximum values.

(see chapter "9 Technical data")

4.7.5 Pressure hazards

Lines or hoses bursting due to excessive pressures can endanger persons.

Measure:

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

4.7.6 Influences on service life

Negative influences include:

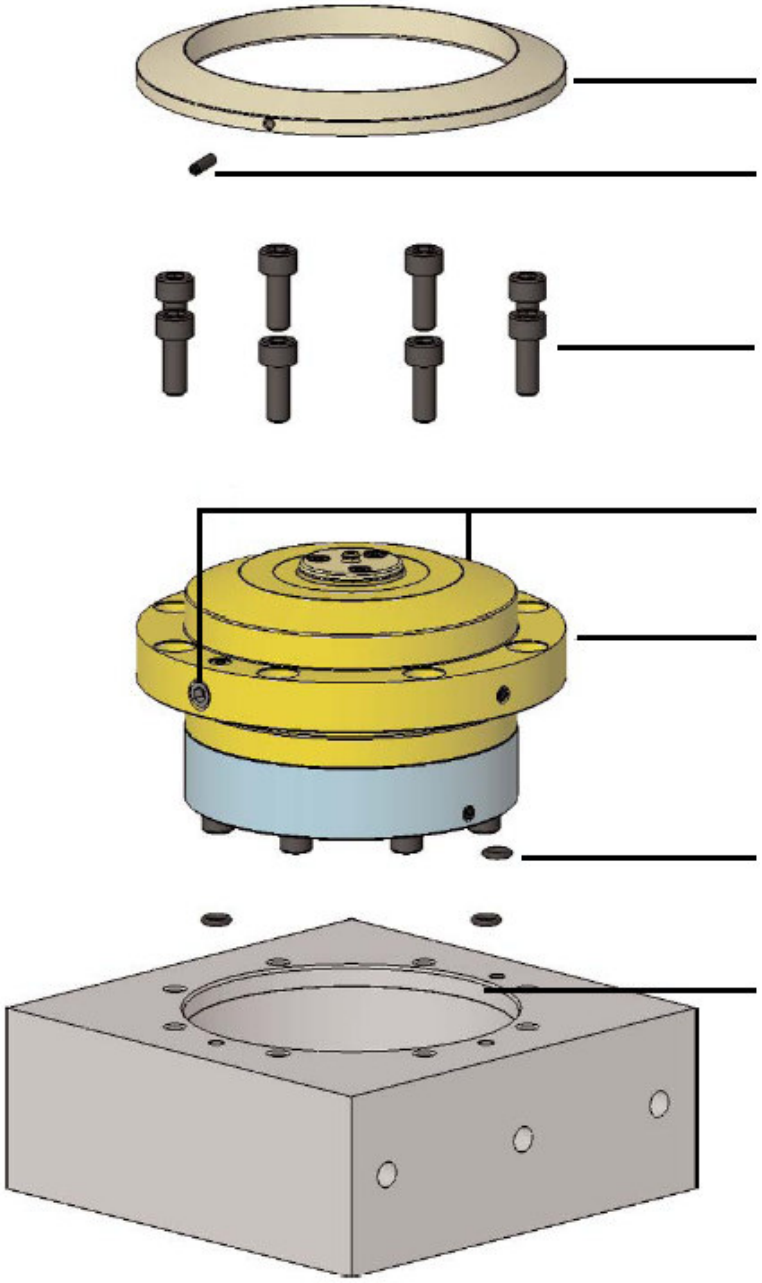
- Insufficient filtering of the oil; observe filter mesh size < 15 my.
- External mechanical damage to functional components.
- Undefined forces or defined forces exceeded.
- Insufficient ventilation of the hydraulic circuit.
- Overloading due to sudden pressure peaks.
- Too high volume flow rates / piston speeds due to large pump capacity.
- Heavy contamination (e.g. casting or grinding dust).
- Aggressive environment, e.g. cooling lubricants which chemically attack seals / wipers.
- The clamping element or parts thereof must not be magnetised. (lifting magnets, dial gauge magnet base, etc.).

5 Description of the fast clamping device

The fast closing clamp connects the machine and the clamping device. It is used for fast setting-up. While one pallet is being processed, the other can be set up.

6 Assembly and installation

Installation and removal instructions for SPEEDY hydratec



6.1 Installation of fast closing clamp with mounting aid

1. Check installation contour for SPEEDY hydratec for dimensional accuracy and surface condition.

2. Grease the O-rings ø5 × 1.5 well and insert them into the housing.

3. Insert the SPEEDY hydratec correctly and carefully guide it into the installation contour.

4. Tighten the cover of SPEEDY hydratec parallel to the system using the DIN 912 M6x16 screws supplied. Only use the supplied screws, or DIN 912 screws with quality 8.8. Tighten all eight screws of the SPEEDY hydratec with 10 Nm using a torque wrench.
   Note: To check the flat support around the cover, use a feeler gauge to try to penetrate between the plate and the cover. If this is successful, dismantle the SPEEDY according to the removal instructions (items 1–4) and start again at Item 1 of the installation instructions.

5. After installation of all SPEEDYs, pressurise the quick release plate, observing the permissible pressure according to the package insert.

   Important: Apply pressure to the fast closing plate only when screwed on. Check specification dimension A for each SPEEDY. Only when the specification dimension is complied with proper functioning of the SPEEDYs is guaranteed. If the specification dimension for one or more SPEEDYs cannot be complied with, the appropriate SPEEDYs must be removed in accordance with the removal instructions (items 1–4), and the springs re-aligned.

6. Slightly loosen the venting screws (loosen max. half a turn) until all the air has been replaced by bubble-free hydraulic oil. This must be done by applying alternating pressure to the release and clamping lines. Then tighten again with a tightening torque of 10 Nm.

7. Place the cover ring on top and then secure with the clamping screw (optional).

6.2 Removing the fast closing clamp

1. The system must be completely depressurised before disassembly is started (disconnect the energy supply to the pressure generator).

2. Loosen the clamping screw and then remove the cover ring. (optional)

3. Loosen and remove all screws uniformly.

4. 2. All screw holes have an M8 thread. An M6 set screw must first be screwed into each of these two holes so that the threaded M6 hole cannot be damaged by the pressure of the M8 screw. Then press the SPEEDY hydratec uniformly out of the fit with the two M8 screws.

7 Commissioning, handling and operation

7.1 During initial commissioning

- Perform a visual inspection of the entire machine and the fast closing clamp.
- Expel any unauthorised persons from the vicinity of the machine.
- Check the filling levels of the hydraulic oil.
- Test the proper functioning of the clamp control valve (if present).
- Check depth gauge A (see chapter "8.1 Specification dimension A").
- Check the fast closing clamp for hydraulic and pneumatic tightness.

7.2 Function check

- When all clamping elements connected to the same circuit have been installed as previously described and tightened with the appropriate torque, the hydraulic pressure generator can be connected to the circuit.
- Slowly and carefully increase the hydraulic pressure to operating pressure. When doing so, check the clamping elements for leaks, switch off the pressure generator immediately if necessary and eliminate the leakage.
- Switch on the blow-out air and check whether sufficient air is flowing out of the nozzles and the closing piston. Check the nozzle(s) for ease of movement.

7.3 Handling and operation

- Set the excess pressure safety valve to max. 5 bar above the max. operating pressure (see chapter "9 Technical data").
- Set the operating pressure of the fast closing clamp (see chapter "9 Technical data").

7.4 SPEEDY with blow-out function

- First, apply pressurised air.
- The blow-out must remain activated and unchanged during the entire charging process.
- Release SPEEDY after approx. 3 seconds.
- Change pallet / clamp SPEEDY.
- Only now turn off the air.

Ensure sufficient air supply.

8 Maintenance and repair

8.1 Specification dimension A

Check that depth A functions correctly. Only if depth A is adhered to according to the enclosed description will the fast closing clamp function properly.

If the specification dimension A is exceeded, service must be carried out immediately by an authorised service technician. If the maximum number of clamping cycles has been reached, this element must be replaced.
The elements can be sent to STARK Spannsysteme GmbH for overhaul.

If no service is performed, safe clamping of the retractable nipple is not possible. There is a risk of accident.

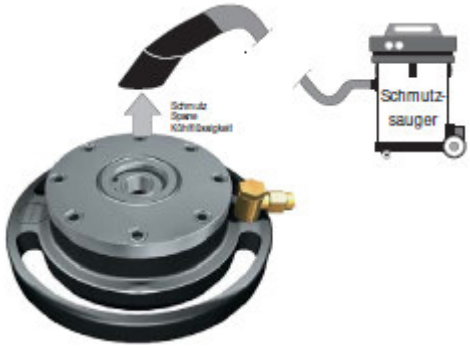
Weekly:
Check the nozzle(s) and closing piston for ease of movement.

Monthly:
Check the specification dimension when the clamping element is released.

Yearly:
Measure the insertion force of the fast clamping element. A suitable mechanical clamping force tester (order no. 504 003) can be ordered from STARK Spannsysteme GmbH to measure the insertion force.

8.2 Surface cleaning

Correct!
Extraction and suction of chips, dirt and coolant from the fast closing clamp.



Possible!
The fast closing clamp may be blown off with compressed air or wiped off but only if the blow-out of the fast closing clamp is active at full pressure.

No contamination is permitted in the fast closing clamp. This is particularly true in the area of the closing mechanism. Dirt must not get under the closing mechanism during cleaning.
Cleaning depends on the application and replacement interval.

Damage to components!

The nipple must be inserted into the elements at a speed of less than 100 mm/s, otherwise the nipples and elements may be damaged.

The product may 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 will cause the gaskets to be destroyed.

The element 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.

Lubricants and oils (hydraulic oil)

Unsuitable lubricants and oils can damage the seals and will drastically shortly the service life.
CAUTION: Mixing of oils is not permitted.

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

8.3 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 (see chapter "8.2 Surface cleaning") and take measures for corrosion protection.

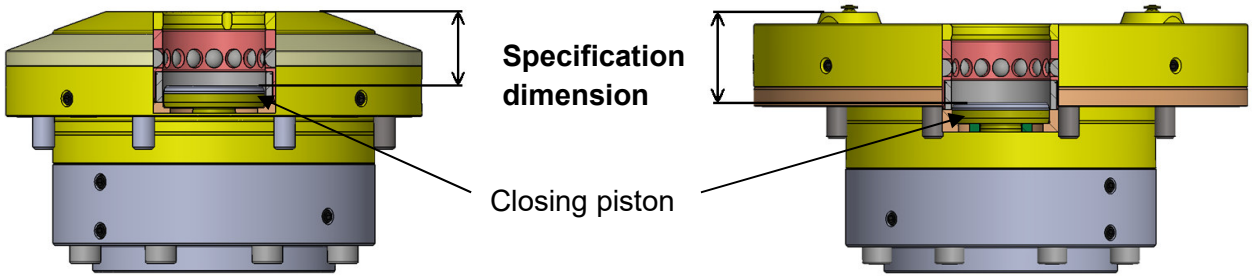
After a long period of storage:
After a long period of storage (approx. 3 years), replace the O-rings before use.

8.4 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

Article numbers:	6000 001, ……6000 XXX
Drawing number:	067-0XX
Designation:	SPEEDY hydratec (1)
Specification dimension:	depending on type see below
Lifting:	depending on type see below
Repeat accuracy:	<0.005 mm
System accuracy:	<0.01 mm
Insertion force[1]:	20 kN
Retention force:	38 kN
Max. lateral forces:	7 kN
Lifting power:	20 kN at release pressure 140 bar
Max. operating pressure:	140 bar
Release pressure[2]:	min. 20 bar / max. 140 bar
Blow-off:	80 l/min / 100 l/min in the case of island blow-out
Preset clamping time:	approx. 0.5 s
Default release time:	approx. 0.5 s
Nipple prepositioning, radial[3]:	±2 mm
Nipple prepositioning, axial:	-0.3 mm (consider retraction path)
Temperature range:	+10 °C to +80 °C
Maintenance cycles[4]:	750,000
Oil volume clamp/release:	16 cm³
Hydraulic oil:	according to DIN 51524 (HLP 32 or HLP 46)
Filter class:	Quality class 4
Sealing material:	NBR; other materials on request



Type	Lifting	Specification dimension
1	2 mm	23 ±0.2
1	4.5 mm	20.5 ±0.2
1	8 mm	17.1 ±0.2

Type	Lifting	Specification dimension
2	2 mm	26 ±0.2
2	4.5 mm	23.5 ±0.2

Note: Blow-out SPEEDY: Procedure: First apply air, after about 3 seconds release SPEEDY, change pallet ,clamp SPEEDY, switch off air. Do not allow any dirt to enter through the pallets (retractable nipples). Ensure sufficient air supply.

1 at 120 bar

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

3 The SPEEDY hydratec clamping element permits radial misalignment of the nipples of: ±0.3 mm with rigid feed; ±2 mm with low-force moving feed ± 2 mm;

4 Only with optimum operating conditions

10 Manufacturer's declaration

Declaration of Conformity
Konformitätserklärung

We / Wir

STARK Spannsysteme GmbH
Römergrund 14
A-6830 Rankweil
Austria

declare under our sole responsibility that the product
erklären in alleiniger Verantwortung, dass das Produkt

Type: SPEEDY hydratec

No.: 6000 001 - 6000 999

to which this declaration relates, corresponds to the following standards
auf das sich diese Erklärung bezieht, mit den folgenden Normen übereinstimmt

2006/42/EC	Machines, Addendum II A
2006/95/EC	Low voltage
2004/108/EG	Electromagnetic compatibility / Elektromagnetische Verträglichkeit

and the following standards were applied.
und dass die folgenden Normen zur Anwendung gelangten.

EN 292-1/2	Safety of machines, devices and equipment Sicherheit von Maschinen, Geräten und Anlagen
EN 60204-1	Electric equipment of industrial machines Elektrische Ausrüstung von Industriemaschinen
EN 414	Safety principles Sicherheitsgrundsätze

A technical documentation exists completely. The instruction manual for the product is available.
Eine technische Dokumentation ist vollständig vorhanden. Die zum Produkt gehörende Betriebsanleitung liegt vor.

STARK Spannsysteme GmbH

Rankweil, 11 April 2019

Martin Greif
Managing director / Geschäftsführer