Zero point clamping system • system 3000
unique  •  flush mounted SPEEDY and spigot
push-on  •  handling without interfering contour
very strong  •  50kN retention force
automatic  •  suitable for automation
monitored  •  all functions can be polled
GO!

**Maximum productivity**
- With the system 3000 you will increase your production times to a maximum.
- This clamping element stands for the highest requirements in automation.

**Maximum flexibility**
- System 3000 has a uniform interface that can be arranged in various ways.
- System 3000 features a compact design, easy assembly as well as fast changing cycles.

**Maximum safety**
- Double-action zero point clamping system with small size and high clamping force.
- Easy handling, as the pallet can be moved to the clamping element with practically no lifting.

System 3000 – will pay for itself in a very short time.
Zero point clamping system

STARK clamping systems overview

Differentiation is by the method of actuation and varying size of the retractable nipples:

**SPEEDY classic – clamp mechanically / release hydraulically**
Most complete and versatile zero point clamping system.
- Four sizes and numerous variants

**SPEEDY metec – clamp / release mechanically**
Robust mechanical zero point clamping system for simple, low cost solutions.
- Three sizes

**SPEEDY airtec – clamp mechanically / release pneumatically**
Pneumatic zero point clamping system.
- One size and numerous variants

**SPEEDY hydratec – clamp / release hydraulically**
Hydraulic, double-action zero point clamping system for very high clamping speeds.
- One size and numerous variants

**system 3000 – clamp / release hydraulically**
Double-action zero point clamping system with small size and high clamping force.
- One size and numerous variants

**system 4000 – custom systems**
Flexible zero point clamping system for mechanical, pneumatic and hydraulic applications.
- One size and numerous variants
## Zero point clamping system system 3000

### Contents system 3000

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<td>3000 851</td>
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<td>3000 853</td>
<td></td>
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<thead>
<tr>
<th>Clamping spigot</th>
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<tr>
<td>With zero point</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With equaliser</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without centring</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With equaliser ± 1mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Without centring ± 1mm</td>
<td></td>
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</table>

<table>
<thead>
<tr>
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<tbody>
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<td>3000 818</td>
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<td>2.1</td>
</tr>
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<td>3000 811</td>
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</tr>
<tr>
<td>3000 812</td>
<td></td>
<td>2.2</td>
</tr>
<tr>
<td>3000 811-1</td>
<td></td>
<td>2.3</td>
</tr>
<tr>
<td>3000 812-1</td>
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<table>
<thead>
<tr>
<th>Accessories</th>
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<tr>
<td>Ball ring</td>
<td></td>
<td></td>
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<tr>
<td>Round wire ring with 36 balls</td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
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<th></th>
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<tr>
<td>3000 901</td>
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Technical data -  Transparency from the start

<table>
<thead>
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<th>system 3000 Order no.</th>
<th>3000 850</th>
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<td>✔️</td>
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<td>✔️</td>
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<tr>
<td>Oil feed, base</td>
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<td>✔️</td>
<td>✔️</td>
</tr>
<tr>
<td>Maintenance interval</td>
<td>Cycles</td>
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<td>500,000</td>
<td>500,000</td>
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<tr>
<td>Max. clamping force 1</td>
<td>[ N ]</td>
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<td>50,000</td>
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<tr>
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<td>Max. operating pressure</td>
<td>[ bar ]</td>
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<td>Oil volume for clamping</td>
<td>[ cm³ ]</td>
<td>75</td>
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<td>Oil volume for releasing</td>
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<td>Air volume - clearing device</td>
<td>[ l/min. ]</td>
<td>80l/min 6bar</td>
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<td>Operating temperature</td>
<td>[ °C ]</td>
<td>+10 to +80</td>
<td>+10 to +80</td>
<td>+10 to +80</td>
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<tr>
<td>Min. permissible clamping time</td>
<td>[ s ]</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Min. permissible release time</td>
<td>[ s ]</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Radial pre-positioning 2</td>
<td>[ mm ]</td>
<td>± 0.4</td>
<td>± 0.4</td>
<td>± 0.4</td>
</tr>
<tr>
<td>Axial pre-positioning</td>
<td>[ mm ]</td>
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<td>+0.1</td>
<td>+0.1</td>
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<tr>
<td>Repeatability 3</td>
<td>[ mm ]</td>
<td>&lt; 0.005</td>
<td>&lt; 0.005</td>
<td>&lt; 0.005</td>
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<tr>
<td>System accuracy 4</td>
<td>[ mm ]</td>
<td>&lt; 0.01</td>
<td>&lt; 0.01</td>
<td>&lt; 0.01</td>
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<tr>
<td>Weight</td>
<td>[ kg ]</td>
<td>approx. 3.75</td>
<td>approx. 4.45</td>
<td>approx. 3.75</td>
</tr>
</tbody>
</table>

**1 Clamping force**  
Clamping force refers to the load up to which the zero point is guaranteed. The clamping force stated must not be exceeded. Due to the adjustable clamping force, there is a maximum, at the maximum clamping pressure (see table below).

**2 Radial pre-positioning**  
The loading device must, during manual and automated loading, yield without the application of force.

**3 Repeatability**  
Repeatability refers as a rule to the accuracy with which the same pallet in a specific orientation is changed on the same interface.

**4 System accuracy**  
System accuracy refers to the accuracy obtained on changing several pallets, e.g. on different machines.
Variable clamping force with system 3000.

The continuously adjustable clamping force makes possible optimal clamping. By adjusting the clamping pressure, unnecessarily high forces are not applied. As a result the receptacles or pallets do not need to be as strong, depending on the machining - the result is advantages in handling and price.

A key aspect, e.g. during milling, is ensuring an adequate, but not excessively high clamping force during the machining to be able to absorb the machining forces. Clamping based on shape and force is ideal.

Depending on the clamping pressure, there is a clamping force of:

**Clamping force / clamping pressure diagram**

![Clamping force / clamping pressure diagram](image)

**Example calculation:**

Hydraulic clamping pressure = 80bar. According to the diagram this will give a clamping force of 20,000N.

**Fail-safe:**

The system 3000 is not self-locking. If all lines are switched to the tank the pallet can be removed with a low force of 300N.
Technical data - Tilting torque example calculation
Profit from our specialist competence

Example:
Fast closing clamp plate 4x system 3000 with 200 x 200 spacing and max. feed force of 7kN with distance of 400mm and clamping pressure 80bar.

Question:
Due to the predominance of roughing work, the system is to be checked for double safety. Are the insertion force, number of fast closing clamps and the selected spacing right for this application?

Solution:

\[ M_E > 2 \times M_V? \]

\[ M_V = F_V \times L_V = 7.000N \times 0.4m \]
\[ M_V = 2.800Nm \]
\[ M_E = 2 \times (F_E \times L_1) + 2 \times (F_E \times L_2) \]
\[ M_E = 2 \times F_E \times (L_1 + L_2) \]
\[ L_1 = \frac{\text{ØD}}{2} \]
\[ L_2 = \frac{\text{ØD}}{2} + \text{Spacing} \]
\[ L_1 + L_2 = \frac{\text{ØD}}{2} + \text{Spacing} \]
\[ L_1 + L_2 = 0.12m + 0.200m = 0.32m \]
\[ M_E = 2 \times F_E \times (L_1 + L_2) = 2 \times 20.000N \times 0.32m \]
\[ M_E = 12800Nm \]

\[ M_E \div M_V > 2? \]
\[ M_E \div M_V = 12800Nm \div 2.800Nm \]
\[ M_E \div M_V = 4.57 > 2 \]

With this design, safety by around a factor of 4.57-times is provided. The pressure could be reduced to 34bar to reach the double safety.

(All dimensions to be entered in SI units [metres, Newtons])

*Insert at duct Ø85.
Function description SYSTEM 3000 –
Positioning and clamping in one function

Principle of operation:

Move to system 3000:
Simple positioning of the pallet with radial pre-centring of ±0.4mm.

System 3000 clamped:
The piston is pressed up and during this process positions the pallet precisely. The inner piston follows (sequential control), the ball chain clamps the clamping spigot with its shape. The clamping pressure is now applied to the system.

Release system 3000:
On releasing the inner piston moves down, the ball chain releases the clamping spigot, then the outer piston is lowered and the pallet released.
Standard

- Module
- Raised supports
- Clearing device
- Pneumatic mount control
- Central locking

**Characteristics:**
Flush Mount fast closing clamp module made of high quality tool steel.

Due to the compact dimensions, requires little space. Can be installed as a module, in plates or directly in the machine table. Double-action fast closing clamp, hydraulically clamped and released. Due to its short cycle times, particularly suitable for automation.

The oil feed is via the flange.
Intelligent clearing system for cleaning the bearing surface and the precision bore.
Mount control via differential pressure, blocking air possible.

**Application:**
For flush mounting in machines, machine pallets, plates, angles, cubes, mounting towers and swivelling yokes.

Can be used for all common machining tasks such as milling, grinding, eroding as well as on test stands and mounting devices.
Ideal for automated loading.

**Order no.**

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Retention force</th>
<th>Clamping force</th>
<th>Pressure max.</th>
<th>Weight</th>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 850</td>
<td>50,000N</td>
<td>50,000N</td>
<td>200bar</td>
<td>3.75kg</td>
<td>D039</td>
</tr>
</tbody>
</table>

* For pressure for releasing and clamping the system 3000 see also page i.6 and i.7.

**Practical example:**
Mounted directly into the machine table. The pallet moves sideways, practically without lifting, onto the clamping element.

1) Raised supports with central clearing device (0.4mm high)
Zero point clamping system

Standard

- Module
- Raised supports
- Clearing device
- Pneumatic mount control
- Polling feature
- Central locking

Characteristics:
Flush Mount fast closing clamp module made of high quality tool steel.

Due to the compact dimensions, requires little space. Can be installed as a module, in plates or directly in the machine table. Double-action fast closing clamp. Is clamped and released hydraulically. Due to its short cycle times, particularly suitable for automation. The oil feed is via the flange. Intelligent clearing system for cleaning the bearing surface and the precision bore. Mount control via differential pressure, blocking air possible.

Application:
For flush mounting in machines, machine pallets, plates, angles, cubes, mounting towers and swivelling yokes.

Can be used for all common machining tasks such as milling, grinding, eroding as well as on test stands and mounting devices. Ideal for automated loading.

Order no. Retention force Clamping force Pressure max. * Weight Data sheet
3000 851 50,000N 50,000N 200bar 4.45kg D039

* For pressure for releasing and clamping the system 3000 see also page i.6 and i.7.

Practical example:

dystem 3000 completely recessed into machine table.

For data sheets and 3D data see www.stark-inc.com

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Fax: +43 (0) 55 23 / 6 47 39-7
E-mail: verkauf@stark-inc.com
www.stark-inc.com

Subject to modifications
WM-020-333-00-en

1.2
Zero point clamping system

Standard

- Module
- Bearing ring
- Central locking

**Characteristics:**
Flush Mount fast closing clamp module made of high quality tool steel.

Due to the compact dimensions, requires little space. Can be installed as a module, in plates or directly in the machine table. Double-action fast closing clamp. Is clamped and released hydraulically. Due to its short cycle times, particularly suitable for automation. The oil feed is via the flange.

**Application:**
For flush mounting in machine pallets, plates, angles, cubes, towers and swivelling yokes.

Can be used for all common machining tasks such as milling, turning, grinding, eroding as well as on test stands for mounting devices. Ideal for automated loading.

### Practical example:

#### Integrated system 3000 with cones for pre-centring.

Usage of the system 3000 in a custom machine in the automotive manufacturing sector. The task of the fast changing element is to clamp and position a workpiece carrier in an integrated universal press up to 50kN. The stipulated cycle times for the press-fitting processes are 5 seconds.

#### Usage of the system 3000 in a custom machine in the automotive manufacturing sector. The task of the fast changing element is to clamp and position a workpiece carrier in an integrated universal press up to 50kN. The stipulated cycle times for the press-fitting processes are 5 seconds.

The advantage of the element in this example is the magnitude of the clamping force in relation to the installation volume as well as the dirt-resistant smooth surface. A further option is the contact-free polling of the clamping element.

#### The advantage of the element in this example is the magnitude of the clamping force in relation to the installation volume as well as the dirt-resistant smooth surface. A further option is the contact-free polling of the clamping element.

### Order no.  Retention force  Clamping force  Pressure max. *  Weight  Data sheet
3000 852  | 50,000N  | 50,000N  | 200bar  | 3.75kg  | D092

* For pressure for releasing and clamping the system 3000 see also page i.6 and i.7.
Zero point clamping system

Characteristics:
Flush Mount fast closing clamp module made of high quality tool steel.

Due to the compact dimensions, requires little space. Can be installed as a module, in plates or directly in the machine table. Double-action fast closing clamp. Is clamped and released hydraulically. Due to its short cycle times, particularly suitable for automation. The oil feed is via the flange or the base.

Application:
For flush mounting in machine pallets, plates, angles, cubes, towers and swiveling yokes.

Can be used for all common machining tasks such as milling, turning, grinding, eroding as well as on test stands for mounting devices. Ideal for automated loading.

---

Standard

- Module
- Bearing ring
- Central locking
- Pipe connection

Order no. Retention force Clamping force Pressure max. * Weight Data sheet
3000 853 50,000N 50,000N 200bar 3.75kg D092

* For pressure for releasing and clamping the system 3000 see also page i.6 and i.7.
### Characteristics:
Clamping spigot with zero point.

### Application:
For positioning and clamping on machine pallets, machine vices, chucks, jigs, direct workpiece clamping.

### Characteristics:
Clamping spigot with equaliser.

### Application:
For positioning and clamping on machine pallets, machine vices, chucks, jigs, direct workpiece clamping.

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Screw quality</th>
<th>Tightening torque at the screw</th>
<th>Weight</th>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 818</td>
<td>min. 10.9</td>
<td>48Nm</td>
<td>1.5kg</td>
<td>D093</td>
</tr>
<tr>
<td>3000 811</td>
<td>min. 10.9</td>
<td>48Nm</td>
<td>1.5kg</td>
<td>D093</td>
</tr>
</tbody>
</table>

1) 8 counterbores for screws DIN 912, M8
Clamping spigot

- With retaining ring

**Characteristics:**
Clamping spigot without centring.

**Application:**
For positioning and clamping on machine pallets, machine vices, chucks, jigs, direct workpiece clamping.

**Order no.** | **Screw quality** | **Tightening torque at the nipple** | **Tightening torque at the screw** | **Weight** | **Data sheet**
---|---|---|---|---|---
3000 812 | min. 10.9 | 73Nm | 48Nm | 1.5kg | D093

**Zero point clamping**

1) Clamping spigot with zero point
2) Clamping spigot with equaliser
3) Clamping spigot without centring

**Application:**
Equalisation of thermal expansion and manufacturing tolerances.
Clamping spigot

- With equaliser ±1 mm
- With retaining ring

**Characteristics:**
Clamping spigot with equaliser ±1 mm.

**Application:**
For positioning and clamping on machine pallets, machine vices, chucks, jigs, direct workpiece clamping.

---

**Order no.** | **Screw quality** | **Tightening torque at the screw** | **Weight** | **Data sheet**
--- | --- | --- | --- | ---
3000 811-1 | min. 10.9 | 48Nm | 1.5kg | D093

**Clamping spigot with retainer and ±1mm equaliser**
Manufacturing tolerances ±0.5mm?
Due to the equalisation it is sufficient to position the elements with generous tolerances.
The entire system has zero point accuracy.

**Thermal expansion?**
The system can compensate for changes in length up to ±1mm in total.

You define the zero point!

---

Example, other arrangement variants possible.
### Clamping Spigot

**Without centring ±1 mm**

**With retaining ring**

**Characteristics:**
- Clamping spigot without centring ±1 mm.

**Application:**
- For positioning and clamping on machine pallets, machine vices, chucks, jigs, direct workpiece clamping.

![Clamping Spigot Diagram]

**Info:** For sketch see previous page.

1. Pull off the ball ring using two fingers.
2. Lightly grease the ball ring prior to assembly. Fit the bottom end of the replacement ball ring in the groove.
3. Snap ball ring into the groove.

#### Ball Ring for System 3000

**Characteristics:**
- Ball ring component with round wire ring and 36 balls with flats.

**Application:**
- For clamping and releasing the clamping spigot.

**Order no.:** 3000 901

**Your advantages:**
- Easy replacement in accordance with operating instructions WM-020-309.

<table>
<thead>
<tr>
<th>Order no.</th>
<th>Screw quality</th>
<th>Tightening torque at the nipple</th>
<th>Tightening torque at the screw</th>
<th>Weight</th>
<th>Data sheet</th>
</tr>
</thead>
<tbody>
<tr>
<td>3000 812-1</td>
<td>min. 10.9</td>
<td>73Nm</td>
<td>48Nm</td>
<td>1.5kg</td>
<td>D093</td>
</tr>
</tbody>
</table>

1) Spring pressure piece
2) 8 counterbores for screws DIN 912, M8

**For data sheets and 3D data see [www.stark-inc.com](http://www.stark-inc.com)**
Only the original ...

...fits together!

For this reason our customers receive:

- A manufacturer’s guarantee
- A function guarantee
- Warranty protection
- A range of fits
Consultation, planning, design, production, mounting, service – everything from a single source!

Cost savings in manufacturing are these days increasingly only possible during machine set-up and by shortening the process times. Your production will be significantly faster if you use zero point clamping systems.

Key aspects such as focusing on bottlenecks (TOC), the reduction of cycle times, batch sizes and inventories, to name but a few of the advantages, are implemented quickly in manufacturing by using STARK zero point clamping systems.

Utilise the many years of experience and flexibility of specialists in zero point clamping technology to optimise your production.

The double-action clamping system 3000 is robust in use and designed for the fastest possible changing processes. Due to the compact design the system 3000 only requires little installation volume, as such close spacings are possible.

High position accuracy is therefore guaranteed.

Push on, pre-position, clamp, release – system 3000 everything is integrated into a hydraulic zero point clamping system.

"We are very satisfied with the collaboration. Starting from the constructive conversations during the planning phase to the on-site service."

Rainer Frisch, Lewa Attendorn

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