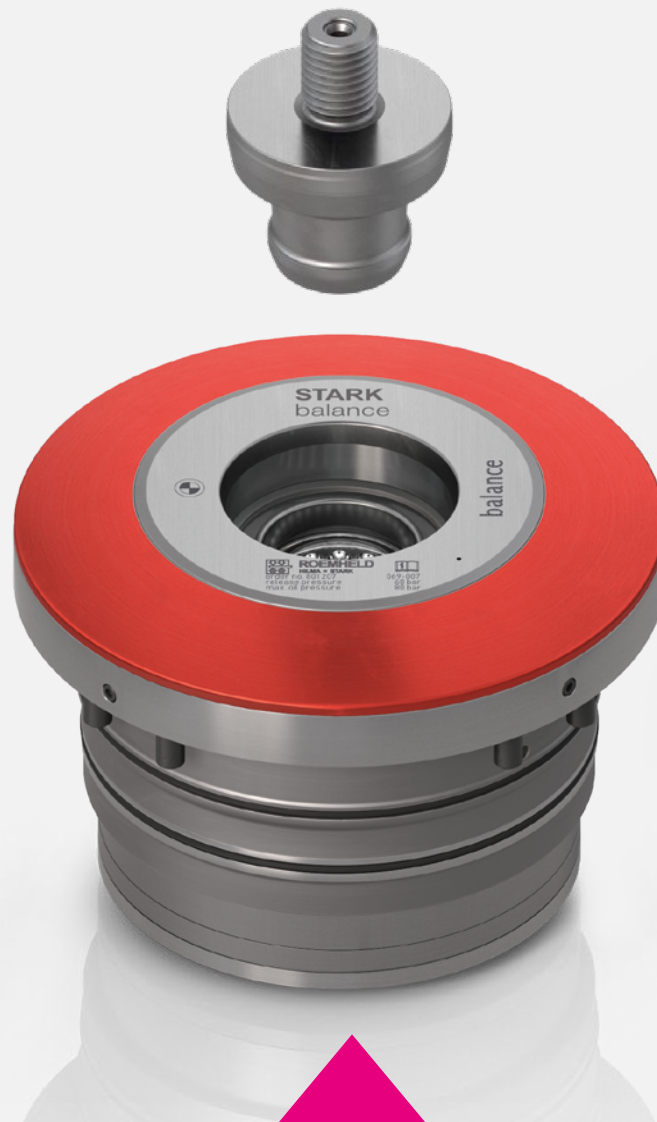




**ROEMHELD**  
HILMA ■ STARK



## **STARK.balance**

Zero point clamping system  
Single acting, hydraulic





**POWERFUL  
INNOVATIVE  
PROFICIENT  
INDIVIDUAL  
RELIABLE**

The high-tech company STARK Spannsysteme, founded in 1977, is regarded as a pioneer in the development and manufacture of zero point clamping systems, being the first company on the market to specialise exclusively in this technology for decades.

High quality and precision distinguish what is possibly the broadest product range available on the market in the field of highly productive work-piece clamping.

Production is more efficient and flexible with STARK components, products and systems.

**FOCUS ON  
INDUSTRIES  
& MARKETS.**



AUTOMOTIVE



AVIATION



MACHINE AND  
TOOL CONSTRUCTION



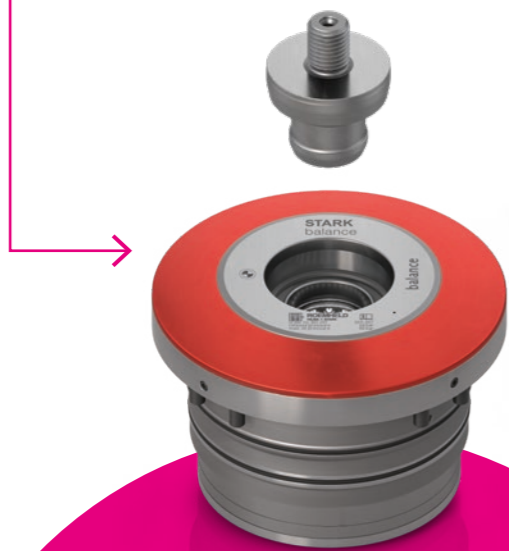
MEDICINE

Every customer has specific requirements. Our established and extensive industry expertise allows us to offer you the best solutions, services and products for sustainable and efficient use in your market.



# STARK.balance

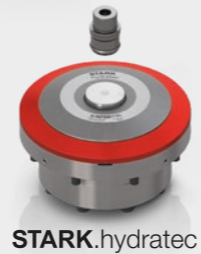
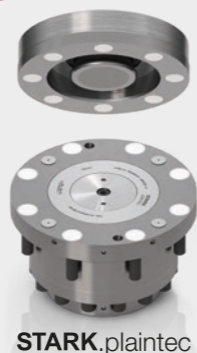
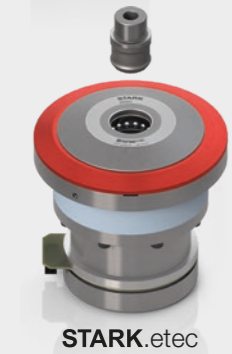
- Equalising:** Equalisation up to  $\pm 0.75$  mm
- Monitored:** all functions can be queried
- Direct:** designed for direct workpiece clamping
- Lifting capability:** STARK.balance lifts pallets when released
- Optimal:** best suited for large devices



## STARK Spannsysteme

More productivity through:

- maximum flexibility in production
- maximum process reliability
- reduced manufacturing costs thanks to set-up time optimisation



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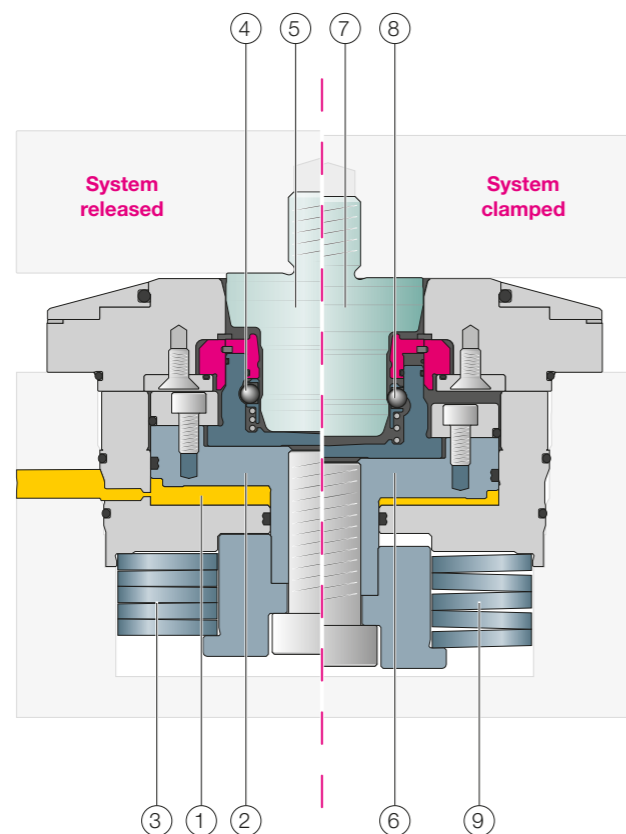
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► Note NEW order numbers – see information on page 34

## Functions

The STARK.balance fast closing clamp is a hydraulic single-acting zero point clamping system. A piston is held in the clamping position by springs. The clamping mechanism can be moved in the X and Y axis with little force.



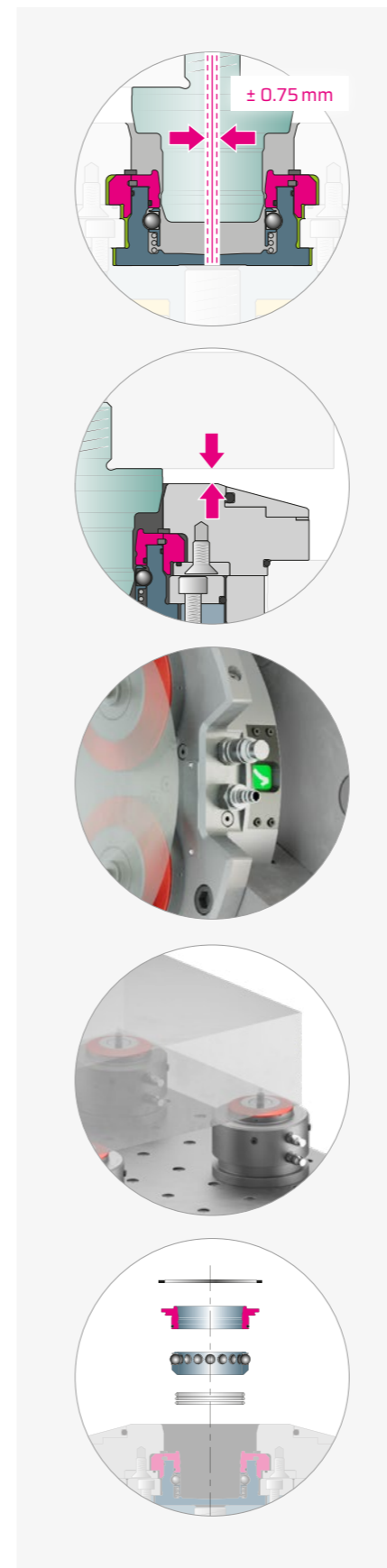
### Release hydraulically:

- The piston (2) is subjected to the hydraulic pressure (1) and moves upwards. The spring assembly (3) is compressed.
- The balls in the ball retainer (4) move outwards to the parking position.
- The retractable nipple (5) moves into the fast closing clamp until it rests against the piston crown.
- The clamping mechanism can equalise for position deviations from the retractable nipple to the element with little force. For the equaliser element in one axis and for the element without centring in the X and Y axis ( $\pm 0.75$  mm).
- The retractable nipple (5) is pre-positioned.

### Clamp mechanically:

- The hydraulics are released. The hydraulic pressure drops to 0 bar.
- The spring pre-tensioning force is initiated via the piston (6), the piston moves down and grips the retractable nipple. The fit is joined and the retractable nipple (7) is positioned with high precision.
- The zero point element positions in both axes and the equaliser element ensures a completely defined system by positioning in one axis.
- The balls (8) lie form-fitted between the piston and the retractable nipple in the contour provided.
- The force of the springs (9) now acts directly and permanently on the retractable nipple and pulls it down into the system.

## Benefits



### BALANCE FUNCTION

- Compared to a classic zero point clamping system, the STARK.balance fast closing clamp offers a greater equalisation of  $\pm 0.75$  mm.
- Specially developed to meet the special requirements of direct clamping and large pallets.

► more on page 12

### PRE-TENSIONED FORCE & ACTIVE INSERTION

- Maximum catch range with 1 mm travel for STARK.balance.2
- The spring pre-tensioning force is initiated via the piston which moves down. The fit is joined and the retractable nipple is positioned with high precision.
- Media feedthroughs are coupled by the active insertion or decoupled by the lifting.

### QUERY

- Safety queries with pneumatic clamping and release control are possible as standard. The access lines to the clamping elements are supplied pneumatically via deep-hole bores.
- Clamping control, release control and seat check.
- Third-hand function position query.

► more on page 14

### DIRECT CLAMPING

- Thanks to an integrated equaliser function in the STARK.balance fast closing clamp, the workpiece can be clamped directly in the thread without any additional effort.
- Existing threads on the workpiece can be used. A fit is not required.

► more on page 20f

### EASE OF SERVICE

- In machining production, contamination of the clamping system is unavoidable in the long term. Therefore, an easy cleaning option is very important.
- For the STARK.balance fast closing clamp, the retaining ring, ball retainer and spring of can be easily removed, cleaned and reinserted after removing the locking ring. This enables easy maintenance and the lowest possible downtimes.
- Easy to exchange due to highly accurate tolerances – no need for set-up or tuning.

## Functions

The STARK.balance.2 zero point clamping system is available in Standard, Twister and Direct Clamping versions. Optionally, each element is available with a third-hand function (THF). The following list shows the function and query options of the different versions.

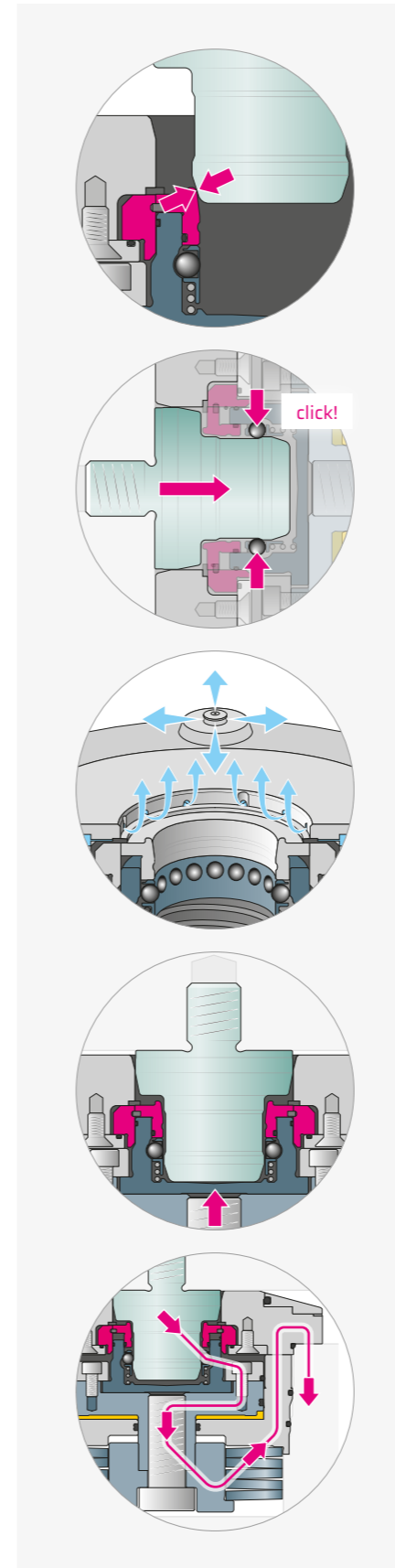


Functions & benefits	Standard	Standard THF	Twister	Twister THF	Direct clamping	Direct clamping THF
Balance function – equalisation ±0.75 mm	✓		✓			✓
Pre-tensioned force and active insertion	✓		✓			✓
Query: clamp control	✓		✓			✓
Query: release control	✓		✓			✓
Query: seat check	✓		✓			✓
Third-hand function position	-	✓	-	✓	-	✓
Disc shape for direct clamping		-		-		✓
Ease of service	✓		✓			✓
Wear-resistant insertion and pre-centring	✓		✓			✓
Third-hand function (THF)	-	✓	-	✓	-	✓
Blow-out & blow-off		-		✓		-
Lifting from fit*	✓		✓			✓

- ✓ Standard function
- ✓ Function can be used as an option

\* If no lifting is desired for process reasons, shortened nipples can be used.

## Benefits



### WEAR-RESISTANT INSERTION & PRE-CENTRING

- Due to the special retractable nipple contour, no damage occurs to the fitting diameter when inserting into the STARK.balance fast closing clamp.
- High alloy tool steel provides wear resistance.

### THIRD-HAND FUNCTION (THF)

The third hand function (THF) engages the workpiece or pallet in the zero point clamping system. Once the pallet or workpiece is engaged on all sides, it is secured against falling out and the clamping process can be completed easily and safely.

► more on page 15

### BLOW-OUT & CLEANING

Intelligent blow-out and blow-off technology for cleaning the support islands and the fitting bore. The blow-off takes place directly at the support surfaces and at the fitting diameter. To clean the support islands, air flows upward and mushroom-shaped downward via retractable nozzles.

► more on page 19

### LIFTING FROM FIT

When releasing, the retractable nipple is lifted out of the fit in a controlled manner and the operator sees that the system is released. This makes handling safe and extremely simple. Controlled movement in and out of the fit minimises wear on the fit.

### OPTIMAL FORCE PROGRESSION

- High positioning accuracy due to optimum force flow – no bending or lifting.
- Systems with active insertion ensure stable force transmission – the force is transmitted from the workpiece via the retractable nipple into the element and via the element housing further into the machine table.
- Spring force permanently pulls the retractable nipples into the system in a form-fit and highly precise manner – this has a vibration-damping effect and increases the quality of the surface to be processed as well as the service life of the tools.

## Technical data

		STARK.balance.2
Maintenance interval	Cycles	40,000
Insertion force <sup>1</sup>	[N]	20,000
Retention force <sup>2</sup>	[N]	38,000
Release pressure	[bar]	60
Lifting force at 70 bar	[N]	approx. 10,000
Lifting force at 80 bar	[N]	approx. 15,000
Lifting	[mm]	1.2
Insertion	[mm]	1.5
Max. pressure	[bar]	80
Oil volume	[cm <sup>3</sup> ]	22
Min. permitted clamping time	[s]	2
Min. permitted release time	[s]	2
Radial pre-positioning <sup>3</sup>	[mm]	2.5
Axial pre-positioning <sup>4</sup>	[mm]	-0.3
Repeat accuracy <sup>5</sup>	[mm]	< 0.005
System accuracy <sup>6</sup>	[mm]	< 0.01

- <sup>1</sup> Insertion force: The insertion force (pre-tensioning force of the spring assembly) is the load up to which the zero point is guaranteed. The specified insertion force must not be exceeded.
- <sup>2</sup> Retention force: This is the maximum overload at which the retractable nipple is still held but the zero point has already been left.
- <sup>3</sup> Radial pre-positioning: The loading device must be compliant for automated loading.
- <sup>4</sup> Axial pre-positioning: Retractable nipple is in contact with the piston crown before the clamping process. A gap of max. 0.3mm is permissible.
- <sup>5</sup> Repeat accuracy: This usually indicates the accuracy that refers to the change of the same pallet position-oriented on the same interface.
- <sup>6</sup> System accuracy: This refers to the accuracy resulting from changing several pallets, e.g. on different machines.

## Tilting moment calculation example

### INFO

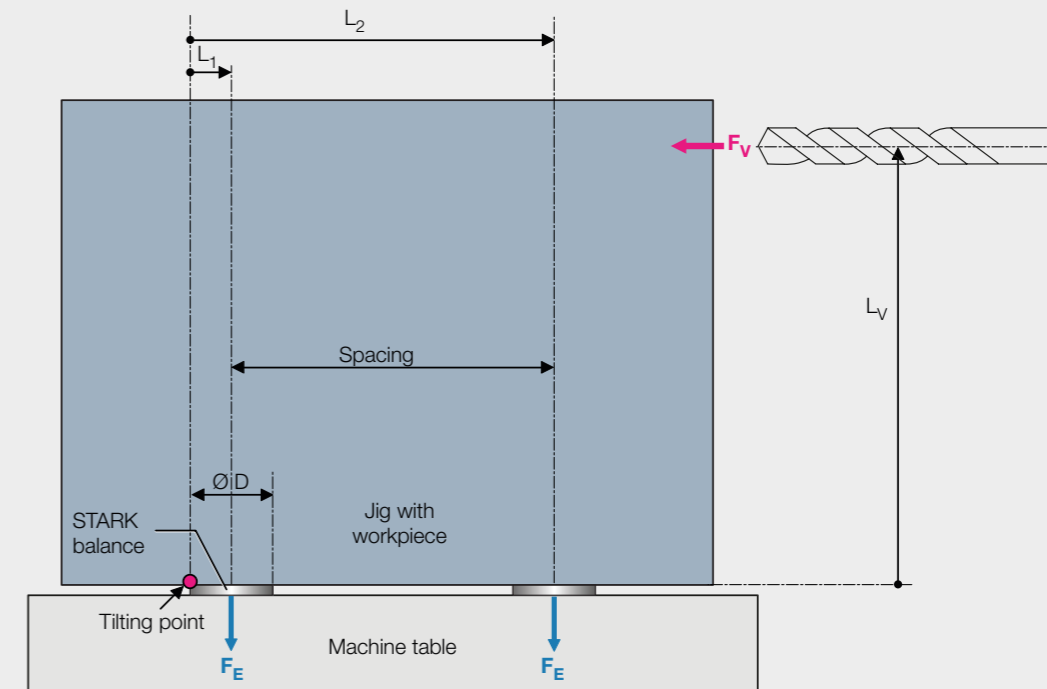
### Tilting moment calculation example

#### Example:

Fast closing clamp plate 4 STARK.balance.2 with spacing 400 x 400 and max. feed force of 10 kN with distance of 1000 mm.

#### Question:

Due to the predominance of roughing work, the system is to be checked for a double safety factor. Is the insertion force, the number of fast closing clamps and the spacing selected adequate?



#### Solution:

$$M_E > 2 \times M_V ?$$

$$M_V = F_V \times L_V = 10,000 \text{ N} \times 1.0 \text{ m}$$

$$M_V = \mathbf{10,000 \text{ Nm}}$$

$$M_E = 2 \times (F_E \times L_1) + 2 \times (F_E \times L_2)$$

$$M_E = 2 \times F_E \times (L_1 + L_2)$$

$$L_1 = \text{Ø D} / 2$$

$$L_2 = \text{Ø D} / 2 + \text{Spacing}$$

$$L_1 + L_2 = \text{Ø D} + \text{Spacing}$$

$$L_1 + L_2 = 0.135 \text{ m} + 0.40 \text{ m} = 0.535 \text{ m}$$

$$M_E = 2 \times F_E \times (L_1 + L_2) = 2 \times 20,000 \text{ N} \times 0.535 \text{ m}$$

$$M_E = \mathbf{21,400 \text{ Nm}}$$

$$M_E / M_V > 2 ?$$

$$M_E / M_V = 21,400 \text{ Nm} / 10,000 \text{ N}$$

$$M_E / M_V = \mathbf{2.14 > 2}$$

With this design there is a safety factor of around two.

(Enter all variables in SI units (metres, newtons))

$M_V$  : Moment from feed force

$M_E$  : Moment from insertion force

$F_V$  : Feed force (10,000 N)

$F_E$  : Insertion force (20,000 N)

Spacing = 400 mm = 0.40 m

Ø D (bearing ring) : 135 mm = 0.135 m

$L_V$  : 1,000 mm = 1.00 m

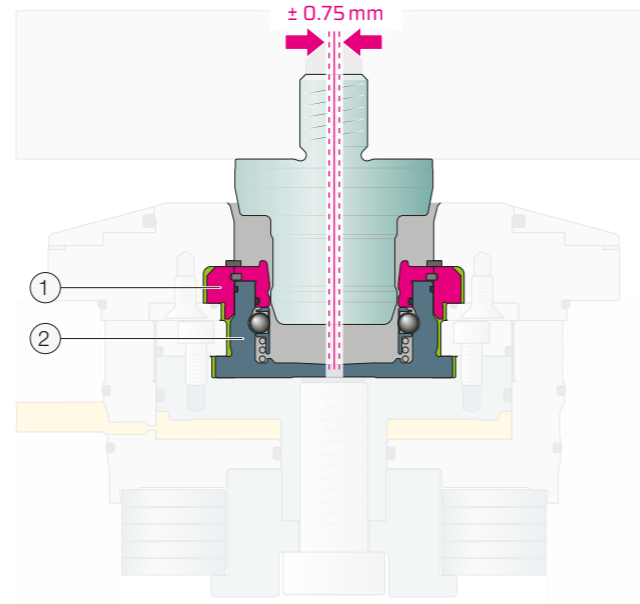


## Balance function

The STARK.balance fast closing clamp offers a very large equalisation of  $\pm 0.75$  mm and has been specially developed to meet the special requirements for direct clamping and large pallets.

### Functional principle

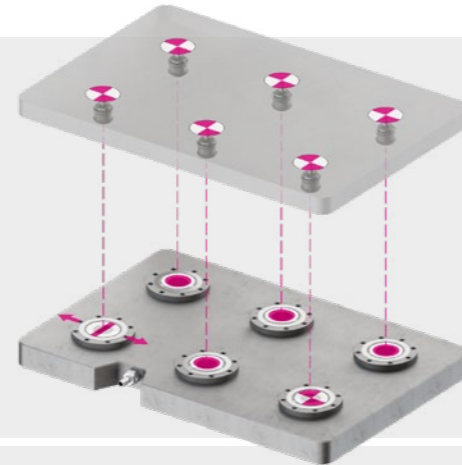
- During the clamping process, the retractable nipple moves into the fast closing clamp until it rests against the piston crown.
- The clamping mechanism (1) & (2) can equalise for position deviations from the retractable nipple to the element with little force. For the equaliser element in one axis and for the element without centring in the X and Y axis ( $\pm 0.75$  mm).



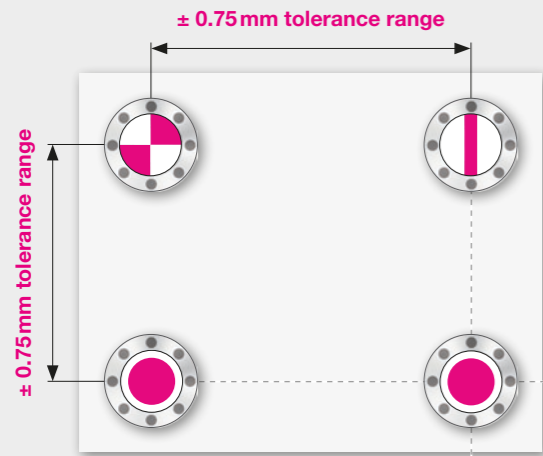
### INFO Equalisation via fast clamping clamp

#### Area of application

- Different materials between pallet and plate
- Pallets with the same retractable nipple
- For a large number of pallets
- Direct tool clamping
- Tolerance range  $\pm 0.75$  mm



### balance - Function Zero point accuracy with equaliser



#### Low production costs

For large centre distances, the advantage of a large equalisation can lead to much cheaper manufacture and thus significant cost savings. There are no processing steps, which also reduces the cycle time for the manufacturing of fast closing plates and pallets.

#### Thermal expansion

Temperature changes, e.g. night 17 °C / day 32 °C, require special precautions to prevent redundant dimensioning (e.g. in the case of aluminium, this change in temperature modifies a centre distance from 1000 mm to 1000.36 mm).

#### Manufacturing tolerances

Due to the large equalisation, it is sufficient to prepare the position of the elements and retractable nipples with generous tolerances. The entire system is always zero point accurate.

#### You determine the zero point.

Zero point and axis alignment are retained and are always known. A total of up to  $\pm 0.75$  mm can be compensated.

○ with zero point (NP)   ○ with equaliser (AG)   ● without centring (OZ)

## Combination options & tolerance range

Depending on the requirement, there are many possibilities to equalise tolerances with different materials and device sizes.

Element		STARK.balance.2 – NP retractable nipple			Spacer	Support disc
		S804-470	S804-474	S801-22x S801-230	S801-280	S804-281
<b>STARK.balance.2 Standard</b>						
NP	S801-201	✓	✓			
NP THF	S801-204		✓			
AG	S801-202	✓	✓	–	–	✓
AG THF	S801-205	$\pm 0.75$ mm <sup>1</sup>	$\pm 0.75$ mm <sup>1</sup>			
OZ	S801-203	✓	✓			
OZ THF	S801-206	$\pm 0.75$ mm <sup>2</sup>	$\pm 0.75$ mm <sup>2</sup>			
<b>STARK.balance.2 direct clamping</b>						
NP	S801-207			✓		
NP THF	S801-210					
AG	S801-208	–	–	✓	–	–
AG THF	S801-211			$\pm 0.75$ mm <sup>1</sup>		
OZ	S801-209			✓		
OZ THF	S801-212			$\pm 0.75$ mm <sup>2</sup>		
<b>STARK.balance.2 Twister</b>						
NP	S801-213		✓			
NP THF	S801-216					
AG	S801-214	–	✓	–	✓	✓
AG THF	S801-217		$\pm 0.75$ mm <sup>1</sup>			
OZ	S801-215		✓			
OZ THF	S801-218		$\pm 0.75$ mm <sup>2</sup>			

✓ Recommended combination

✓ Possible combination

<sup>1</sup> Equaliser of theoretical centre in equalisation direction

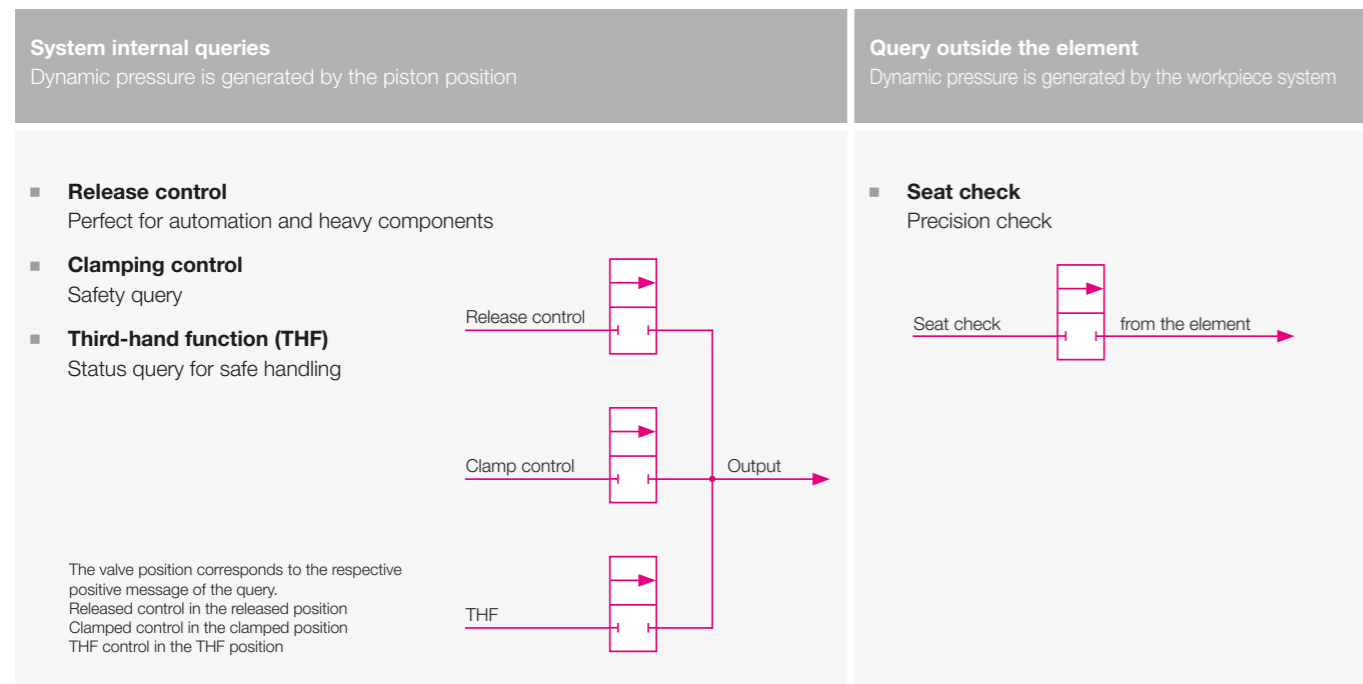
<sup>2</sup> Equaliser of radial theoretical centre in all directions

THF Third-hand function

Values correspond to the radial tolerance for the position of element and retractable nipple including expected temperature variation

## Queries

In the STARK.balance.2 zero point clamping system, safety queries with pneumatic clamping and release control are possible as standard. The access lines to the clamping elements are supplied pneumatically via deep-hole bores. This involves a dynamic pressure query. The seat check also works with dynamic pressure, but only serves as a precision check. Optionally, all elements are available with a third-hand function (THF). In addition to the query options integrated in the machine control system, the optical clamping control provides an option for clamping control independent of the machine.



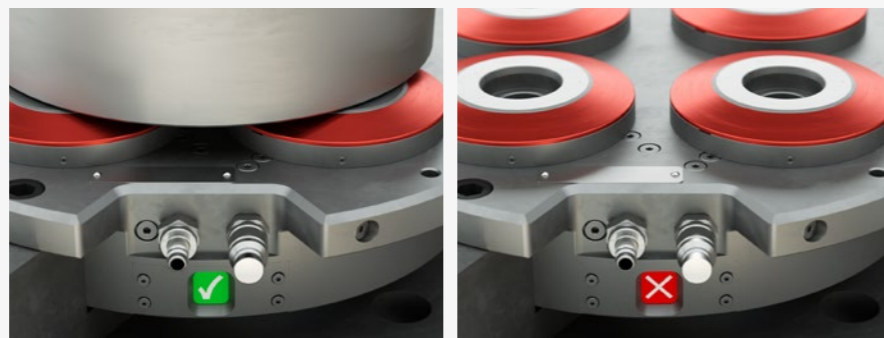
## INFO Optical clamping control

### Is the zero point clamping system securely clamped?

In many applications, e.g. when turning, clamping control is mandatory. The optical clamping control shows the position of the piston after activation of the clamping control in the fast closing clamp and provides absolutely reliable information via a traffic light signal.

Simple operation and easy retrofitting are key advantages with this safety component.

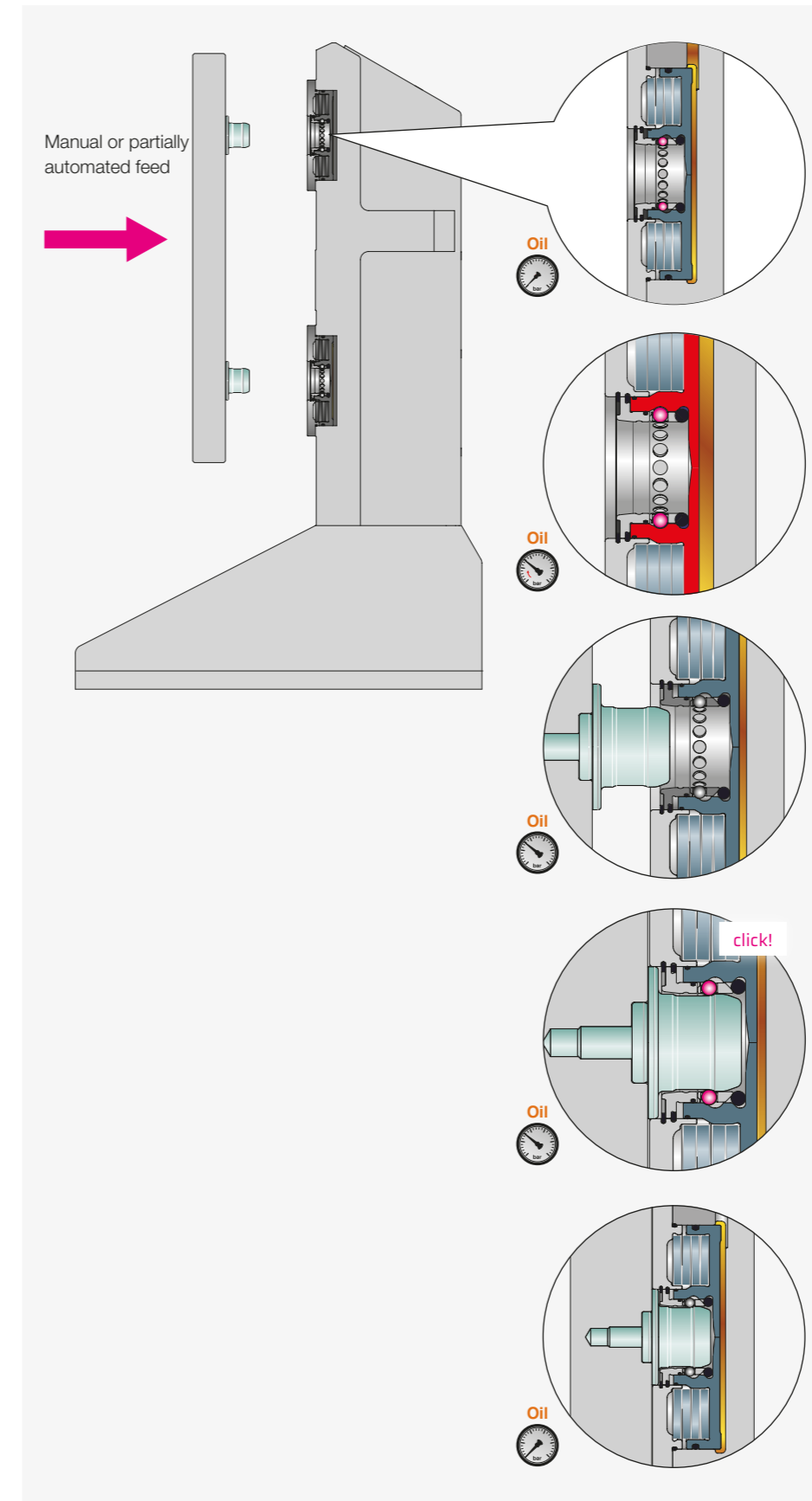
The optical clamping control can be integrated into the fast closing plate.



The green display shows that clamping is correct.

The display changes to red when releasing until positive clamping control occurs again.

## Third-hand function (THF) - the option for your process reliability



### THIRD-HAND FUNCTION

Schematic diagram for all STARK elements with third-hand function (THF).

### HOLDING FUNCTION

The fast closing clamp is applied with the holding pressure and is ready for the secure engagement of the pallet.

### FEEDING

The pallet is fed by hand or by crane.

### ENGAGING

The retractable nipples are retracted, engaged and then mechanically secured. You can release the palette.

### POSITIONING AND CLAMPING

The fast closing clamp is switched without pressure. The pallet is now positioned, inserted and securely clamped via the cup springs.



STANDARD ELEMENTS

STARK.balance.2 D135, installation - NP

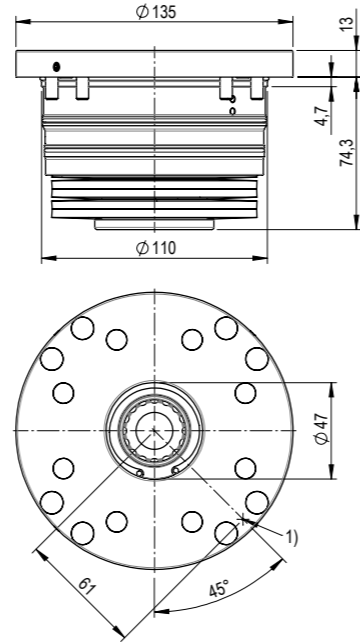


Fast closing clamp made of high-quality tool steel

- Installation module ø 135 mm, standard
- Element with zero point
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Repeat accuracy: < 0.005 mm
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.2 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-201\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S931-138, enclosed separately  
- Screw cover M6 S989-408, enclosed separately  
- O-ring Ø 4.0 x 1.5 mm S933-200, enclosed separately

Order number	Article designation	Function
S801-201	SE Z2 H 200 D135 ST NP	Standard
S801-204	SE Z2 H 200 D135 ST NP DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

STARK.balance.2 D135, installation - OZ

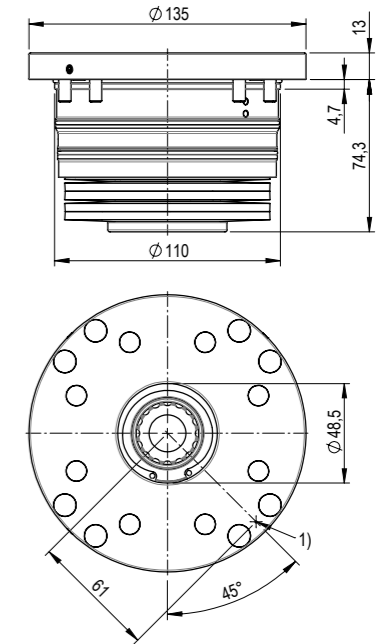


Fast closing clamp made of high-quality tool steel

- Installation module ø 135 mm, standard
- Element without centring (circumferential floating area ±0.75 mm)
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.2 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-203\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S931-138, enclosed separately  
- Screw cover M6 S989-408, enclosed separately  
- O-ring Ø 4.0 x 1.5 mm S933-200, enclosed separately

Order number	Article designation	Function
S801-203	SE Z2 H 200 D135 ST OZ	Standard
S801-206	SE Z2 H 200 D135 ST OZ DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

STARK.balance.2 D135, installation - AG

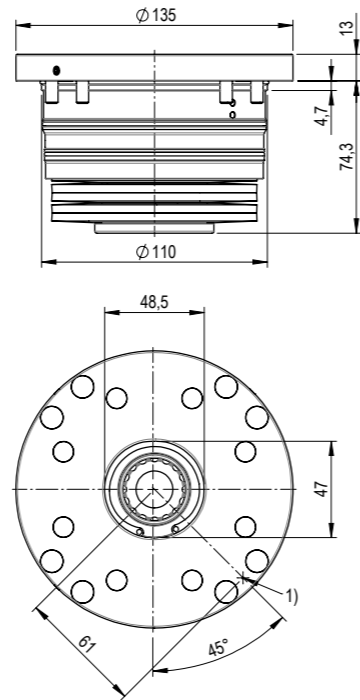


Fast closing clamp made of high-quality tool steel

- Installation module ø 135 mm, standard
- Element with equaliser (floating area in one axis ±0.75 mm)
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.2 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-202\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S931-138, enclosed separately  
- Screw cover M6 S989-408, enclosed separately  
- O-ring Ø 4.0 x 1.5 mm S933-200, enclosed separately

Order number	Article designation	Function
S801-202	SE Z2 H 200 D135 ST AG	Standard
S801-205	SE Z2 H 200 D135 ST AG DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

TWISTER ELEMENTS

STARK.balance.2 D139, installation - NP

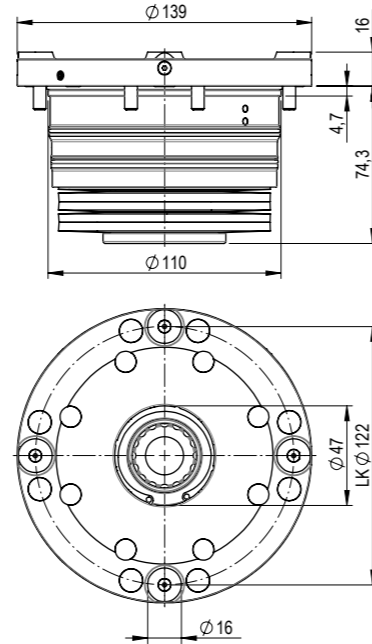


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  139 mm, Twister with blow-out via 4 support islands ( $\varnothing$  16 mm)
- Element with zero point
- Hydraulic single-acting
- With clamping and release control
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Repeat accuracy: < 0.005 mm
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.4 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-213\_00

- Cylinder screw with hexagon socket M6 x 16 mm S831-138, enclosed separately  
- Screw cover M6 S849-408, enclosed separately  
- O-ring  $\varnothing$  7.0 x 1.5 mm S833-045 and O-ring  $\varnothing$  4.0 x 1.5 mm S833-200, enclosed separately

Order number	Article designation	Function
S801-213	SE Z2 H 200 D139 TW NP	Standard
S801-216	SE Z2 H 200 D139 TW NP DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

STARK.balance.2 D139, installation - OZ

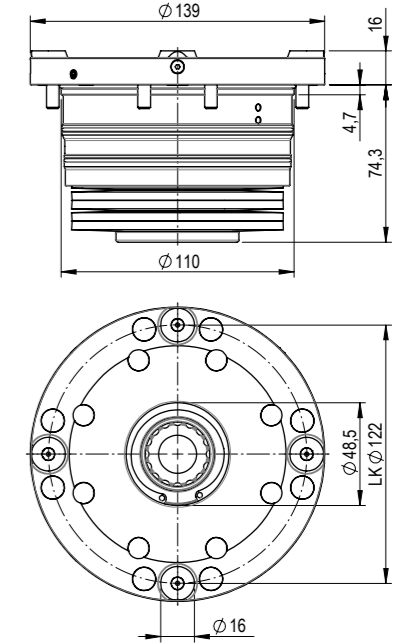


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  139 mm, Twister with blow-out via 4 support islands ( $\varnothing$  16 mm)
- Element without centring (circumferential floating area  $\pm$  0.75 mm)
- Hydraulic single-acting
- With clamping and release control
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.4 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-215\_00

- Cylinder screw with hexagon socket M6 x 16 mm S831-138, enclosed separately  
- Screw cover M6 S849-408, enclosed separately  
- O-ring  $\varnothing$  7.0 x 1.5 mm S833-045 and O-ring  $\varnothing$  4.0 x 1.5 mm S833-200, enclosed separately

Order number	Article designation	Function
S801-215	SE Z2 H 200 D139 TW OZ	Standard
S801-218	SE Z2 H 200 D139 TW OZ DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

STARK.balance.2 D139, installation - AG

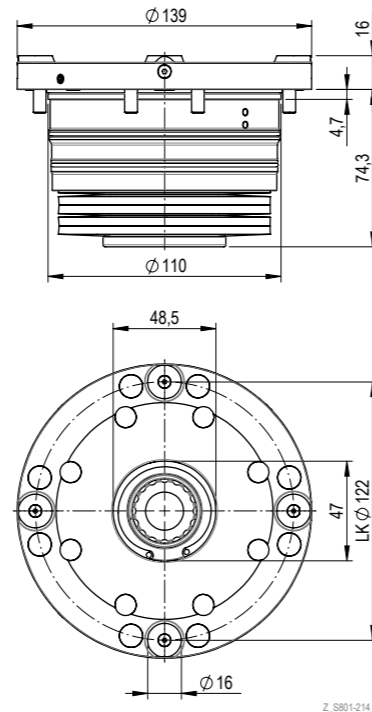


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  139 mm, Twister with blow-out via 4 support islands ( $\varnothing$  16 mm)
- Element with equaliser (floating area in an axis  $\pm$  0.75 mm)
- Hydraulic single-acting
- With clamping and release control
- Third-hand function (THF) optional

Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.4 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-214\_00

- Cylinder screw with hexagon socket M6 x 16 mm S831-138, enclosed separately  
- Screw cover M6 S849-408, enclosed separately  
- O-ring  $\varnothing$  7.0 x 1.5 mm S833-045 and O-ring  $\varnothing$  4.0 x 1.5 mm S833-200, enclosed separately

Order number	Article designation	Function
S801-214	SE Z2 H 200 D139 TW AG	Standard
S801-217	SE Z2 H 200 D139 TW AG DH	with third-hand function (THF)

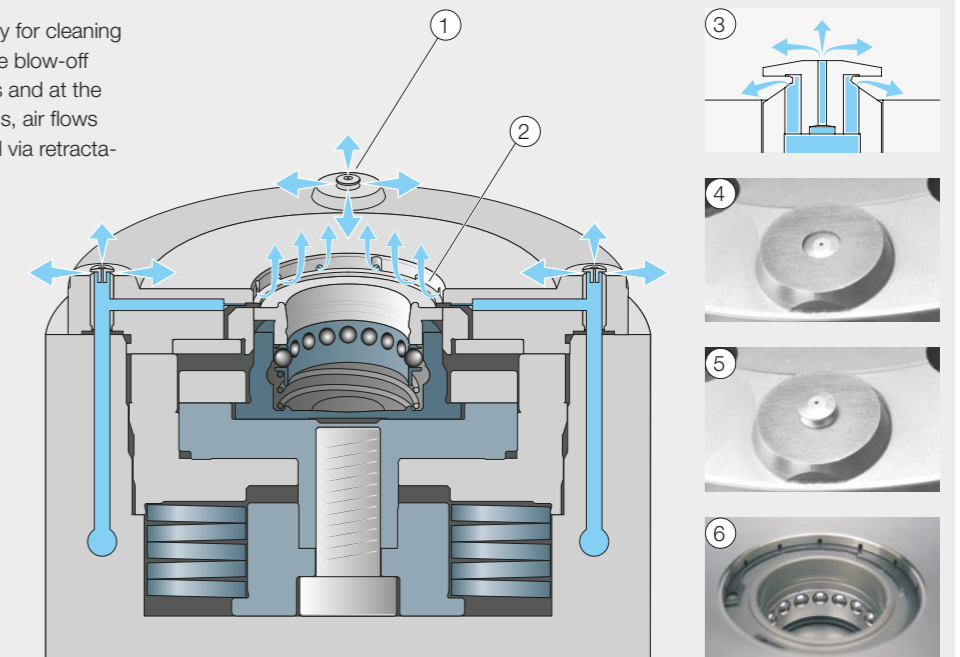
- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

INFO

Blow-off & cleaning functional principle

Intelligent blow-out and blow-off technology for cleaning the support islands and the fitting bore. The blow-off takes place directly at the support surfaces and at the fitting diameter. To clean the support islands, air flows upward and mushroom-shaped downward via retractable nozzles.

- 1) Island blow-off
- 2) Centre blow-off
- 3) Island blow-off Nozzle functionality
- 4) Island blow-off Nozzle retracted
- 5) Island blow-off Nozzle extended
- 6) Openings for centre blow-off



## DIRECT CLAMPING ELEMENT

### STARK.balance.2 D135, installation - NP

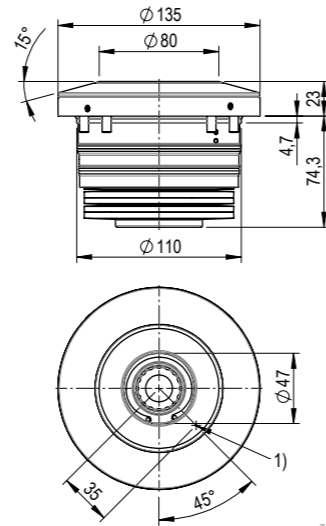


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  135 mm with raised support ring for direct clamping
- Element with zero point
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

#### Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Repeat accuracy: < 0.005 mm
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.7 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-207\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S801-138, enclosed separately  
- O-ring  $\varnothing$  4.0 x 1.5 mm S803-200, enclosed separately

Order number	Article designation	Function
S801-207	SE Z2 H 200 D135 EH NP	Standard
S801-210	SE Z2 H 200 D135 EH NP DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

### STARK.balance.2 D135, installation - OZ

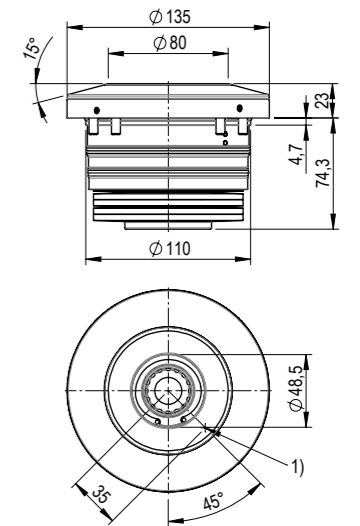


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  135 mm with raised support ring for direct clamping
- Element without centring
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

#### Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.7 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-209\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S801-138, enclosed separately  
- O-ring  $\varnothing$  4.0 x 1.5 mm S803-200, enclosed separately

Order number	Article designation	Function
S801-209	SE Z2 H 200 D135 EH OZ	Standard
S801-212	SE Z2 H 200 D135 EH OZ DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

### STARK.balance.2 D135, installation - AG

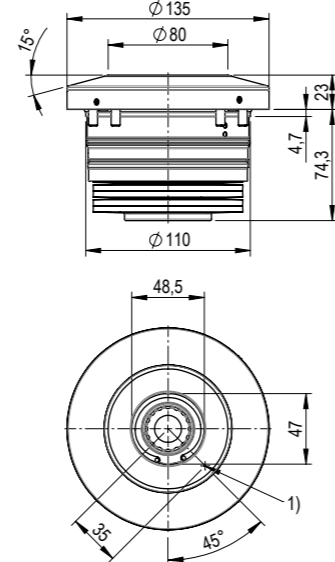


Fast closing clamp made of high-quality tool steel

- Installation module  $\varnothing$  135 mm with raised support ring for direct clamping
- Element with equaliser
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

#### Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Weight: 5.7 kg
- Installation according to data sheet D139
- Operating Manual WM-020-369-xx-xx



Z\_S801-208\_00

1) Seat check  
- Cylinder screw with hexagon socket M6 x 16 mm S801-138, enclosed separately  
- O-ring  $\varnothing$  4.0 x 1.5 mm S803-200, enclosed separately

Order number	Article designation	Function
S801-208	SE Z2 H 200 D135 EH AG	Standard
S801-211	SE Z2 H 200 D135 EH AG DH	with third-hand function (THF)

- ▶ Third-hand function (THF) – see information on page 15
- ▶ Observe NEW order numbers – see information on page 34

## INFO

### Clamping directly on thread

STARK has developed the STARK.balance product families for the special requirements for direct workpiece clamping.

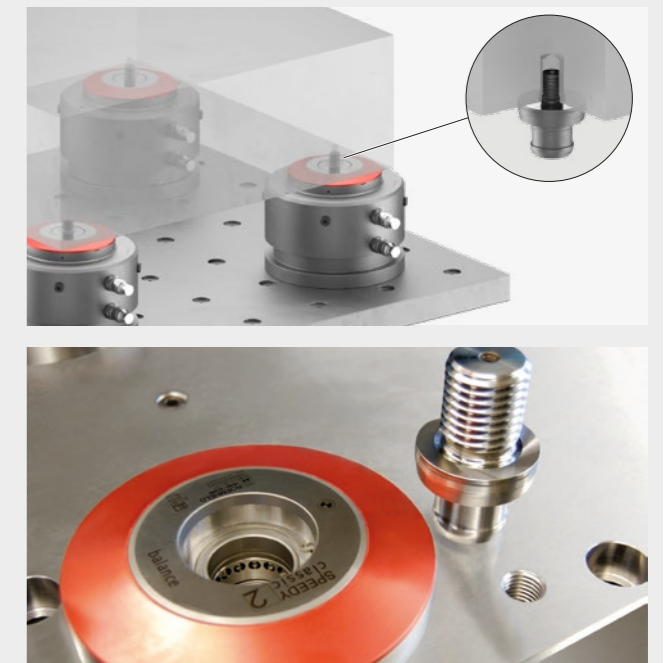
The STARK.balance series has special advantages: existing threads on the workpiece can be used. A special fit is not required. Thanks to an integrated equaliser function in the clamping element  $\pm$  0.75 mm, the workpiece can be clamped directly in the thread without any additional effort.

The retractable nipples are available with different threads. They can be screwed in either manually or automatically.

The system is zero point accurate and therefore the workpiece can be used across several machines or for intermediate measurements.

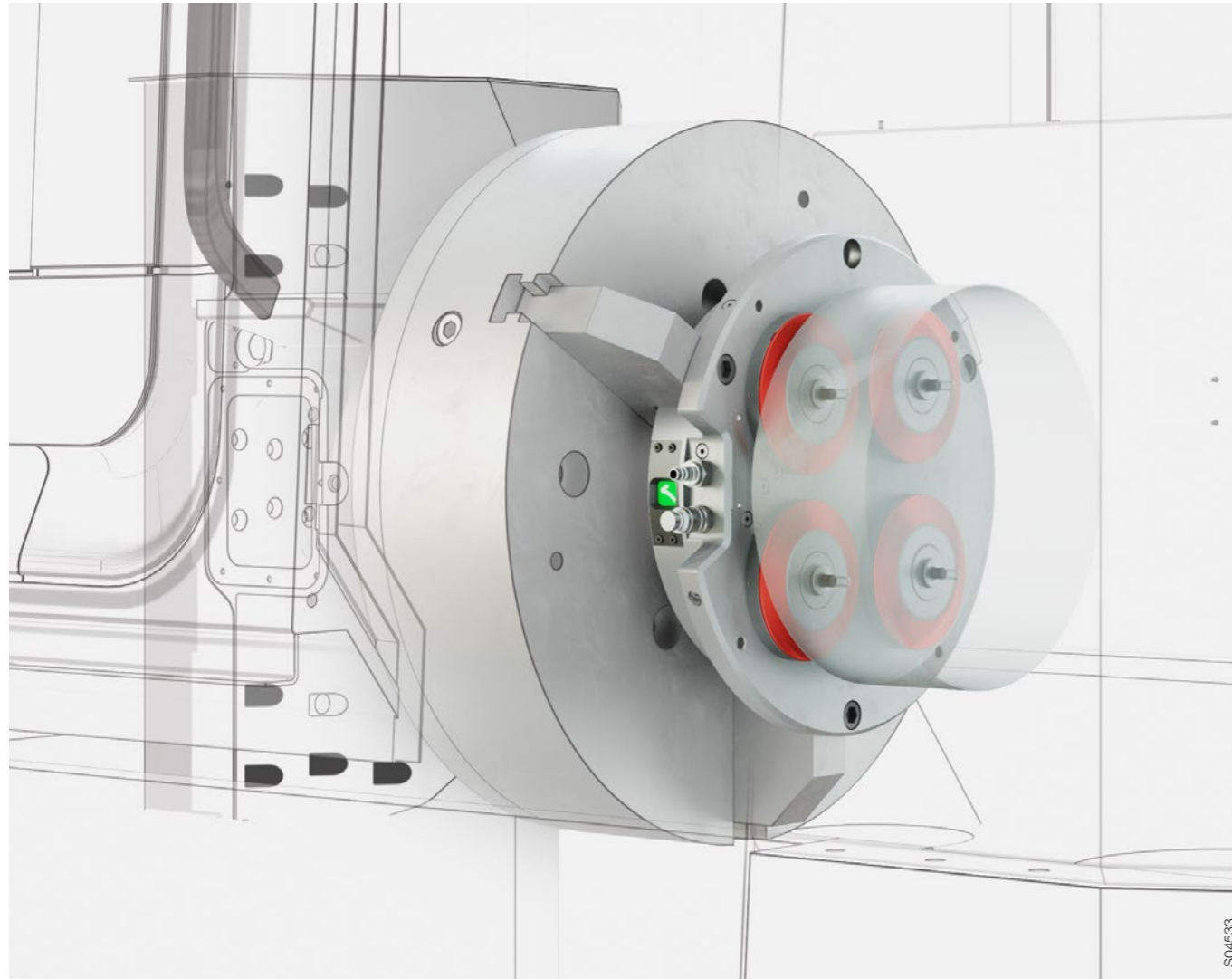
#### Example requirements

- Workpiece processing with zero point accuracy across multiple machines
- 5-side accessibility
- Use existing threads on the workpiece
- Zero point oriented flexibility
- Equaliser options for tolerances and temperature variation
- Predestined for castings





Application example - turning machines



S04633

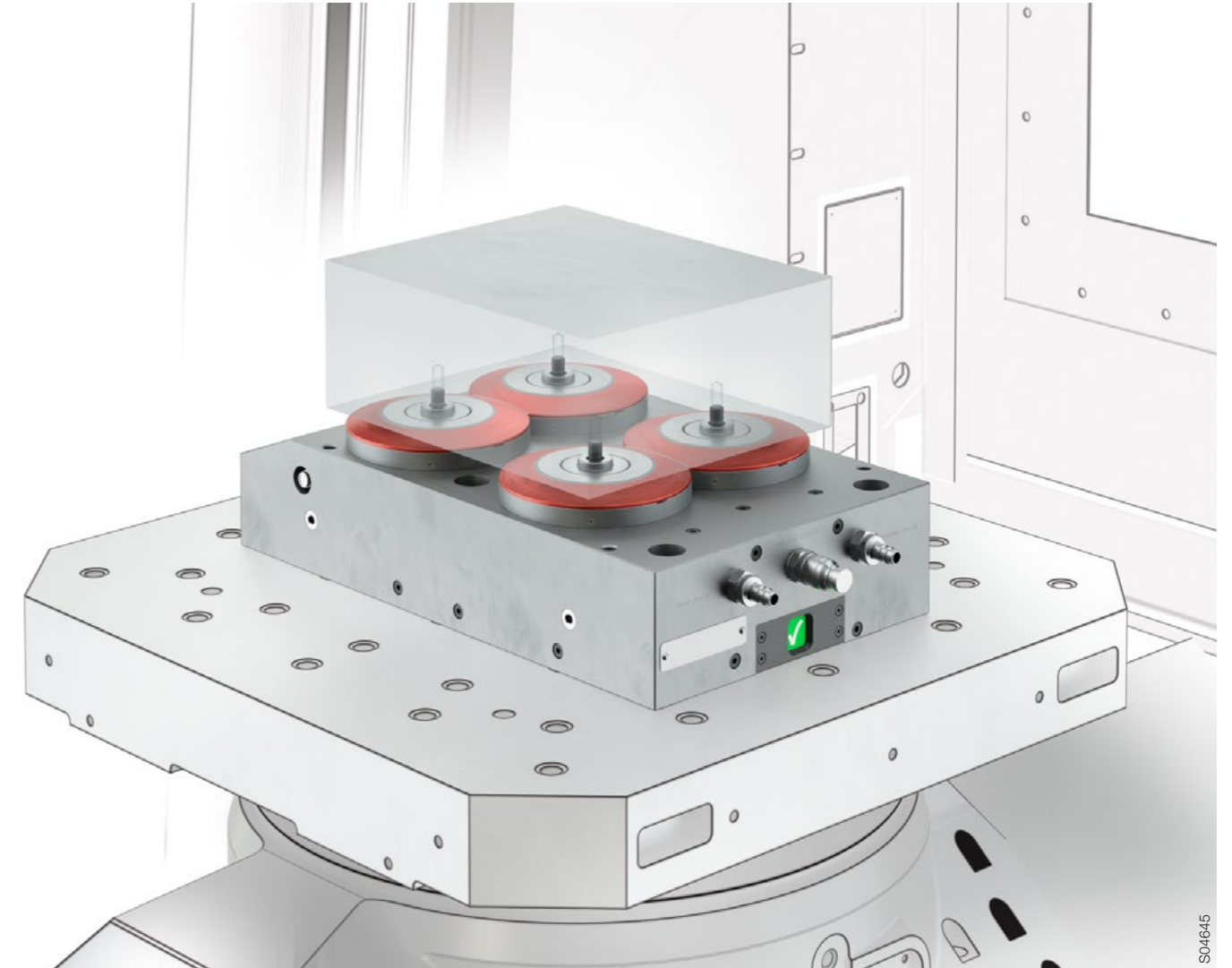
**Direct workpiece clamping for turning machines**

- Zero point clamping system with 4 STARK.balance elements (S801-20x)
- Optical clamping control
- Asymmetrical arrangement of elements – position orientation
- 5 ½ sides accessible for processing
- Simple conversion – clamped in jaw chuck, secured with screws

**System options**

- Elements with third-hand function
- Clamping control – via the machine control system or optical clamping control
- Seat check possible
- Direct assembly on spindle nose possible
- Control via rotary transmission possible

Application example - milling machines



S04645

**Typical application for milling machines**

- Zero point clamping system with 4 STARK.balance elements (S801-20x)
- Optical clamping control
- Flattened STARK.balance for narrower centre distance
- Raised or bevelled fast closing plate for optimal 5-axis processing
- 5 sides with unrestricted access

**System options**

- Elements with third-hand function
- Clamping control – via the machine control system or optical clamping control
- Seat check possible
- Adapted fast closing plate and elements for optimum customer benefit

## SURFACE-MOUNTED ELEMENT

### STARK.balance.2 D139, surface-mounted element

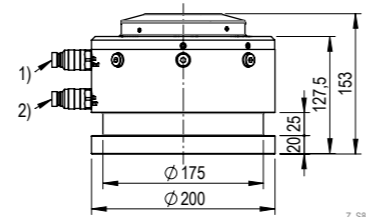


Surface-mounted element  $\varnothing$  200 mm incl. STARK.classic.2 NG (S804-538) and STARK.balance.2 (S801-20x)

- Installation module  $\varnothing$  135 mm with raised support ring for direct clamping
- Hydraulic single-acting
- With clamping, release and seat check
- Third-hand function (THF) optional

#### Properties

- Retention force: 38,000 N
- Insertion force: 20,000 N
- Pressure: min. 60 bar, max. 80 bar
- Operating Manual WM-020-369-xx-xx



Z\_S801-250\_00

1) STARK.balance.2 release connection  
2) STARK.classic.2 release connection

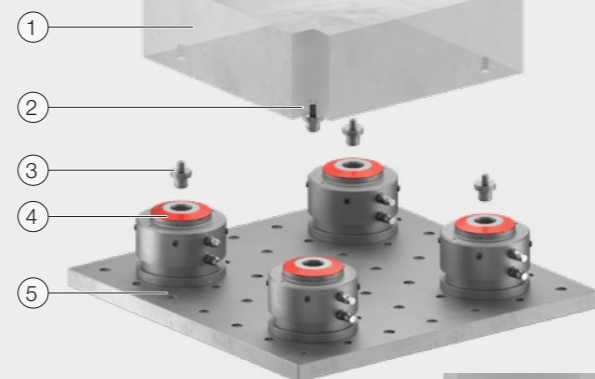
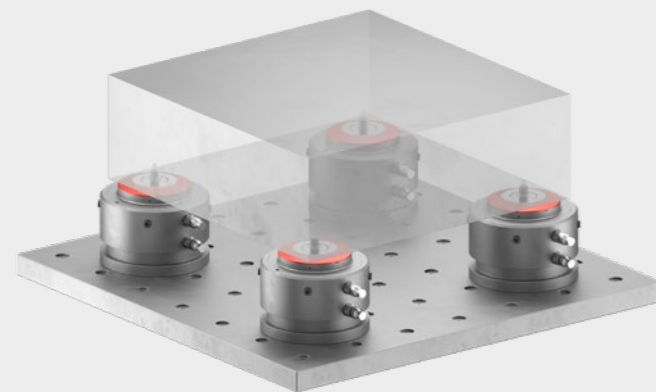
Order number	Article designation	Element	Element
S801-250	Surface-mounted element STARK.balance.2 D139 NP	Zero point element	STARK.balance.2 (S801-207)
S801-251	Surface-mounted element STARK.balance.2 D139 AG	Element with equaliser $\pm$ 0.75 mm	STARK.balance.2 (S801-208)
S801-252	Surface-mounted element STARK.balance.2 D139 OZ	Element without centring $\pm$ 0.75 mm	STARK.balance.2 (S801-209)

► Note NEW order numbers – see information on page 34

### INFO STARK.balance surface-mounted element functionality

#### Do you want to gain height?

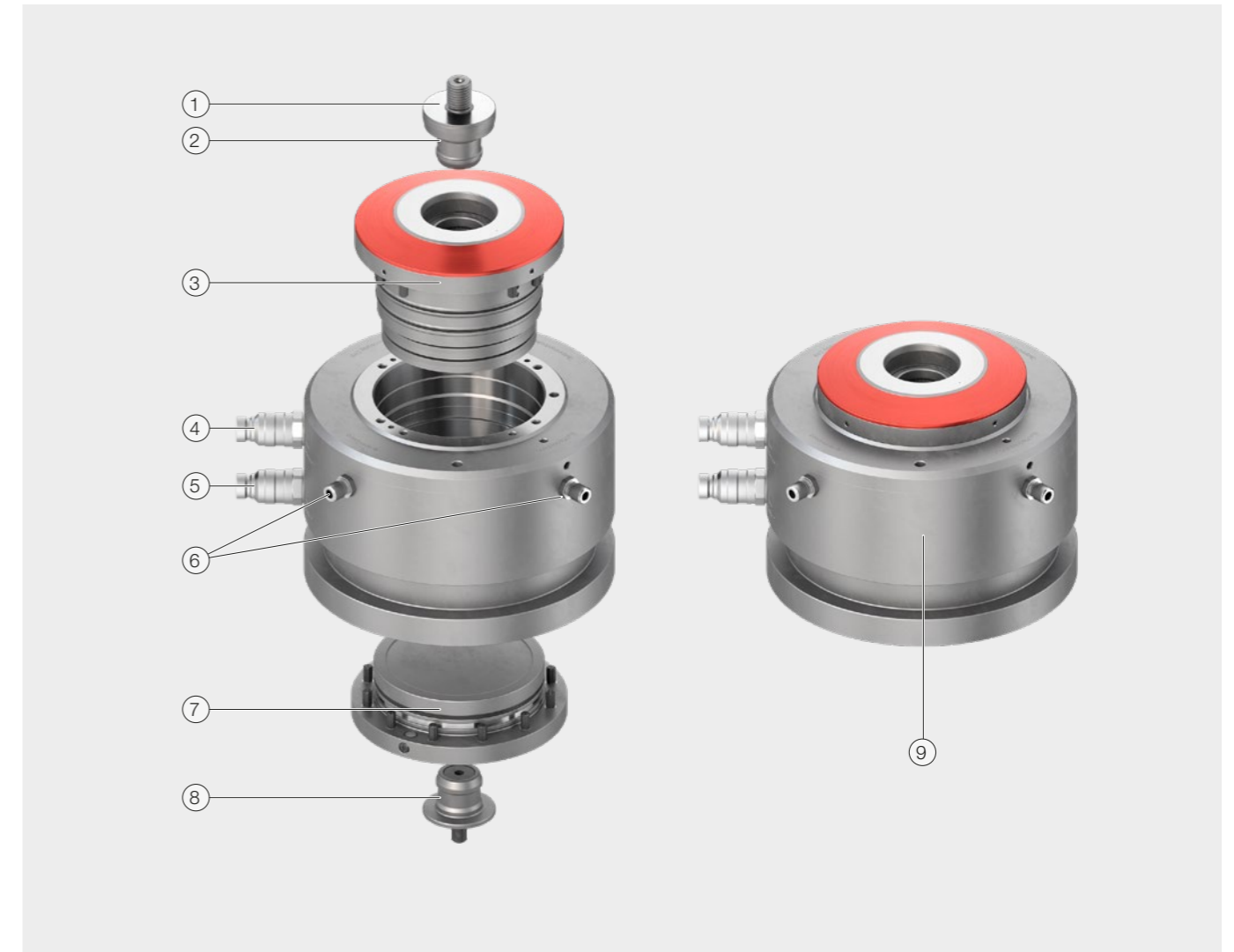
All STARK zero point clamping systems are also available as surface-mounted elements. In addition, you have the option of adapting the retractable nipple to ensure that nothing "gets in the way" when processing.



- 1 Workpiece
- 2 Retractable nipple mounted
- 3 Retractable nipple
- 4 STARK.balance surface-mounted element
- 5 Base plate



### Application example - surface-mounted element



#### Centre distance flexible application

- Application with surface-mounted element
- Fast and flexible positioning
- Height advantage  
Height can be customised
- Bottom side with clamping edge for clamping claws or optionally with STARK.classic

- 1 Screw-on situation depending on application
- 2 Retractable nipple with zero point
- 3 STARK.balance.2 NP (S801-207) or STARK.balance.2 AG (S801-208) or STARK.balance.2 OZ (S801-209)
- 4 STARK.balance.2 release
- 5 STARK.classic.2 NG release
- 6 Release and clamping control
- 7 STARK.classic.2 NG (S804-538)
- 8 Retractable nipple with zero point (S804-470)
- 9 Surface-mounted element, complete

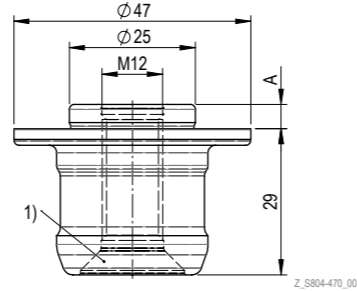
**RETRACTABLE NIPPLE**

**STARK.balance.2 retractable nipple with zero point**



Retractable nipple suitable for all fast closing clamps of the STARK.classic.2 and the STARK.balance.2 family

- Retractable nipple with zero point
- Material: Tool steel
- Min. screw quality 10.9
- Weight: 0.16 kg
- Installation according to data sheet D029-2
- Operating Manual WM-020-369-xx-xx



Order number	Article designation	Collar length (A)	Area of application*
S804-470	EB C2 NP 250 12 048	4.8 mm	STARK.balance.2 Standard
S804-474	EB C2 NP 250 12 148	14.8 mm	STARK.balance.2 Standard / Twister

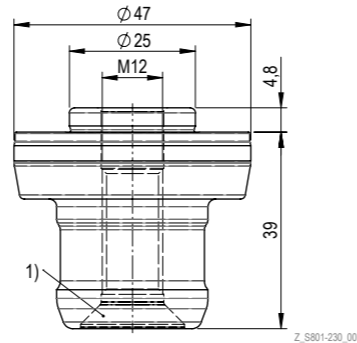
\* See Combination options & tolerance range on page 13  
▶ Note NEW order numbers – see information on page 34

**STARK.balance.2 retractable nipple with zero point**



Retractable nipple for STARK.balance direct clamping fast closing clamps

- Retractable nipple with zero point
- Without fit
- Material: Case hardening steel
- Weight: 0.3 kg
- Operating Manual WM-020-369-xx-xx



Order number	Article designation
S801-230	EL Z2 NP 250 12 048

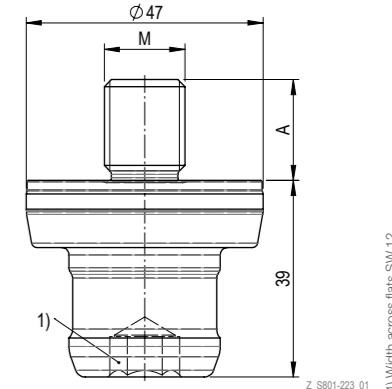
▶ Note NEW order numbers – see information on page 34

**STARK.balance.2 retractable nipple with zero point**



Retractable nipple for STARK.balance direct clamping fast closing clamps

- Retractable nipple with zero point
- Without fit
- Material: Case hardening steel
- Weight: 0.3 kg
- Operating Manual WM-020-369-xx-xx



Order number	Article designation	Thread (M)	Tightening torque	Thread length (A)
S801-221	EL Z2 NP 000 10 000 EG	M10	45 Nm	13 mm
S801-222	EL Z2 NP 000 12 000 EG	M12	60 Nm	12 mm
S801-223	EL Z2 NP 000 16 000 EG	M16	100 Nm	20 mm
S801-224	EL Z2 NP 000 20 000 EG	M20	110 Nm	26 mm
S801-225	EL Z2 NP 000 40 000 EG	M24	123 Nm	33 mm

▶ Note NEW order numbers – see information on page 34

**INFO**

**Retractable nipple selection & support surface design**

1 Element  
Standard / Standard THF

2 Retractable nipple (S804-470)

1 Twister / Twister THF element

2 Retractable nipple (S804-474)

3 Spacer with O-ring

4 Support disc

1 Direct clamping /  
Direct clamping THF element

2 Retractable nipple (S801-22x, S801-230)

3 For direct clamping, ensure plane support on the support surface (> 50 %).



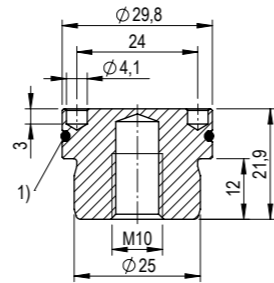
## NIPPLE FASTENING

### Nipple fastening D



Counterpart for assembling the retractable nipple according to the version "D"

- Allows to make the nipple fastening with one clamping.
- Mounting key or face wrench recommended for counterholding.
- Installation according to data sheet D029-2
- Operating Manual WM-020-369-xx-xx.



Z\_S804-267\_00

1) S804-267 O-ring Ø 26.7 x 1.78 mm S933-163

Order number	Article designation	Weight
S804-267	NB 30 22 25 12 M10 NI D	0.05 kg

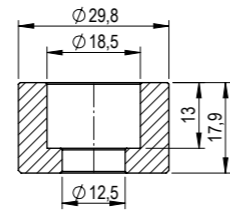
► Note NEW order numbers – see information on page 34

### Nipple fastening E



Counterpart for assembling the retractable nipple according to the version "E"

- Allows to make the nipple fastening with one clamping.
- Installation according to data sheet D029-2
- Operating Manual WM-020-369-xx-xx.



Z\_S804-266-01\_00

Order number	Article designation	Weight
S804-266-01	NB 30 18 00 00 F12 NI E	0.05 kg

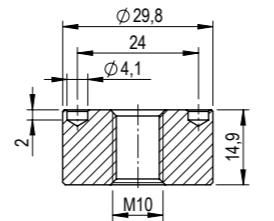
► Note NEW order numbers – see information on page 34

### Nipple fastening E.1



Counterpart for assembling the retractable nipple according to the version "E.1".

- Allows to make the nipple fastening with one clamping. Mounting key or face wrench recommended for counterholding.
- Installation according to data sheet D029-2.
- Operating Manual WM-020-369-xx-xx.



Z\_S804-266\_00

Order number	Article designation	Weight
S804-266	NB 30 15 00 00 M10 NI E1	0.05 kg

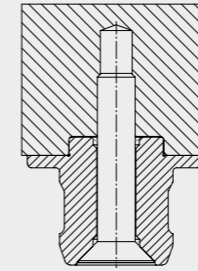
► Note NEW order numbers – see information on page 34

## INFO

### Retractable nipple fastening versions

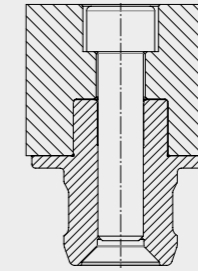
#### Version A

For applications where nipple bores are not permitted on the surface (e.g. pallet top) or for direct clamping of workpieces.



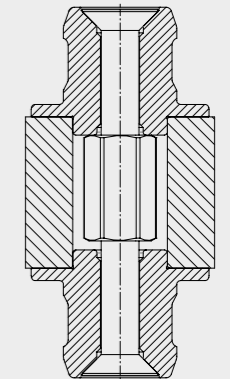
#### Version B

Simple nipple fastening from above.



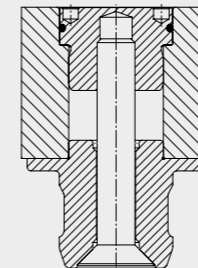
#### Version C

Ideal fastening version for clamping in laterally inverted manufacturing. Highest level of accuracy is guaranteed because the retractable nipples are fastened in the same locating bore.

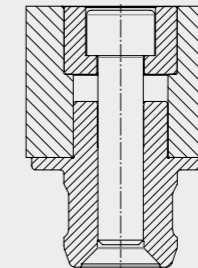


#### Version D

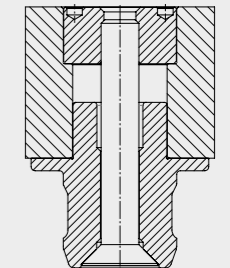
The fitting bores for the retractable nipples and all necessary positioning bores on the pallet can be produced in one operation. This results in the highest level of accuracy of the positions to each other. Mounting version D is additionally sealed by an O-ring.



#### Version E



#### Version E.1

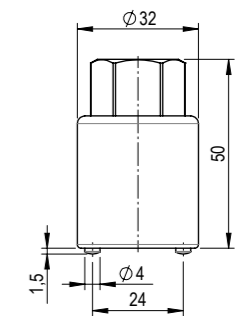


### Key for nipple fastening D & E.1



For assembly and disassembly of the retractable nipples according to versions "D & E.1"

- Width across flats SW22
- Tightening torque, see installation data sheets of retractable nipples.



Z\_S804-254\_00

Order number	Article designation	Dimensions	Weight
S804-254	Key for nipple fastening M10	ø32 mm / 50 mm	0.16 kg

► Note NEW order numbers – see information on page 34

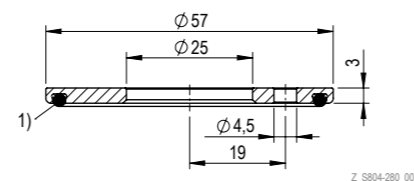
## ACCESSORIES

### Spacer with O-ring



For sealing the centre bore and for height compensation for STARK.classic.2 Twister and STARK.balance.2 Twister

- Very precise seat check (up to 0.01 mm) possible, as air can only escape at the 4 support islands due to the sealing of the centre bore
- Operating Manual WM-020-369-xx-xx

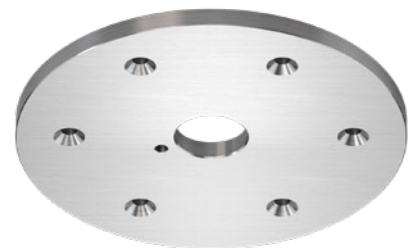


1) O-Ring  $\varnothing$  48.0 x 2.5 mm S835-231-01

Order number	Article designation	Installation according to data sheet	Weight
S804-280	Twister spacer	D033	0.02 kg

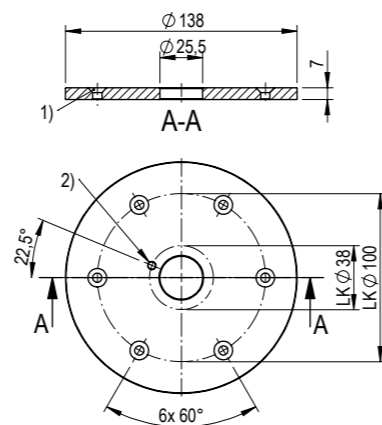
► Note NEW order numbers – see information on page 34

### Support disc made of hardened steel



For the use of non-hardened machine pallet surfaces for STARK.balance Twister

- High wear resistance for non-hardened machine pallet surfaces
- Operating Manual WM-020-369-xx-xx



1) Countersink for M5 screw  
2) Indexing bore for M4 / DIN427 shaft screw

Order number	Article designation	Surface	Installation according to data sheet	Weight
S804-281-02	Twister support disc	ground on both sides	D033	0.78 kg

► Note NEW order numbers – see information on page 34

### Screw cover



Screw cover suitable for the retractable nipples or fast closing clamps of the STARK.balance family

Order number	Article designation	Design	Weight
S999-428	Plastic cover for M5	M5 $\varnothing$ 10 mm x 3.5 mm	0.001 kg
S999-408	Plastic cover for M6	M6 $\varnothing$ 11 mm x 3.3 mm	0.001 kg

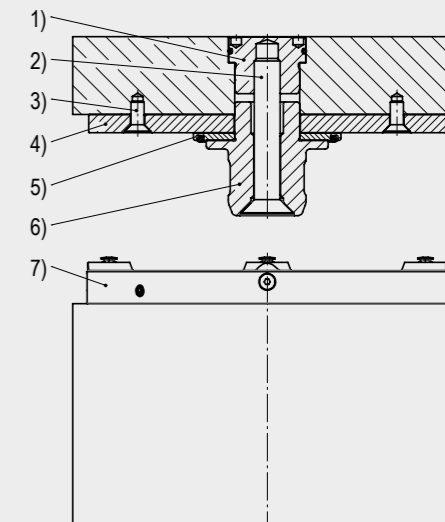
► Note NEW order numbers – see information on page 34

## INFO

### Application example

Application example; STARK.balance.2 Twister with spacer and support disc

- Nipple fastening
- Fixing screws for retractable nipple
- Fixing screw for hardened support disc
- Hardened support disc
- Spacer with O-ring
- Retractable nipple
- STARK.balance.2 Twister



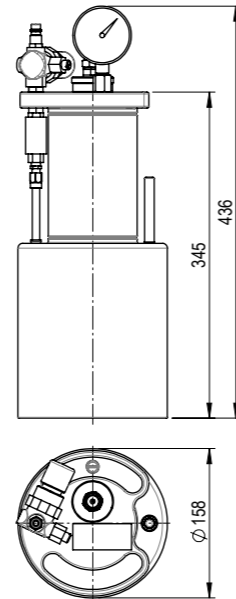
## Record pressure booster



The RECORD pressure booster converts air pressure into the required hydraulic system pressure for actuating the STARK.balance fast closing clamps

- Control of max. 5 STARK.balance units up to max. 80 bar (system pressure)
- Air pressure 6 bar
- Oil volume 0.148 l
- Weight 8.80kg

► Pressure booster can be extended to THF with article S804-427



Z\_S804-412\_00

Order number	Article designation
S804-412	"Record" pressure booster 80 bar

► Note NEW order numbers – see information on page 34

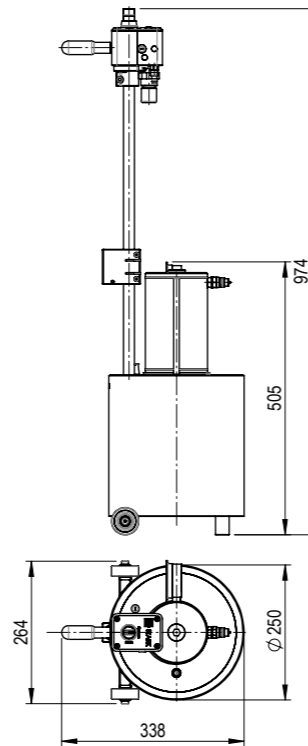
## Booster pressure booster



The pressure booster is used to release single-acting clamping systems. The booster converts compressed air into hydraulic pressure and is suitable for application areas of 80 bar.

- Control of max. 20 STARK.balance units up to max. 80 bar (system pressure)
- Air pressure 6 bar
- Oil volume 0.5 l
- Weight 27.30kg

► Pressure booster can be extended to THF with article S804-427



Z\_S804-433\_00

Order number	Article designation
S804-433	"COMFORT" booster 80bar

► Note NEW order numbers – see information on page 34

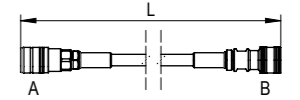
## Hydraulic hose with couplings



Hydraulic hose with hydraulic plug-in coupling on both sides

Used to connect between pressure booster and fast closing clamp plate or surface-mounted element

- Max. pressure 300 bar

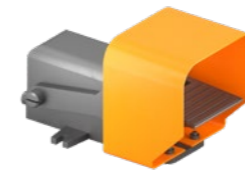


Z\_S704-153\_00

Order number	Article designation	Couplings A/B	Length L	Weight
S704-150	Hydraulic hose set	A/B: Standard (S952-044)	1.5 m	0.63 kg
S704-151	Hydraulic hose set	A: Leak-free (S952-177) / B: Standard (S952-044)	1.5 m	0.63 kg
S704-152	Hydraulic hose set	A/B: Standard (S952-044)	3.0 m	0.85 kg
S704-153	Hydraulic hose set	A: Leak-free (S952-177) / B: Standard (S952-044)	3.0 m	0.85 kg

► Note NEW order numbers – see information on page 34

## Pedal controller



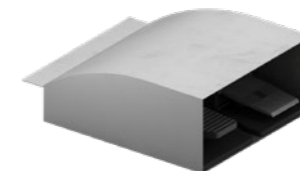
Pedal controller for controlling the pressure booster

- Control of the pressure booster via foot controller
- The pressure booster does not have to be located in the immediate vicinity
- Both hands are free for loading or for removing the workpieces to be processed
- Weight 1.5kg

Order number	Article designation
S804-419	Pedal controller for pressure booster (incl. pneumatic hose and screw-in connections)

► Note NEW order numbers – see information on page 34

## THF pedal controller (third-hand function)



The special pressure control (actuation) of the fast closing clamps allows the workpiece, pallet or device to be easily engaged. Feed, engage and clamp.

- For a vertical clamping position or for feeding by robots or handling systems
- Weight 4kg

Order number	Article designation
S804-427	Pedal controller for pressure booster (incl. pneumatic hose and screw-in connections)

► Note NEW order numbers – see information on page 34



## STARK.balance order number directory

► Note NEW order numbers

S704-150	33	S801-210	20	S801-225	27	S804-427	33
S704-151	33	S801-211	20	S801-230	26	S804-433	32
S704-152	33	S801-212	21	S801-250	24	S804-470	26
S704-153	33	S801-213	18	S801-251	24	S804-474	26
S801-201	16	S801-214	18	S801-252	24	S999-408	30
S801-202	16	S801-215	19	S804-254	29	S999-428	30
S801-203	17	S801-216	18	S804-266	28		
S801-204	16	S801-217	18	S804-266-01	28		
S801-205	16	S801-218	19	S804-267	28		
S801-206	17	S801-221	27	S804-280	30		
S801-207	20	S801-222	27	S804-281-02	30		
S801-208	20	S801-223	27	S804-412	32		
S801-209	21	S801-224	27	S804-419	33		

### INFO NEW order numbers

In the course of a system modification within the ROEMHELD Group, the order numbers for STARK Spannsysteme have been adapted and standardised.

- NEW: all order numbers start with **S**
- NEW: hyphen - instead of blank space

**S801-201**

instead of  
801 201

#### Examples

NEW order number	OLD order number	Modifications
<b>S04342</b>	S04342	No modification
<b>S801-201</b>	801 201	<b>S</b> prefix, hyphen - instead of blank space

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## STARK Spannsysteme

The ROEMHELD Group consists of 5 companies at locations in Germany and Austria, each with different products and orientations. With numerous subsidiaries, sales partners and service companies on all continents and in more than 50 countries, rapid and intensive customer support is provided in the mechanical engineering, medical technology, automotive, aviation and agricultural industries.

As part of the ROEMHELD Group, STARK benefits from the security and experience of a family-run traditional company as well as from the worldwide sales and service network. At the same time, this background provides the independence to pursue dynamic and innovative goals for new market-driven developments and customer-specific solutions with which STARK maintains its leading technological position.



**ROEMHELD**  
HILMA ■ STARK

## **STARK** Spannsysteme

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