



**ROEMHELD**  
HILMA ■ STARK

# The future starts now

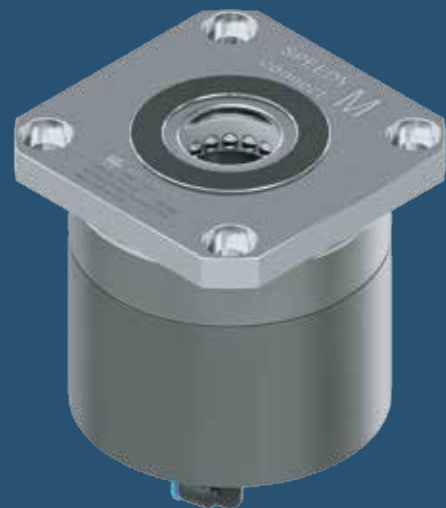


## Zero point clamping system **SPEEDY connect**

Products | *for* | productivity

reliable  
boosting  
compact  
powerful

- Industry 4.0-compatible
- Pneumatic double-action
- Very small dimensions
- High insertion force





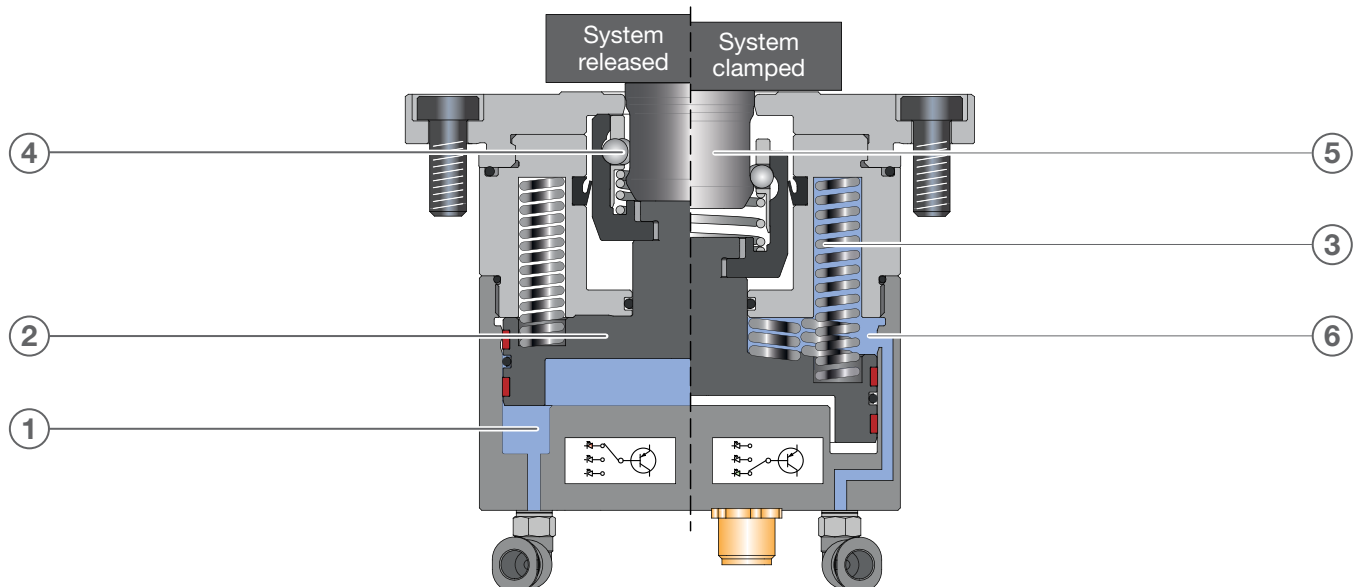
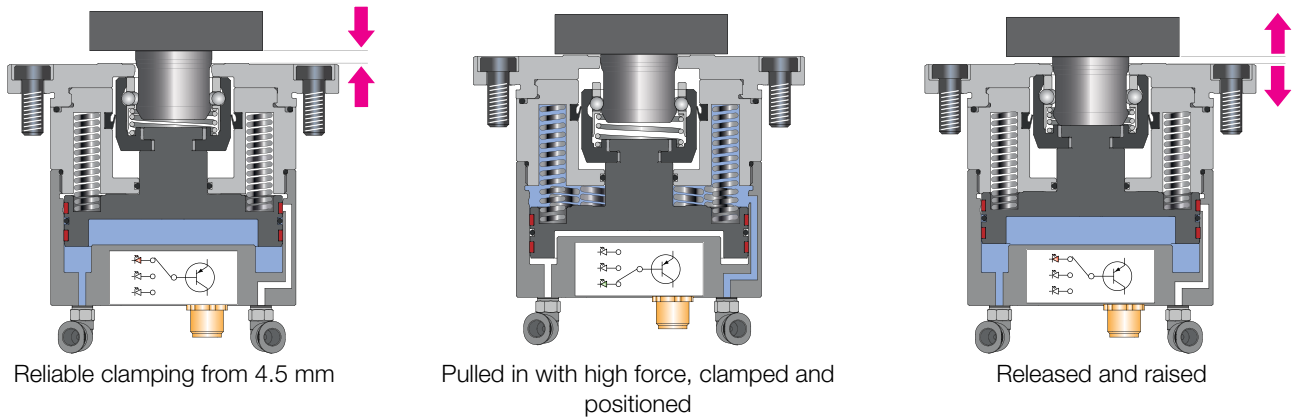
## Contents SPEEDY connect

<b>Information</b>	Function description SPEEDY connect	.....	4
	Tried and tested technology with a system – original down to the smallest detail	.....	5
	Characteristics	.....	6
	Pin assignment	.....	7
	Specifications – transparency from the start	.....	8
	Tilting torque calculation example	.....	9
	Installation instructions, nipple	.....	13
	Application	.....	13
			<b>Order no.</b>
<b>SPEEDY connect</b>	M	● Standard	9000 001 ..... 10
<b>Retractable nipple connect</b>	M	● With zero point	9000 100 ..... 11
		● With equaliser	9000 101 ..... 11
		● Without centring	9000 102 ..... 11
<b>Nipple fastening</b>		● D	809 120 ..... 12
		● E	809 128 ..... 12
<b>Accessories</b>	Push-in fitting 0°		953 160 ..... 14
			953 273 ..... 14
	Push-in fitting 90°		953 171 ..... 14
			953 272 ..... 14
	Sensor cable 1 m, 3 m		999 700 – 999 703 ..... 14
	Bridge for unlocking		9000 900 ..... 15
	Key for nipple fastening E		804 962 ..... 15



## Function description SPEEDY connect

SPEEDY connect is a pneumatically actuated zero point clamping system. A piston is held in the clamped position using springs. The piston is of a double-action pneumatic design.

**Releasing:**

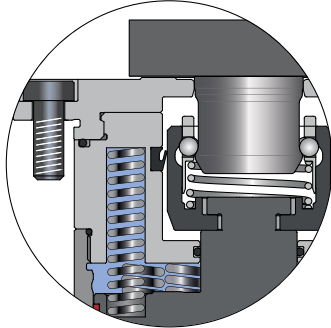
- The release pressure (1) is applied to the piston (2) and the piston moves up. The springs (3) are compressed.
- The balls (4) move to the parking position.
- The retractable nipple (5) is raised – “released” signal.

**Clamping:**

- The release pressure (1) is relieved and drops to 0 bar.
- The spring pre-load is applied via the piston (2), the piston moves down.
- The balls (4) are pressed in by the clamping contour, enclose the retractable nipple (5) and pull it down so it is in contact – “clamped with retractable nipple” signal.
- If there is no retractable nipple in the retraction mechanism, the piston (2) moves to the stop – “clamped without retractable nipple” signal.
- The clamping pressure (6) can also be applied to the piston (2) to increase the insertion force.

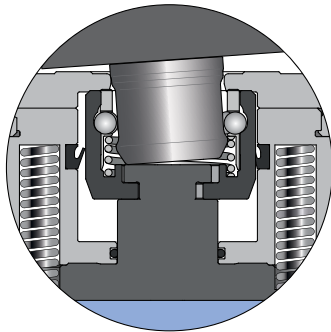
Tried and tested technology with a system –  
Original down to the smallest detail

**Advantages**  
that pay off!



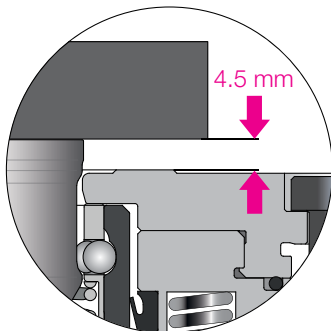
### Design

- Compact design with high clamping forces
- Double-action pneumatic system with clamping force boost
- Simple installation contour
- Easy to maintain – straightforward installation and cleaning
- Made of high-quality, stainless materials



### Floating receptacle

- Clamping mechanism can move sideways (e.g. temperature variation)
- Angled insertion and removal possible
- Optimal for automatic applications



### Active insertion

- Active insertion force for optimal contact
- Maximum capture range with 4.5 mm travel
- Vibrations are damped and the quality of the workpieces therefore increased
- Straightforward robotic feed and removal



### Fully integrated sensors

- Unambiguous acquisition of the clamping state
- Direct signalling on the rear via LEDs
- Digital outputs for straightforward further processing in the higher-level controller
- Greatest possible robustness and suitable for use in welding environments

## Characteristics

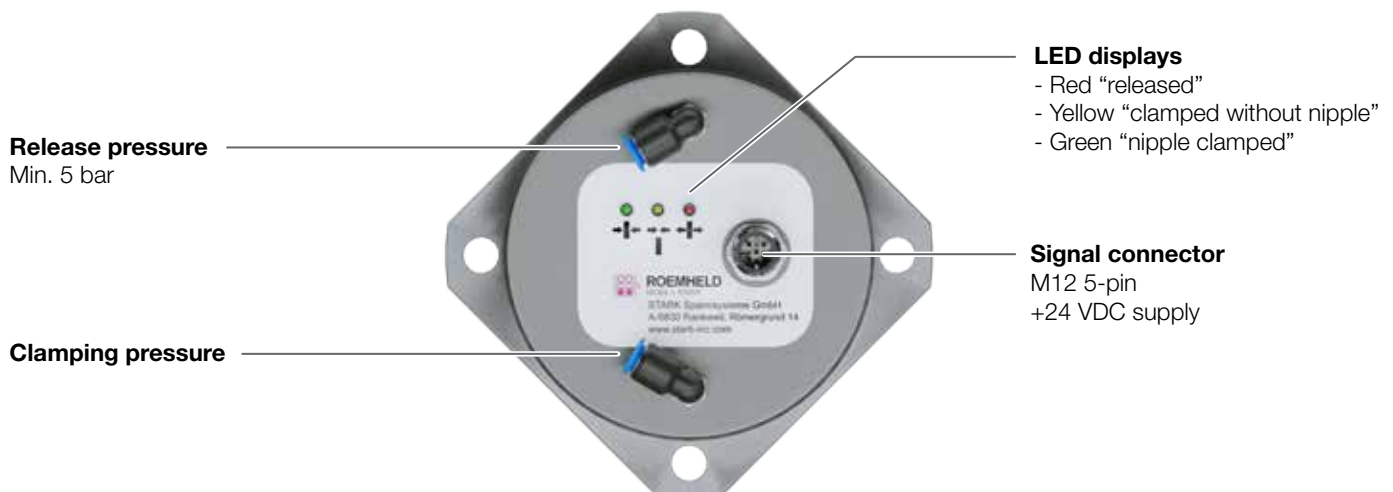
The SPEEDY connect series are fast closing clamps made of high-quality tool steel and a housing made of anodised, high-strength aluminium with very low space requirements due to compact external dimensions. The system is clamped mechanically using springs, the force is boosted pneumatically and the system also released pneumatically. The SPEEDY connect is self-locking due to the integrated spring assembly.

The integrated polling unit acquires and signals the clamping state via three signals ("clamped without nipple", "nipple clamped" or "released") on LEDs on the rear of the element, as well as digital signals for forwarding to a higher-level controller. The polling is designed so it is resilient to interference and is suitable for use in welding systems.



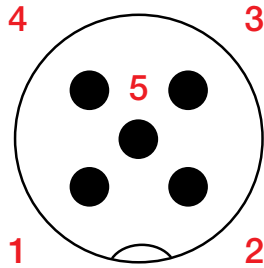
## Connections

On the rear of the element there are the two pneumatic connections for releasing and boosting the clamping, as well as the electrical outputs and optical indication of the clamping state.



## Pin assignment

The integrated polling unit is to be supplied with a nominal voltage of +24 V DC. The related clamping state is indicated by an unambiguous signal ("clamped without nipple", "nipple clamped" or "released"). The signal lines are designed as PNP outputs with a 10 k $\Omega$  pull-down resistor.



M12 connector, male, 5-pin,  
A-coding



Sensor cable with 0° alignment



Sensor cable with 90° alignment

Assignment	Description	Signal type	Indication (rear)
Pin 1	+24 VDC	Supply	
Pin 2	Signal "clamped without nipple"	PNP	Yellow LED
Pin 3	GND	Supply	
Pin 4	Signal "nipple clamped"	PNP	Green LED
Pin 5	Signal "released"	PNP	Red LED
Screen	Not connected		



## Specifications – Transparency from the start

		M 9000 001
Modular design		Yes
Bearing surfaces		Yes
Release check		Electrical
Clamping check (with/without retractable nipple)		Electrical
Maintenance interval	Cycles	2,000,000
Active insertion force <sup>1</sup> without clamping pressure	[ N ]	1,200
Active insertion force <sup>1</sup> at 5 bar / 20 bar	[ N ]	3,000 / 8,500
Retention force <sup>2</sup>	[ N ]	10,000
Min. release pressure	[ bar ]	5
Max. operating pressure	[ bar ]	20
Lifting force at 5 bar	[ N ]	500
Lifting distance*	[ mm ]	1.5
Retraction distance total*	[ mm ]	4.5
Max. permissible lateral forces <sup>3</sup>	[ N ]	7,000
Volume of air for releasing/clamping	[cm <sup>3</sup> ]	64
Operating temperature	[ °C ]	+10 to +60
Min. permissible clamping time	[ s ]	0.5
Min. permissible release time	[ s ]	0.5
Radial pre-positioning <sup>4</sup>	[ mm ]	± 1
Axial pre-positioning <sup>5</sup>	[ mm ]	-3
Max. loading angle	[°]	± 5
Repeatability <sup>6</sup>	[ mm ]	< 0.05
System accuracy <sup>7</sup>	[ mm ]	< 0.1
Weight	[ kg ]	1.8
Air connection		M5
Sensor connection		M12 5-pin
Voltage range	[V]	24 V (18 to 34 V)

\* Other lifting and retraction distances possible on request.

- <sup>1</sup> Insertion force: The insertion force refers to the load up to which the zero point is guaranteed. The retractable nipple is actively inserted 4.5 mm with this force.
- <sup>2</sup> Retention force: The retention force refers to the max. overload at which the nipple will continue to be retained, but the zero point has already been left.
- <sup>3</sup> Lateral force: The permissible force applies only to retractable nipples with zero point and retractable nipples with equaliser at 90° to the equalisation direction.
- <sup>4</sup> Radial pre-positioning: The loading device must have play on manual or automated handling.
- <sup>5</sup> Axial pre-positioning: The max. distance the retractable nipple is allowed to be from the piston base (stop before clamping) so that positive clamping can take place. Within this tolerance, the retractable nipple is inserted with the stated insertion force until it is in contact.
- <sup>6</sup> Repeatability: Repeatability generally refers to the accuracy with which the same pallet is positioned on changing on the same interface.
- <sup>7</sup> System accuracy: The system accuracy is the accuracy resulting from changing several pallets, e.g., on different machines.



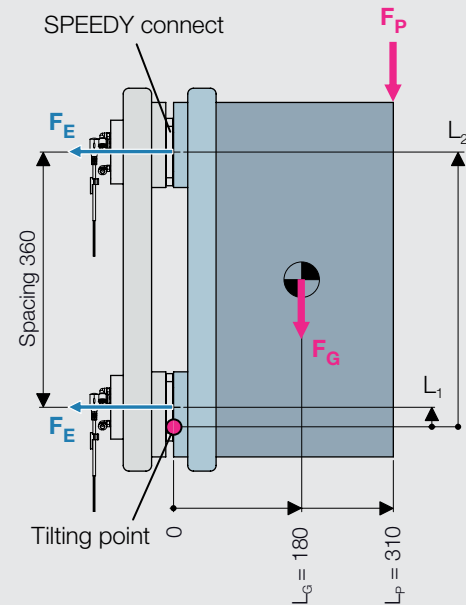
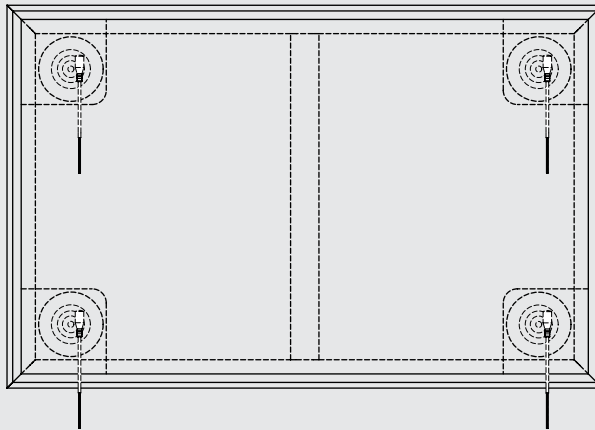
## Tilting torque calculation example

Profit from our expertise

i

**Calculation example, tilting torque (fictive figures):**

4 SPEEDY connect M on a frame structure, fitted horizontally

**Question:**Insertion moment  $M_E > 2 \times$  load moment  $M_L$ ? (safety factor 2) $M_E$  : Moment from insertion force $M_L$  : Moment from load $F_P$  : Process force = 2000 N $F_E$  : Insertion force = 3000 N (at 5 bar) $F_G$  : Force due gravity, workpiece + pallet =  $300 \text{ kg} \times 9.81 \text{ m/s}^2 = 2943 \text{ N}$ Spacing =  $660 \times 360$ **Solution:**

Contact diameter = 55 mm

 $L_1 = 55 \text{ mm} / 2 = 27.5 \text{ mm} = 0.0275 \text{ m}$  $L_2 = (55 \text{ mm} / 2 = 27.5 \text{ mm}) + 360 \text{ mm} = 0.3875 \text{ m}$  $M_E = 2 \times (F_E \times L_1 + F_E \times L_2) = 2 \times (3000 \text{ N} \times 0.0275 \text{ m} + 3000 \text{ N} \times 0.3875 \text{ m})$  $M_E = \mathbf{2490 \text{ Nm}}$  $M_L = M_G + M_P$  $M_L = (F_G \times L_G) + (F_P \times L_P) = (2943 \text{ N} \times 0.18 \text{ m}) + (2000 \text{ N} \times 0.31 \text{ m})$  $M_L = \mathbf{1149.7 \text{ Nm}}$  $M_E/M_L > 2?$  $M_E/M_L = 2490 \text{ Nm} / 1149.7 \text{ Nm}$  $M_E/M_L = \mathbf{2.17 > 2}$ 

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

**Attention:** acceleration forces due to handling operations are to be considered separately!

All variables are to be stated in SI units (metre, newton).



## SPEEDY connect M

- **Module**
- **Pneumatic**
- **Integrated polling**



### Characteristics:

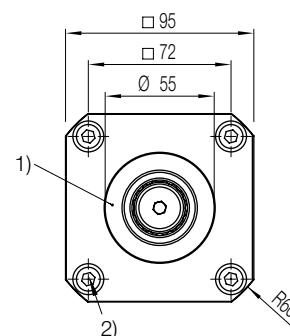
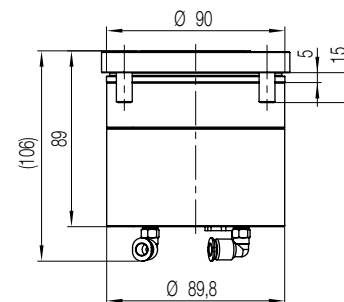
Fast closing clamp made of high-quality tool steel and a housing made of anodised, high-strength aluminium with very low space requirements due to compact external dimensions.

Is clamped mechanically using springs, the force boosted pneumatically and the system released pneumatically.

The integrated polling unit the clamping state via 24 V signals.

### Application:

For installation in systems for vehicle bodysell manufacture, assembly systems and for connecting machine elements. Suitable for usage in welding environments (welding-resistant).



- 1) Hardened contact surface
- 2) Fastening 4x M8 DIN6912

Order no.	Retention force	Pressure max.	Release pressure min.	Weight	Data sheet
9000 001	10.000 N	20 bar*	5 bar	1.8 kg	D169

Four M8x20 mm fastening screws included.

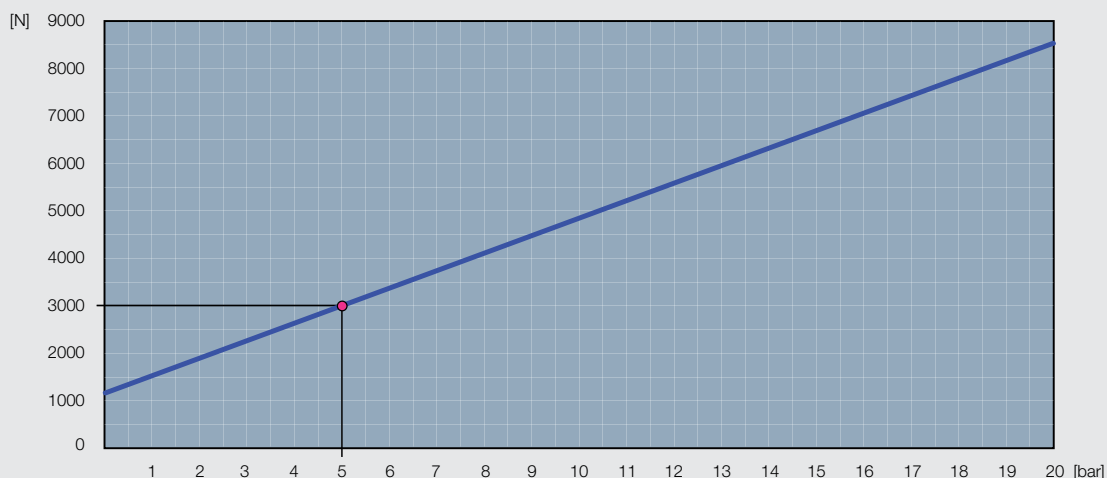
\* Max. 12 bar with push-in fitting 953 160 or 953 271 (included)  
Max. 20 bar with push-in fitting 953 272 or 953 273 (page 14)



### Variable insertion force with SPEEDY connect

Depending on the clamping pressure, the clamping force is:

#### Clamping force / clamping pressure diagram



#### Example calculation:

Pneumatic clamping pressure = 5 bar. According to the diagram there is an insertion force of 3000 N.



## Retractable nipple connect M

● **With zero point**

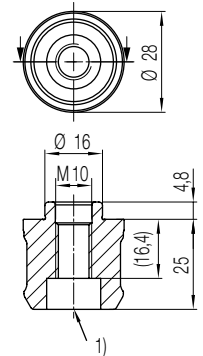


**Characteristics:**

Retractable nipple with zero point.

**Application:**

For positioning and clamping in machines and systems.



1) Counterbore for DIN912 M8

Order no.	Screw quality	Tightening torque		Weight	Data sheet
		M8	M10		
9000 100	min. 10.9	36 Nm	36 Nm	0.05 kg	D170

## Retractable nipple connect M

● **With equaliser**

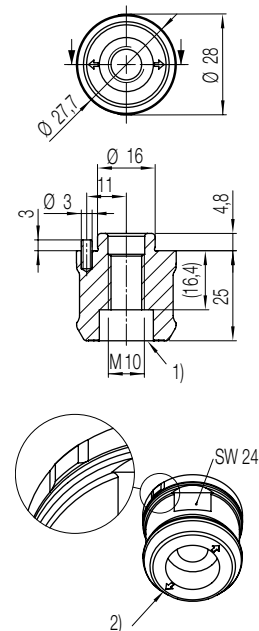


**Characteristics:**

Retractable nipple with equaliser in one axis (sword shape). An index pin  $\varnothing 3$  mm is fitted for correct positioning.

**Application:**

For positioning and clamping in machines and systems.



1) Counterbore for DIN912 M8  
2) Equalisation direction marked

Order no.	Screw quality	Tightening torque		Weight	Data sheet
		M8	M10		
9000 101	min. 10.9	36 Nm	36 Nm	0.05 kg	D170

Index pin included.

## Retractable nipple connect M

● **Without centring**

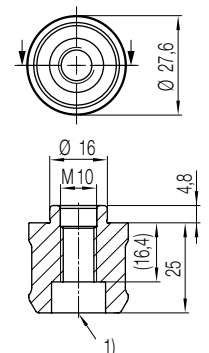


**Characteristics:**

Retractable nipple without centring.

**Application:**

For positioning and clamping in machines and systems.



1) Counterbore for DIN912 M8

Order no.	Screw quality	Tightening torque		Weight	Data sheet
		M8	M10		
9000 102	min. 10.9	36 Nm	36 Nm	0.05 kg	D170



## Nipple fastening D

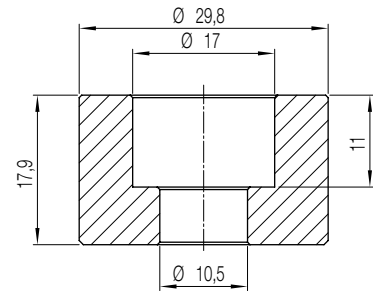


### Characteristics:

Makes it possible to manufacture the nipple fastening with one clamping arrangement. In this way the highest accuracy is achieved.

### Application:

Machine pallets, machine vices, chucks, jigs, direct workpiece clamping.



Order no.	For nipple	Tightening torque M10	Weight	Data sheet
809 120	ø 16 mm	36 Nm	0.05 kg	D170

## Nipple fastening E

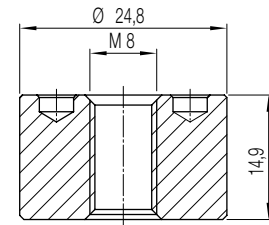


### Characteristics:

Makes it possible to manufacture the nipple fastening with one clamping arrangement. In this way the highest accuracy is achieved.

### Application:

Machine pallets, machine vices, chucks, jigs, direct workpiece clamping.  
Optional: key for installation order no. 804 962, for locking in the face bores.

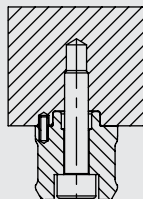


Order no.	For nipple	Tightening torque M8	Weight	Data sheet
809 128	ø 16 mm	36 Nm	0.05 kg	D170

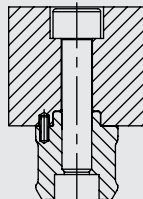


### Application example

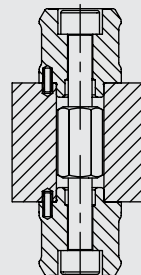
Variant A



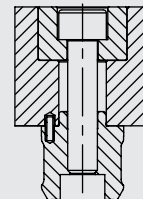
Variant B



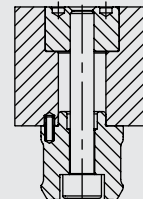
Variant C



Variant D



Variant E



### Variant A:

For applications in which nipple bores are not allowed on the surface (e.g. top of the pallet), or for direct workpiece clamping.

### Variant B:

Straightforward nipple fastening from above.

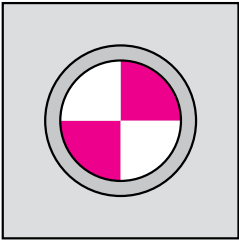
### Variant C:

Ideal fastening variant for clamping arrangements using which the workpiece is machined on both sides. Highest accuracy is ensured because the nipples are fastened in the same mounting bore.

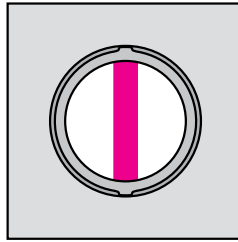
### Variant D, E:

The precision bores for the nipples and all the necessary positioning holes on the pallet can be manufactured in one operation. As a consequence the positions have the highest accuracy in relation to each other.

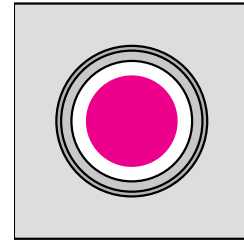
## Installation instructions, nipple



1) Retractable nipple with zero point



2) Retractable nipple with equaliser

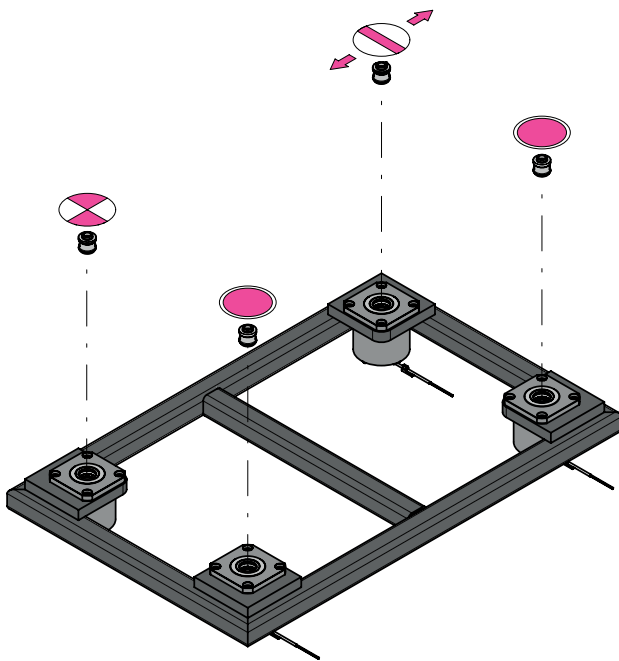


3) Retractable nipple

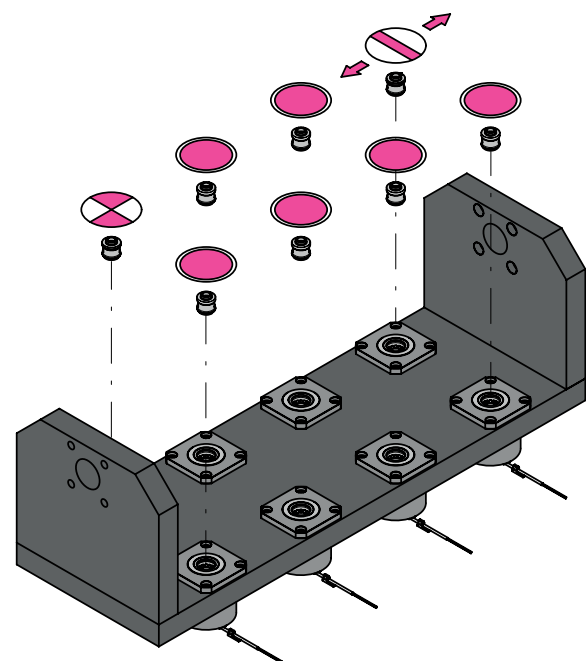
## Application

The product series SPEEDY connect is designed for vehicle bodyshell manufacture, assembly systems and for connecting machine elements. It is suitable for usage in welding environments (welding-resistant).

It can also be used for all common machining tasks such as milling, grinding, eroding as well as on test stands and assembly devices. Ideal for automatic loading.



Example nipple arrangement for a frame structure



Example nipple arrangement for a trunnion table application





## Accessories

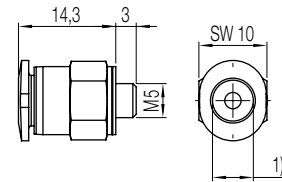
## Push-in fitting 0°

**Characteristics:**

Pneumatic M5 coupler in 0° design suitable for 9000 001.

**Application:**

For the connection and actuation of the SPEEDY connect.



Order no.	Description	Pressure max.	Weight
953 160	M5 Ø6 mm – straight / 0°	12 bar	4.5 g
953 273	M5 Ø6 mm – straight / 0°	20 bar	4.5 g

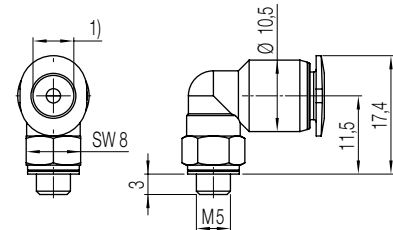
## Push-in fitting 90°

**Characteristics:**

Pneumatic M5 coupler in 90° design suitable for 9000 001.

**Application:**

For the connection and actuation of the SPEEDY connect.



Order no.	Description	Pressure max.	Weight
953 171	M5 Ø6 mm – angled / 90°	12 bar	5 g
953 272	M5 Ø6 mm – angled / 90°	20 bar	5 g

## Sensor cable 1 m, 3 m

**Characteristics:**

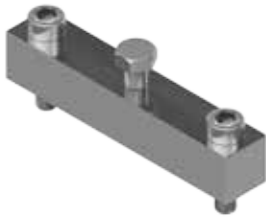
5-core sensor cable with M12 connector in straight or angled design with length of 1 or 3 metres.

**Application:**

For the connection and evaluation of the integrated sensor unit.

Order no.	Description	Weight
999 700	5-core sensor cable, l = 1 m , M12 connector 0°, flying lead	0.05 kg
999 701	5-core sensor cable, l = 3 m , M12 connector 0°, flying lead	0.15 kg
999 702	5-core sensor cable, l = 1 m , M12 connector 90°, flying lead	0.05 kg
999 703	5-core sensor cable, l = 3 m , M12 connector 90°, flying lead	0.15 kg

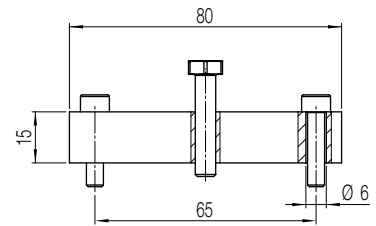
## Bridge for unlocking


**Characteristics:**

Bridge for mechanically unlocking the clamping element including fastening and jacking screws.

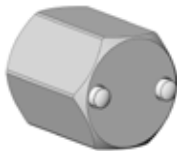
**Application:**

Releasing the element during servicing if, e.g., there is no compressed air available.



Order no.	Description	Weight
9000 900	Bridge for mechanical unlocking with two M5x22 mm screws for fastening and one M6x30 mm screw for jacking	0.07 kg

## Key for nipple fastening E


**Characteristics:**

Retractable nipple key SPEEDY connect.

**Application:**

Nipple fastening as per variant E. Installing and removing retractable nipples.

Order no.	Description	Weight
804 962	Retractable nipple key	0.08 kg

## ... because zero point clamping has an origin!

### Experience

Since 1988, STARK has developed zero point clamping systems and is considered a pioneer in this sector.

In the first catalogue we described our product as follows:

“The retractable nipple is mounted directly on the clamping device or directly on the workpiece.”

As early as during the launch, consideration was given to possibilities that to some extent were realised years later. The original clamping cylinder is still used in production today.

### Partners

In production, STARK sees itself as a partner in various sectors and applications.

For the automotive or aerospace sector, machine tool manufacture as well as one-off and series manufacturing, STARK is available as a competent point of contact.

Individual advice on the usage of STARK components and custom solutions for production are our strengths.

### Specialist

As a leading company in the field of zero point clamping technology, STARK has specialised uncompromisingly in zero point technology. By training specialists, STARK is safeguarding know-how for the future.

STARK combines all core components under one roof.

Continuous development and patents demonstrate the massive innovative power of the company.

Quality, precision, service and individual advice are elements of the corporate strategy.

### Group

ROEMHELD, HILMA, STARK – the three brands of the Römheld group are market leaders worldwide for productive solutions in industrial manufacturing, assembly, clamping and drive technology.

With our components, products and systems, we make your manufacturing more efficient and more flexible. The Römheld group is represented internationally with sales partners and joint ventures.

Your dealer



#### STARK Spannsysteme GmbH

Roemergrund 14, 6830 Rankweil, Austria

Telephone: +43 5522 / 37400-0, Fax: +43 5522 / 37400-700

E-mail: [info@stark-inc.com](mailto:info@stark-inc.com), Homepage: [www.stark-inc.com](http://www.stark-inc.com)