

Machine tooling technology

Zero-Point Clamping System

SPN

THE KNOW-HOW FACTORY

THE KNOW-HOW FACTORY

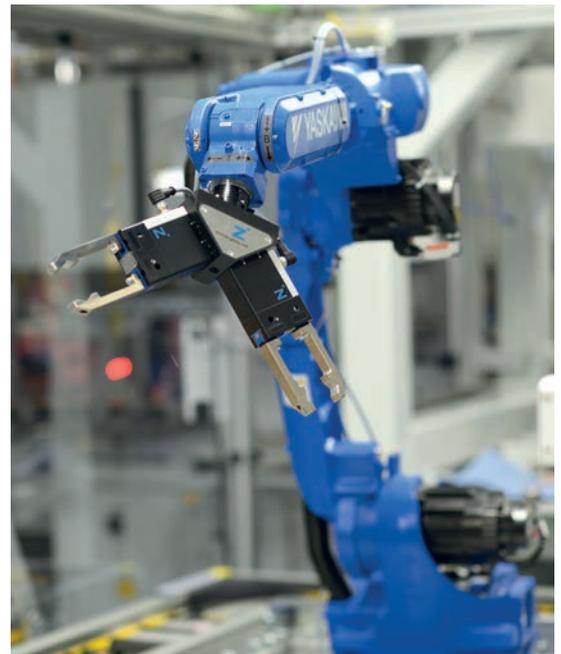
ZIMMER GROUP COMMITTED TO OUR CUSTOMERS

WE HAVE SUCCEEDED FOR YEARS BY OFFERING OUR CUSTOMERS INNOVATIVE AND INDIVIDUALIZED SOLUTIONS. ZIMMER HAS GROWN CONTINUOUSLY AND TODAY WE HAVE REACHED A NEW MILESTONE: THE ESTABLISHMENT OF THE KNOW-HOW FACTORY. IS THERE A SECRET TO OUR SUCCESS?

Foundation. Excellent products and services have always been the foundation of our company's growth. Zimmer is a source of ingenious solutions and important technical innovations. This is why customers with high expectations for technology frequently find their way to us. When things get tricky, Zimmer Group is in its best form.

Style. We have an interdisciplinary approach to everything we do, resulting in refined process solutions in six technology fields. This applies not just to development but to production. Zimmer Group serves all industries and stands ready to resolve even the most unique and highly individualized problems. Worldwide.

Motivation. Customer orientation is perhaps the most important factor of our success. We are a service provider in the complete sense of the word. With Zimmer Group, our customers have a single, centralized contact for all of their needs. We approach each customer's situation with a high level of competence and a broad range of possible solutions.



TECHNOLOGIES



HANDLING TECHNOLOGY

MORE THAN 30 YEARS OF EXPERIENCE AND INDUSTRY KNOWLEDGE: OUR PNEUMATIC, HYDRAULIC AND ELECTRICAL HANDLING COMPONENTS AND SYSTEMS ARE GLOBAL LEADERS.

Components. More than 2,000 standardized grippers, swivel units, robotic accessories and much more. We offer a complete selection of technologically superior products that are ready for rapid delivery.

Semi-standard. Our modular approach to design enables custom configurations and high rates of innovation for process automation.



DAMPING TECHNOLOGY

INDUSTRIAL DAMPING TECHNOLOGY AND SOFT CLOSE PRODUCTS EXEMPLIFY THE INNOVATION AND PIONEERING SPIRIT OF THE KNOW-HOW FACTORY.

Industrial damping technology.

Whether standard or customized solutions, our products stand for the highest cycle rates and maximum energy absorption with minimal space requirements.

Soft Close. Development and mass production of pneumatic and fluid dampers with extraordinary quality and rapid delivery.

OEM and direct. Whether they need components, returning mechanisms or complete production lines – we are the trusted partner of many prestigious customers.



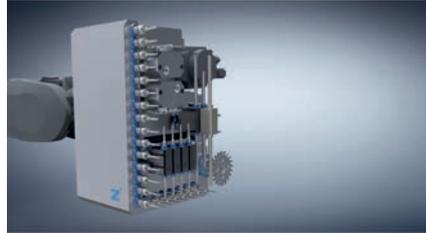
LINEAR TECHNOLOGY

WE DEVELOP LINEAR COMPONENTS AND SYSTEMS THAT ARE INDIVIDUALLY ADAPTED TO OUR CUSTOMERS' NEEDS.

Clamping and braking elements.

We offer you more than 4,000 types for profiled and round rails as well as for a variety of guide systems from all manufacturers. It makes no difference whether you prefer manual, pneumatic, electric or hydraulic drive.

Flexibility. Our clamping and braking elements ensure that movable components such as Z-axes or machining tables maintain a fixed position and that machines and systems come to a stop as quickly as possible in an emergency.



PROCESS TECHNOLOGY

MAXIMUM EFFICIENCY IS ESSENTIAL FOR SYSTEMS AND COMPONENTS USED IN PROCESS TECHNOLOGY. HIGH-LEVEL CUSTOM SOLUTIONS ARE OUR TRADEMARK.

A rich reservoir of experience. Our know-how ranges from the development of materials, processes and tools through product design to production of series products.

Deep production capabilities. The Zimmer Group pairs these capabilities with flexibility, quality and precision, even when making custom products.

Series production. We manufacture demanding products out of metal (MIM), elastomers and plastics with flexibility and speed.

MACHINE TECHNOLOGY

ZIMMER GROUP DEVELOPS INNOVATIVE METAL, WOOD AND COMPOSITE MATERIAL PROCESSING TOOL SYSTEMS FOR ALL INDUSTRIES. NUMEROUS CUSTOMERS CHOOSE US AS THEIR SYSTEMS AND INNOVATION PARTNER.

Knowledge and experience. Industry knowledge and a decades-long development partnership in exchangeable assemblies, tool interfaces and systems make us bound for new challenges around the world.

Components. We deliver numerous standard components from stock and develop innovative, customized systems for OEM and end customers – far beyond the metal and wood processing industries.

Variety. Whether you have machining centers, lathes or flexible production cells, the power tools, holders, assemblies and drilling heads of Zimmer Group are ready for action.

SYSTEM TECHNOLOGY

ZIMMER GROUP IS ONE OF THE LEADING SPECIALISTS IN THE DEVELOPMENT OF CUSTOMIZED SYSTEM SOLUTIONS WORLDWIDE.

Customized. A team made up of more than 20 experienced designers and project engineers develop and produce customized solutions for special tasks in close collaboration with end customers and system integrators. It doesn't matter if it is a simple gripper and handling solution or a complex system solution.

Solutions. These system solutions are used in many industries, from mechanical engineering to the automotive and supplier industries to plastics engineering and consumer goods industries, all the way to foundries. The Know-how Factory helps countless companies to thrive competitively by increasing automation efficiency.

SPN ZERO-POINT CLAMPING SYSTEM

ORDER INFORMATION

STRUCTURE OF THE ORDER NUMBER

Example:

S **P** **N** **112** **E** **6** **AD** - **B**

▶ **Clamping system**

S Clamping system

▶ **Actuation**

P Pneumatic

▶ **Characteristics**

N Zero point clamping system

▶ **Installation size**

Diameter [mm]

▶ **Design**

E Insertion element

▶ **Operating pressure**

4 bar

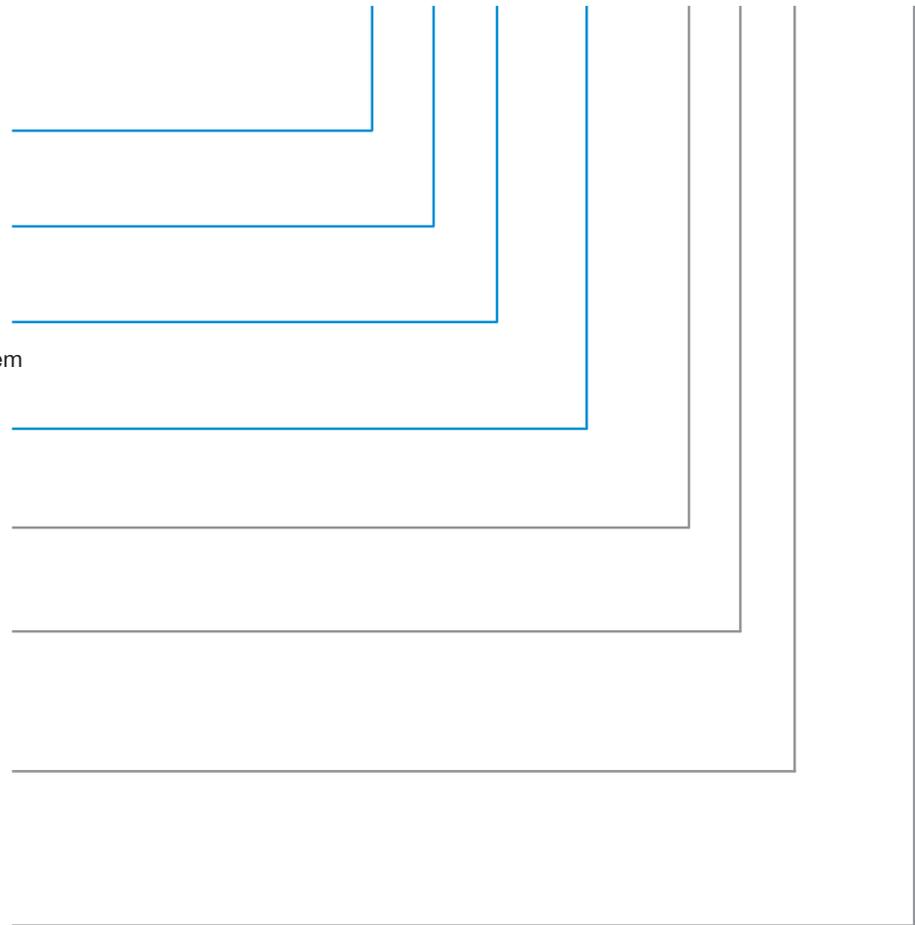
6 bar

▶ **Versions**

SD Standard

AD Advanced

▶ **Model series**



SPN ZERO-POINT CLAMPING SYSTEM

ADVANTAGES

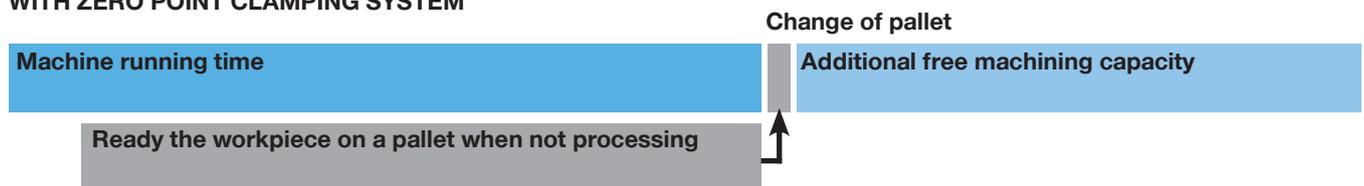
► Increased Productivity

By automating processes the zero point clamping system dramatically increases productivity of processes that required precision. Machine set-up times are reduced by up to 90%, and cleaning and maintenance of the system is minimal. The option to link processes, one after the other, in a single workpiece clamping system, in various machining cells and equipped with identical clamping system geometries, allows previously unrealized synergies. The workpiece carrier with the zero point clamping system accompanies the workpiece all the way through the production process, thus ensuring the ultimate in precision and cost efficiency.

WITHOUT ZERO POINT CLAMPING SYSTEM



WITH ZERO POINT CLAMPING SYSTEM



► Maximum repeatability and precision

The zero-point clamping system features a repeatability of 0.005 mm thanks to its sophisticated design. Thanks to its very high clamping forces and consistent use of tempered stainless steel, the system provides a high-precision, torsion-resistant base and also stabilizes parts that tend to vibrate.

► Increased process reliability

The zero-point clamping system reduces errors during milling, rotating, wire or die eroding, flat or cylindrical grinding, drilling, lasering and measuring. The maintenance-free design also contributes to the superior process reliability.

► Exactly the right system for your production

The modular zero-point clamping system from Zimmer Group gives you the right system for every requirement. In addition to a standard version reduced to the basic functions, which fulfills essential operations such as unlocking and a PLUS connection, there is also an advanced version with an extensive range of functions that are necessary for automated production, for example. Both variants feature positive locking via clamping segments that are specially adapted to the pin contour. This creates an extremely rigid system that can absorb the highest forces with maximum repeat accuracy. The product range is extended by many different types of clamping plates, available in every size and various configurations. To increase the protection of the particular zero-point clamping system and to prevent any intrusion of dirt, there is an optional automatic seal that reliably protects the pin opening.

SPN ZERO-POINT CLAMPING SYSTEM

SPN ADVANCED SERIES – THE SUPERIOR

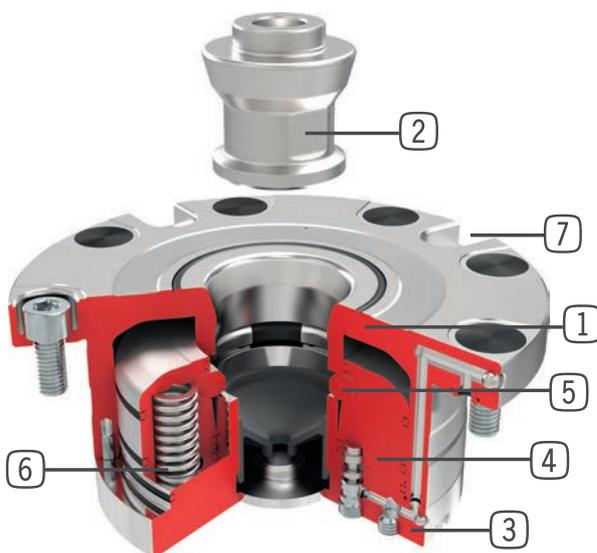
▶ PRODUCT ADVANTAGES



- ▶ Locking by means of clamping segments
- ▶ PLUS connection
- ▶ Rustproof – tempered stainless steel
- ▶ Two integrated rotation locks
- ▶ Integrated positioning check
- ▶ Pneumatic piston position sensing
- ▶ Integrated blow-out function
- ▶ Two connection options
- ▶ Optional automatic seal

- ▶ The zero-point clamping system of Zimmer Group's Advanced series provides a number of functions that are one-of-a-kind in this form and composition. Functions such as the PLUS connection, positioning check and pneumatic piston position sensing are integrated as standard, as well as air discharge of the pin opening and contact surface cleaning. The zero-point clamping system offers two connection options for maximum flexibility: either via spot facing on the flange surface or via hoses at the base of the element. To ensure the best protection, in addition to the standard integrated blow-out function, there is also an automatic seal that reliably protects the pin opening. The zero-point clamping system is able to absorb maximum forces with maximum repeatability. This is achieved through a sophisticated clamping principle that uses clamping segments for positive locking. In comparison to conventional systems where balls are in point contact, clamping segments adapted to the clamping contour establish the surface contact between the clamping system and clamping pin. This gives the system a very high rigidity.

▶ TECHNICAL DETAILS



- ① Housing
- ② Clamping pins
- ③ Cover
- ④ Clamp dog
- ⑤ Clamping segments
- ⑥ Spring assembly
- ⑦ Torque support/rotation lock

SPN ZERO-POINT CLAMPING SYSTEM

SPN STANDARD SERIES – THE ECONOMICAL

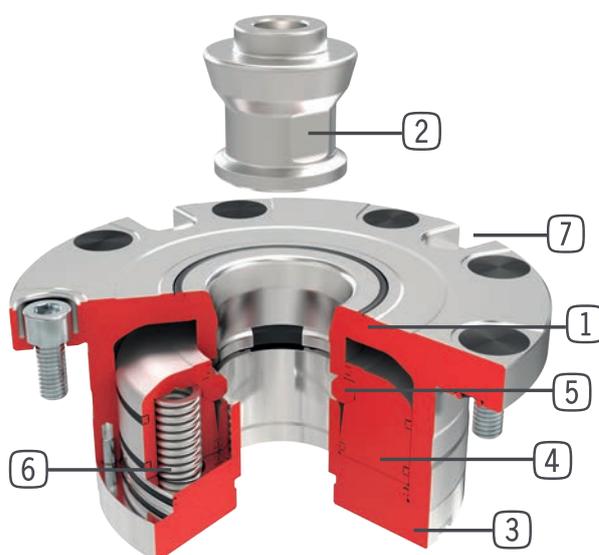
▶ PRODUCT ADVANTAGES



- ▶ Concentration on the basic functions
- ▶ Locking by means of clamping segments
- ▶ PLUS connection
- ▶ Rustproof – tempered stainless steel
- ▶ Two integrated rotation locks
- ▶ Optional automatic seal

- ▶ Zimmer Group's standard zero-point clamping system is reduced to the essentials, with functions such as unlocking and a PLUS connection as well as the two torque reaction devices. Even this economical zero-point clamping system also uses the well-proven positive locking system by means of clamping segments. It therefore offers the best choice for a solution that is both cost-effective and high-quality. The range of accessories also offers an automatic seal for the pin opening, just like for the zero-point clamping system of the Advanced series.

▶ TECHNICAL DETAILS



- ① Housing
- ② Clamping pins
- ③ Cover
- ④ Clamp dog
- ⑤ Clamping segments
- ⑥ Spring assembly
- ⑦ Torque support/rotation lock

SPN ZERO-POINT CLAMPING SYSTEM

FUNCTIONAL DESCRIPTION

▶ CLAMPED



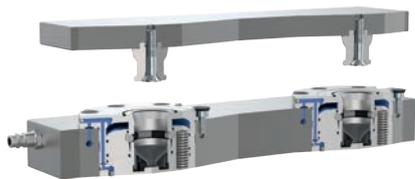
- ▶ Clamping pins clamped in the zero-point clamping system
- ▶ Positive locking
- ▶ Clamped with no energy, so no power consumption

▶ OPEN



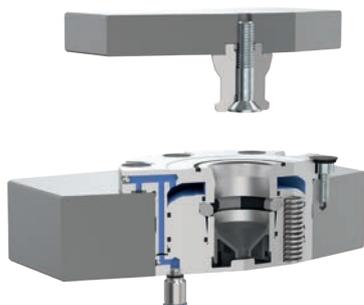
- ▶ Clamping pins not clamped in the zero-point clamping system
- ▶ Zero-point clamping system pressurized with compressed air
- ▶ Clamping mechanism is open

▶ HOSE-LESS CONNECTION



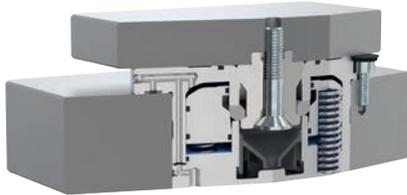
- ▶ All the functions can be controlled using the flange surface through spot facing

▶ HOSE CONNECTION



- ▶ Alternatively, the functions can be controlled using hoses at the base of the zero-point clamping system

▶ PLUS CONNECTION



- ▶ When the additional PLUS connection is used on the zero-point clamping system, the clamping force can be significantly increased

▶ RUSTPROOF



- ▶ The housing is made of stainless steel – contact parts are tempered and thus wear-free

▶ TWO INTEGRATED ROTATION LOCKS



- ▶ Two integrated rotation locks enable torque support around the pin axis

SPN ZERO-POINT CLAMPING SYSTEM

SERIES SPN

▶ OPTIONAL ACCESSORIES – AUTOMATIC SEAL

- ▶ To protect the pin opening reliably during operation, there is an automatic seal that descends when the clamping pin is inserted
- ▶ The automatic seal effectively prevents any dirt and chips from entering the zero-point clamping system
- ▶ In the Advanced series, the blow-out function is available with and without an automatic seal
- ▶ To provide optimum protection of the bolt opening, the delivery includes a locking bolt that closes the bolt opening when not in use



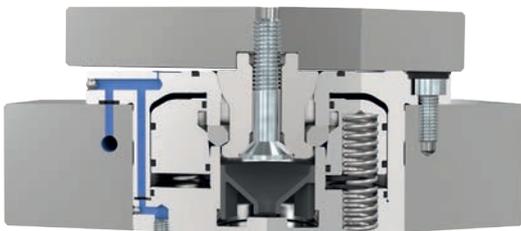
▶ Locking bolt



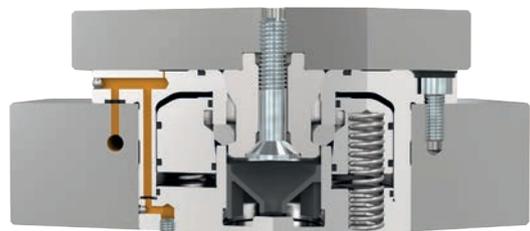
▶ With an automatic seal

▶ POSITIONING CHECK

- ▶ The pneumatic positioning check makes it possible to use an externally connected flowmeter (blue – flow) or pitot tube (orange – dynamic pressure) to check whether the workpiece or clamping pallet is laying correctly on the surface of the zero-point clamping system



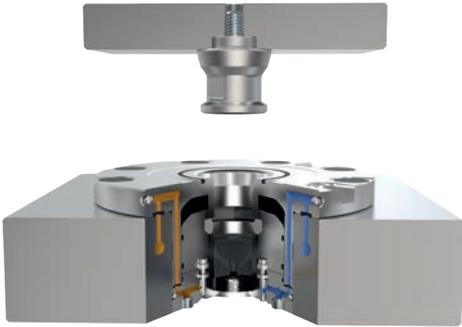
- ▶ The clamped product is not resting correctly on the contact surface. - **No dynamic pressure is generated**



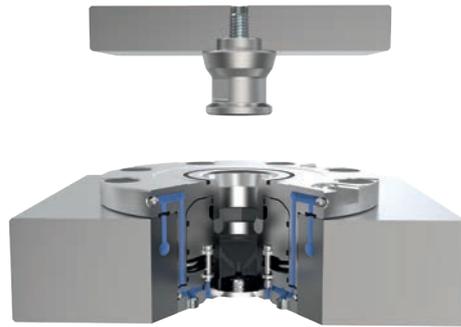
- ▶ The clamped product is resting correctly on the contact surface. - **Dynamic pressure is generated**

▶ PISTON POSITION SENSING

- ▶ By directly sensing the piston position by means of pneumatic dynamic pressure, the status of the zero-point clamping system (open, clamped, clamping pins clamped) can be queried



▶ Open



▶ Clamped, without a clamping pin



▶ Clamped, with a clamping pin

0 = dynamic pressure (orange)

1 = flow (blue)

		Open	Clamped, with a clamping pin	Clamped, without a clamping pin
Connection	4	0	1	1
Connection	5	1	0	1

SPN ZERO-POINT CLAMPING SYSTEM

CLAMPING PINS ARRANGEMENT

► CONFIGURATIONS

In order to best redirect the forces of the device to be clamped, the displayed arrangement of clamping pins is recommended. This arrangement makes it possible to compensate for geometry errors that emerge from production tolerances or thermal expansion:



Configuration with one zero-point clamping system

When one zero-point clamping system is used, only one centering pin is needed.

The centering pin secures the position in all three directions of the X, Y, Z coordinate system, thereby forming the zero point for the device to be secured in place. Two integrated rotation locks enable torque support around the pin axis.



Configuration with two zero-point clamping systems

When two zero-point clamping systems are used, a centering pin and a sword pin are needed.

The sword pin can compensate for a change in length in one direction while absorbing the forces in the other two directions. It must be positioned so that it can support the torques applied around the centering pin in the Z direction.



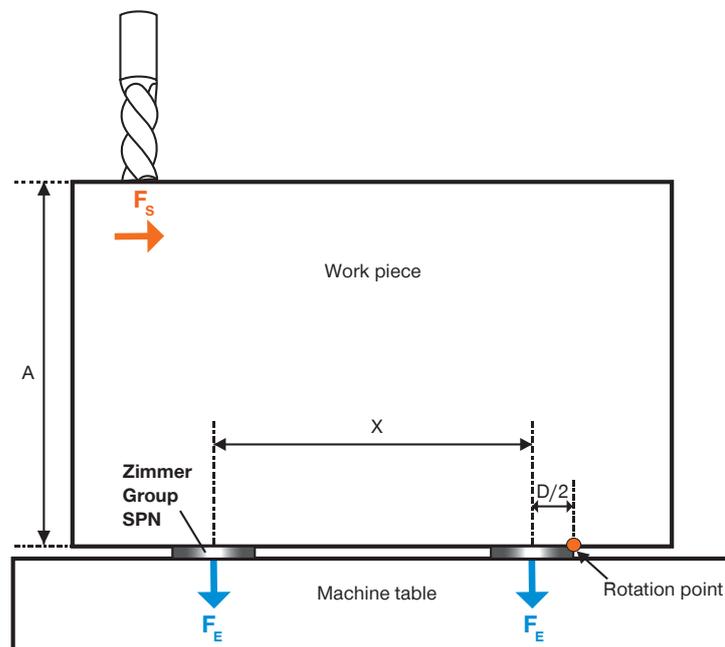
Configuration with four or more zero-point clamping systems

When four or more zero-point clamping systems are used, retention pins are also needed in addition to the centering pin and sword pin.

The retention pin can only absorb forces in the Z direction. It compensates for changes in length in the X and Y direction.

SPN ZERO-POINT CLAMPING SYSTEM

CALCULATION EXAMPLE



► CALCULATION EXAMPLE

FORMULAS

► Layout:

4 Zero-Point Clamping System elements (assumed to be installation size SPN112)

$D = 112 \text{ mm}$

$X = 200 \text{ mm}$

$A = 350 \text{ mm}$

$F_{\text{Cut}} = 5 \text{ kN}$ (cutting force)

Safety $S = 2$

$\sum M=0$ (total of all moments = zero)

$$S \cdot F_{\text{Cut}} \cdot A - 2 \cdot (F_c \cdot (X + D/2) + F_c \cdot D/2) = 0$$

$$-F_c = S \cdot F_{\text{Cut}} \cdot A / (2X + 2D)$$

$$F_c = 2 \cdot 5 \text{ kN} \cdot 350 \text{ mm} / (2 \cdot 200 \text{ mm} + 2 \cdot 112 \text{ mm})$$

$$F_c = 5.6 \text{ kN}$$

► Selection of Zero-Point Clamping Systems:

SPN112E6AD-B clamping force = 6 kN

SPN ZERO-POINT CLAMPING SYSTEM APPLICATIONS

▶ EXAMPLES



▶ Drilling



▶ Milling



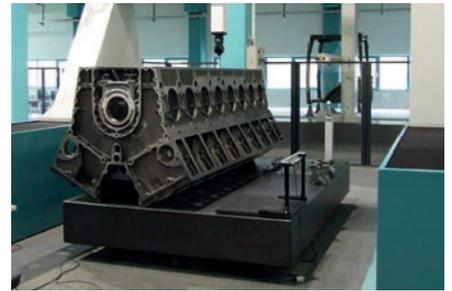
▶ Honing



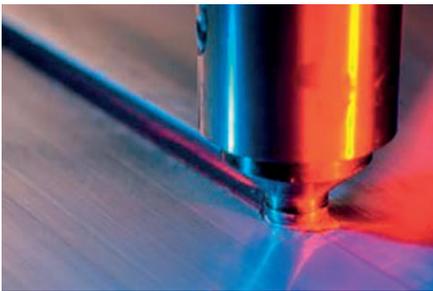
▶ Laser cutting



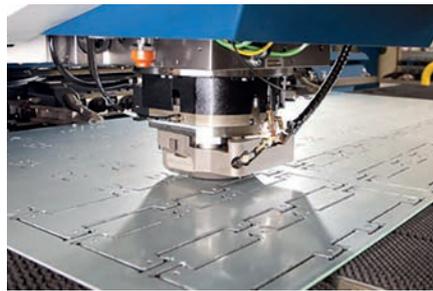
▶ Laser welding



▶ Measuring



▶ Friction stir welding



▶ Stamping



▶ Transport aircraft



▶ Robotics

SPN ZERO-POINT CLAMPING SYSTEM

OVERVIEW

Products	Operating pressure [bar]	Clamping force [kN]	Clamping force with PLUS connection [kN]	Rotation prevention	Contact monitoring	Piston position sensing	Page
SPN062 Advanced	4/6	1/2	2,5/5	●	●	●	18
SPN062 Standard	4/6	1/2	2,5/5	●			20
SPN062 Clamping plates	4/6			●			22
SPZ062 Clamping pins							25
SPN112 Advanced	4/6	4/6	10/15	●	●	●	26
SPN112 Standard	4/6	4/6	10/15	●			28
SPN112 Clamping plates	4/6			●			30
SPZ112 Clamping pins							33
SPN138 Advanced	4/6	12/18	24/36	●	●	●	34
SPN138 Standard	4/6	12/18	24/36	●			36
SPN138 Clamping plates	4/6			●			38
SPZ138 Clamping pins							41

SPN ZERO-POINT CLAMPING SYSTEM

SPN062 ADVANCED

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 18 mm before reaching end position
- ▶ Automatic centering and pull-in already 0,5 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

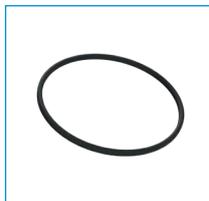
▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		Piston position sensing / positioning check

▶ INCLUDED IN DELIVERY



Mounting screw
M3x8 12.9
C0912030082



O-Ring
COR002010V



Cover cap
M3
095138



Venting filter
CFILT00052



Sealing pin
SPZ062BV-B

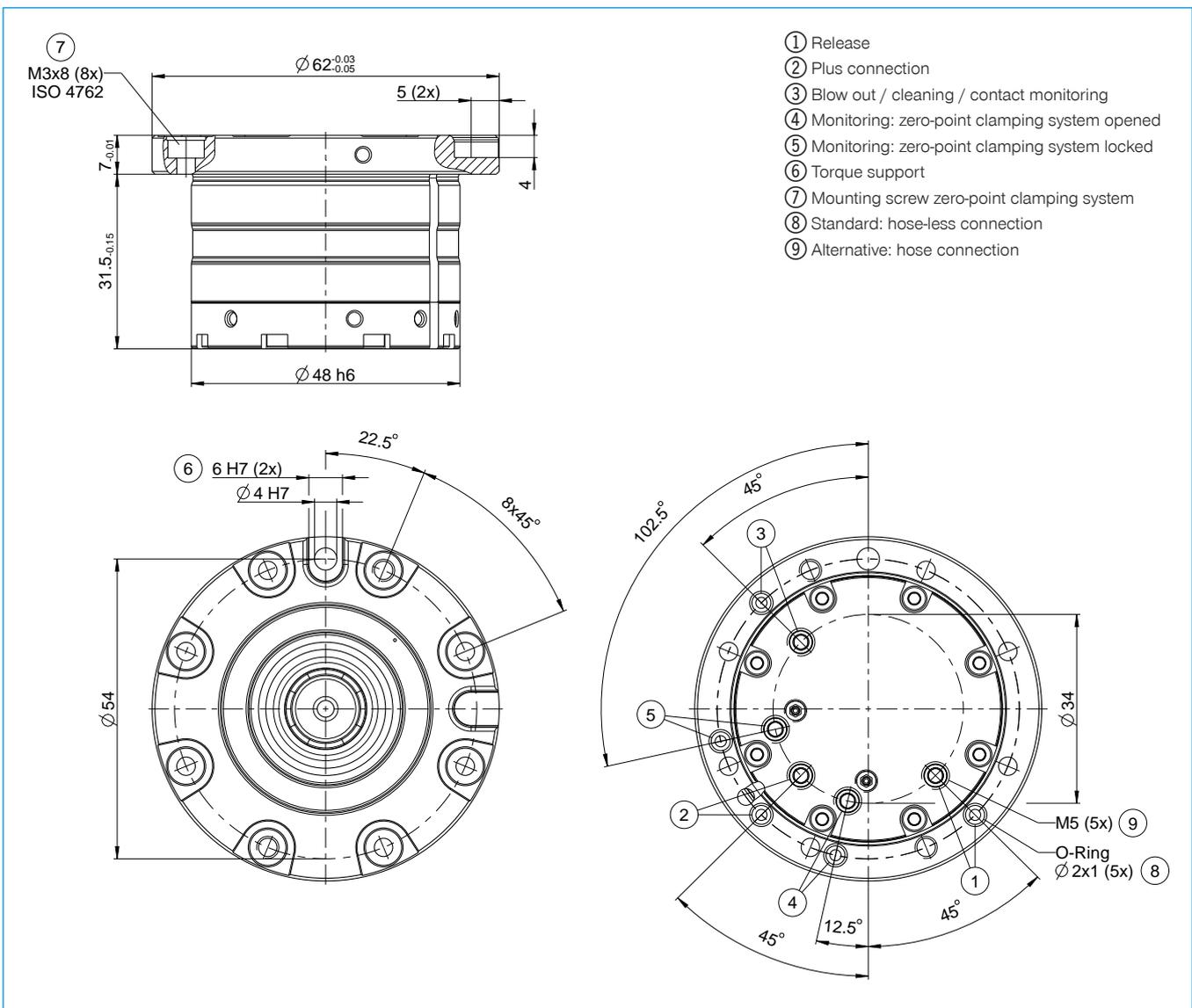
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ062AV-B

▶ TECHNICAL DATA

Order no.	▶ Technical Data	
	SPN062E6AD-B	SPN062E4AD-B
Holding force max.	M8	M8
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	2	1
Pull-in force with PLUS connection [kN]	5	2.5
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	Yes	Yes
Contact monitoring	Yes	Yes
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	0.47	0.47



SPN ZERO-POINT CLAMPING SYSTEM

SPN062 STANDARD

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 18 mm before reaching end position
- ▶ Automatic centering and pull-in already 0,5 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

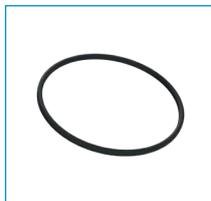
▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		

▶ INCLUDED IN DELIVERY



Mounting screw
M3x8 12.9
C0912030082



O-Ring
COR002010V



Cover cap
M3
095138



Venting filter
CFILT00052



Sealing pin
SPZ062BV-B

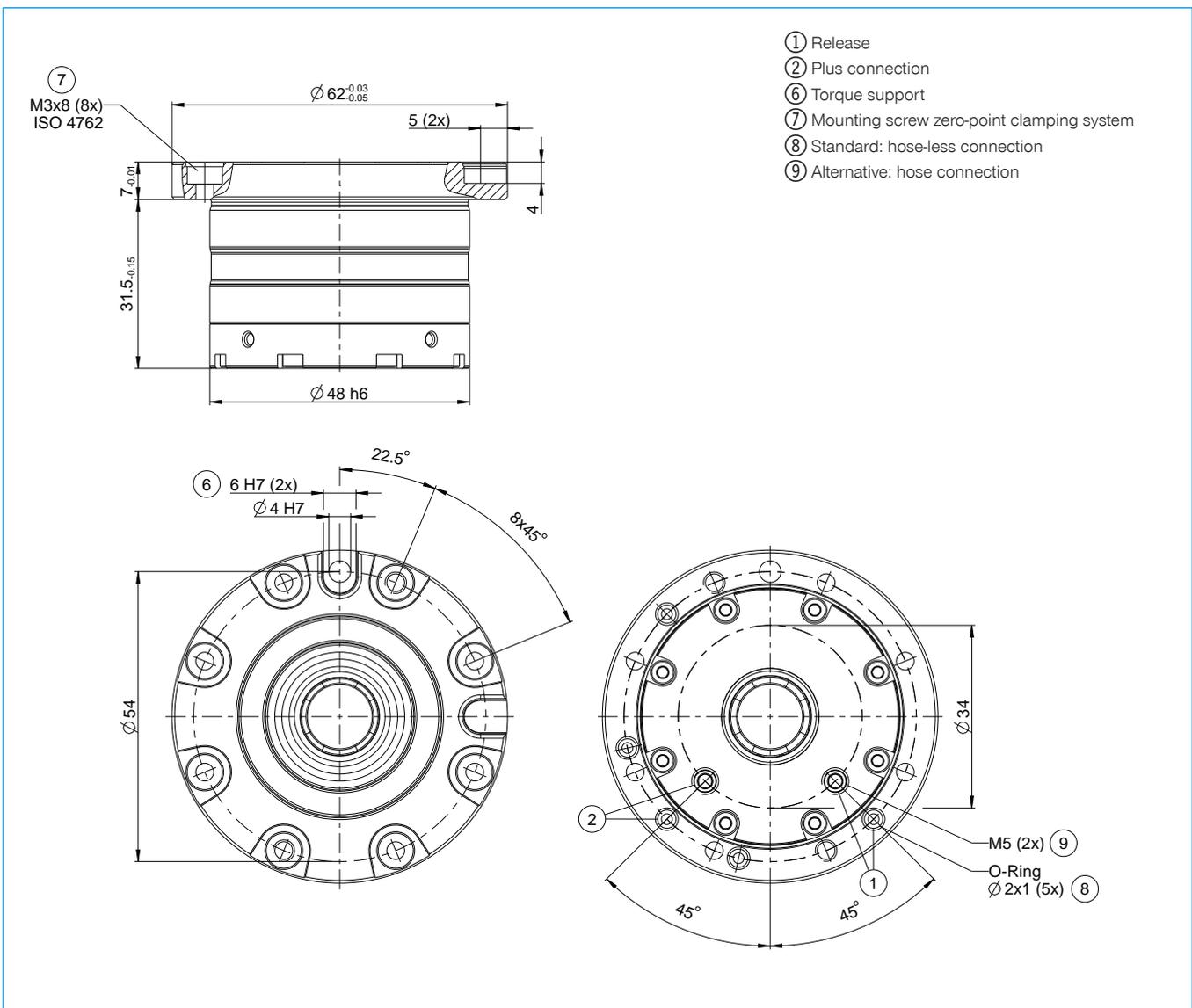
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ062AV-B

▶ TECHNICAL DATA

Order no.	▶ Technical Data	
	SPN062E6SD-B	SPN062E4SD-B
Holding force max.	M8	M8
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	2	1
Pull-in force with PLUS connection [kN]	5	2.5
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Contact monitoring	No	No
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	0.47	0.47



SPN ZERO-POINT CLAMPING SYSTEM

SPN062P2 - CLAMPING PLATE

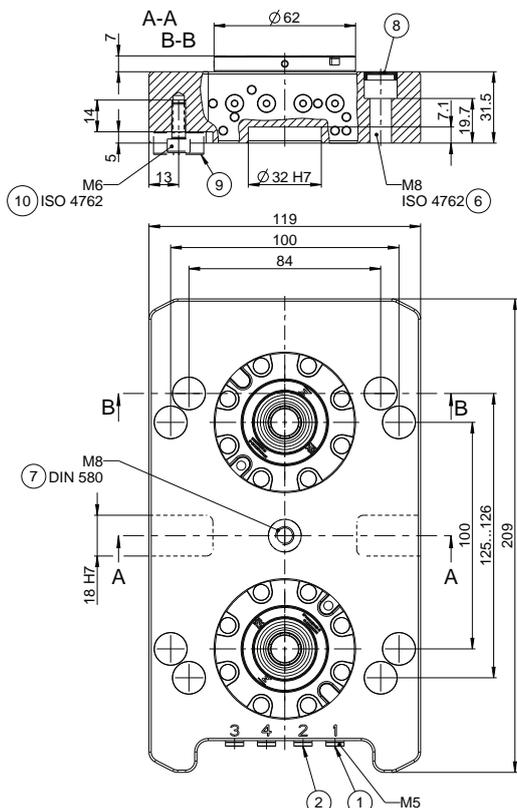
► 2-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

► Technical Data

Order no.	SPN062P2E6SD-B	SPN062P2E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	2xM8	2xM8
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	2x2	2x1
Pull-in force with PLUS connection [kN]	2x5	2x2.5
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	5.6	5.6



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery

SPN ZERO-POINT CLAMPING SYSTEM

SPN062P4 - CLAMPING PLATE

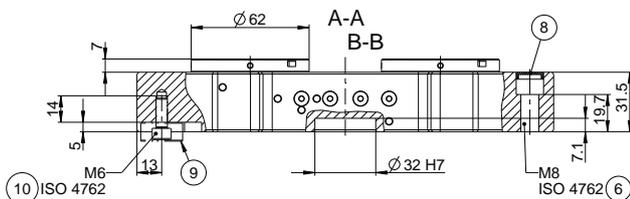
► 4-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

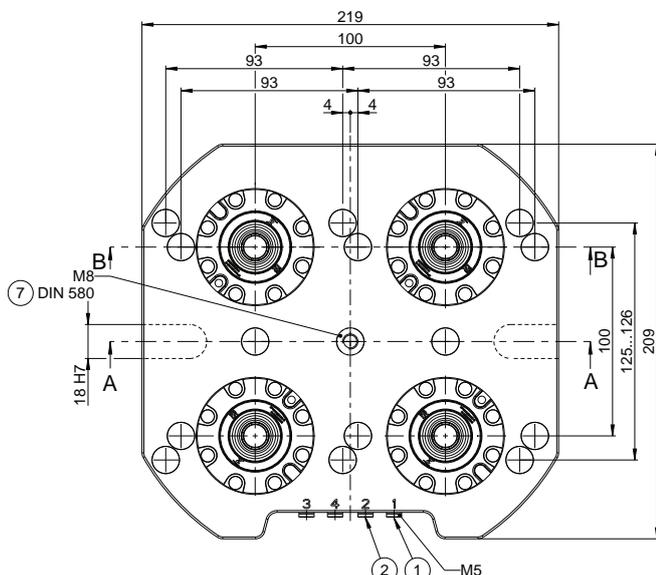
► Technical Data

Order no.	SPN062P4E6SD-B	SPN062P4E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	4xM8	4xM8
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	4x2	4x1
Pull-in force with PLUS connection [kN]	4x5	4x2.5
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	9.8	9.8



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

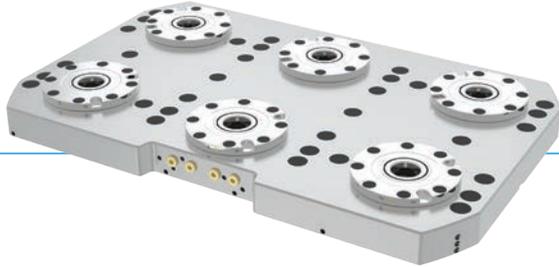
*Not included in delivery



SPN ZERO-POINT CLAMPING SYSTEM

SPN062P6 - CLAMPING PLATE

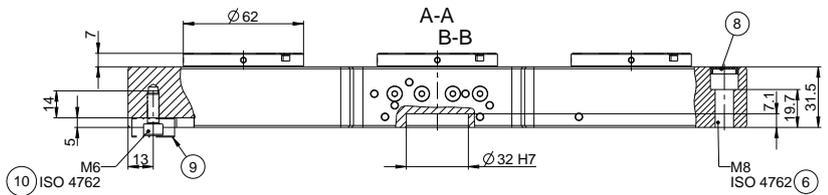
► 6-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

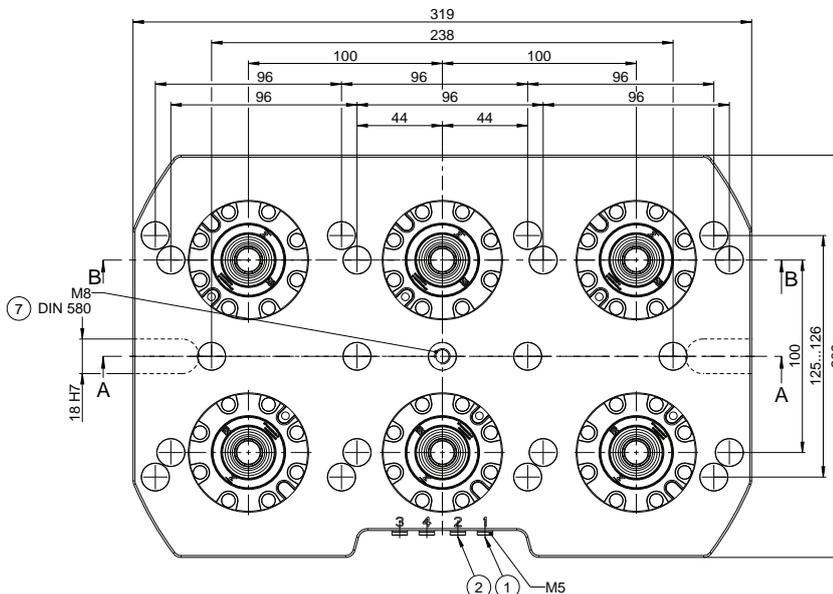
► Technical Data

Order no.	SPN062P6E6SD-B	SPN062P6E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	6xM8	6xM8
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	6x2	6x1
Pull-in force with PLUS connection [kN]	6x5	6x2.5
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	15.2	15.2



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery



SPN ZERO-POINT CLAMPING SYSTEM

SPZ062 - CLAMPING PINS

► TECHNICAL DATA

Order no.	► Technical Data		
	SPZ062BZ08-B	SPZ062BE08-B	SPZ062BS08-B
Ød1 [mm]	12	12	12
Ød2 [mm]	17	16.85	17
Ød3 [mm]	14.3	14.3	14.3
ØD1 [mm]	12	12	12
a [mm]	2.9	2.9	2.9
g [mm]	12	12	12
l [mm]	19.5	19.5	19.5
SW [mm]	12	12	12
T [mm]	3	3	3
M *	M8	M8	M8
Mx **	M6	M6	M6

*ISO 4762

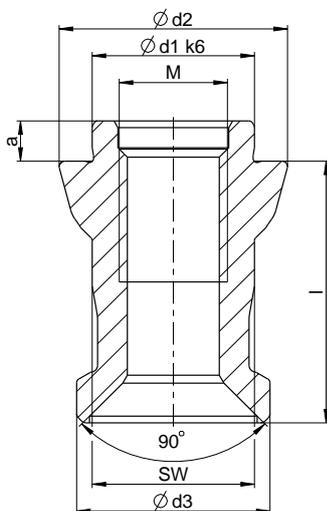
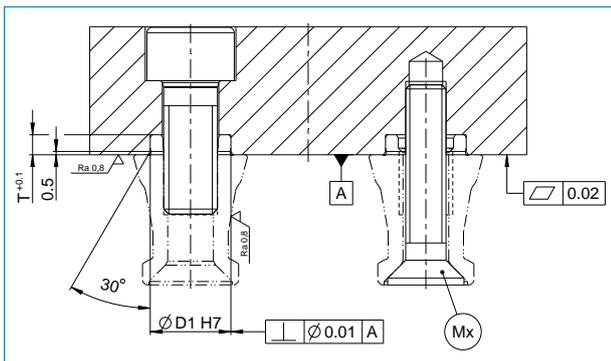
Holding force 12.9 max. [kN]: M6 = 15 ; M8 = 25 ; M10 = 35 ; M12 = 50 ; M16 = 75

Holding force 10.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 30 ; M12 = 40 ; M16 = 60

**ISO 10642

Holding force 12.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 28 ; M12 = 40 ; M16 = 60

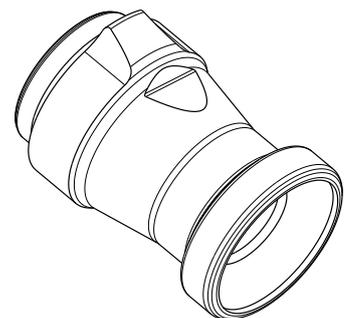
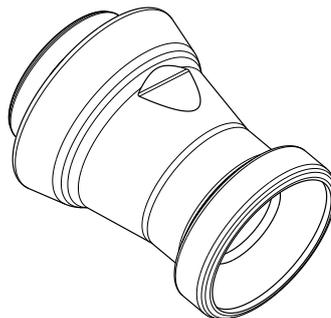
Holding force 10.9 max. [kN]: M6 = 9,5 ; M8 = 16 ; M10 = 24 ; M12 = 32 ; M16 = 48



SPZ062BZ08-B
Centering pin

SPZ062BE08-B
Retention pin

SPZ062BS08-B
Sword pin



SPN ZERO-POINT CLAMPING SYSTEM

SPN112 ADVANCED

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 22 mm before reaching end position
- ▶ Automatic centering and pull-in already 1 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		Piston position sensing / positioning check

▶ INCLUDED IN DELIVERY



Mounting screw
M6x14 12.9
C0912060144D



O-ring
3,5x1,5
COR003515V



Cover cap
M6
093088



Venting filter
CFILT00052



Sealing pin
SPZ112BV-B

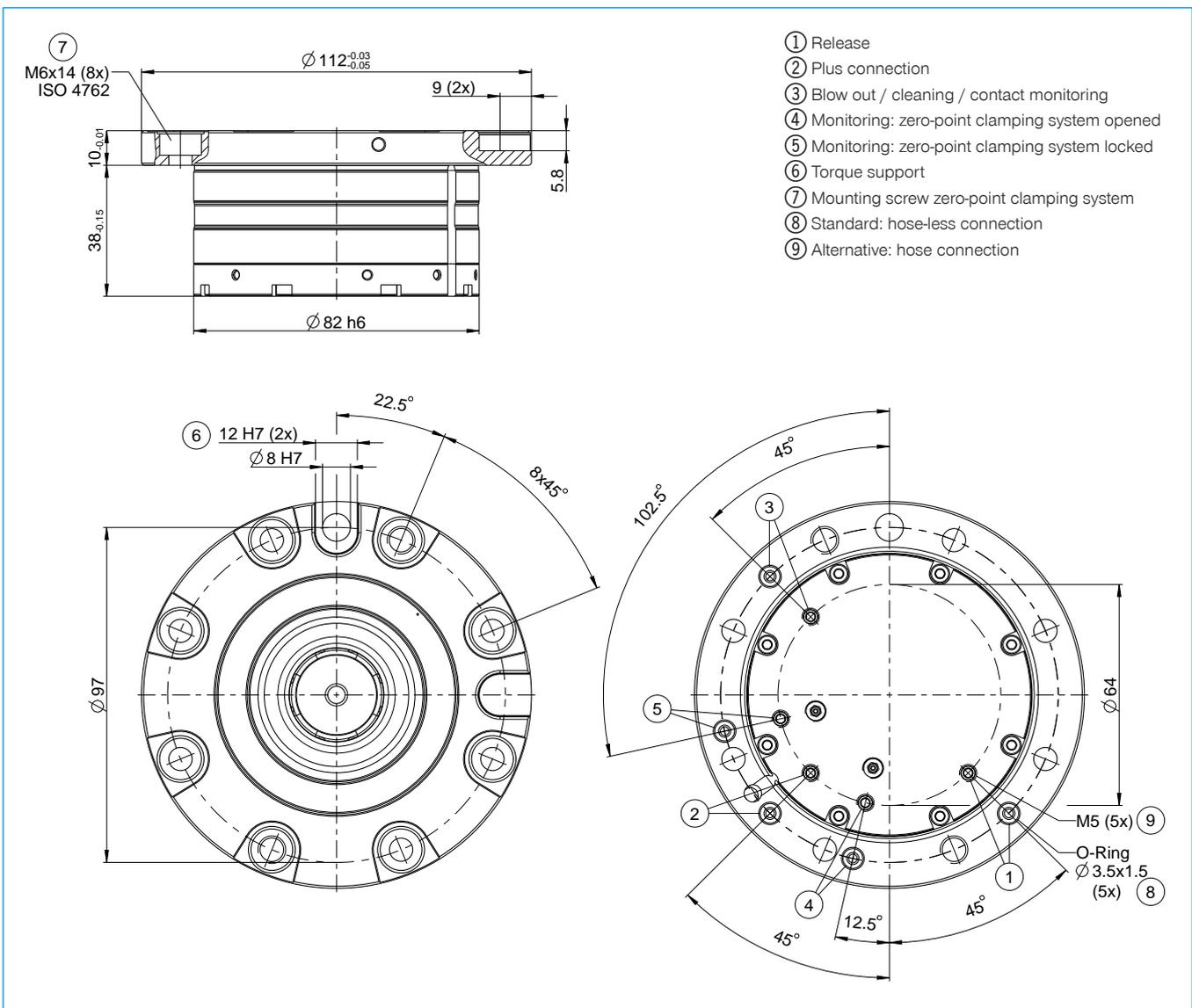
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ112AV-B

▶ TECHNICAL DATA

Order no.	▶ Technical Data	
	SPN112E6AD-B	SPN112E4AD-B
Holding force max.	M10/M12	M10/M12
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	6	4
Pull-in force with PLUS connection [kN]	15	10
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	Yes	Yes
Contact monitoring	Yes	Yes
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	1.67	1.67



SPN ZERO-POINT CLAMPING SYSTEM

SPN112 STANDARD

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 22 mm before reaching end position
- ▶ Automatic centering and pull-in already 1 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		

▶ INCLUDED IN DELIVERY



Mounting screw
M6x14 12.9
C0912060144D



O-ring
3,5x1,5
COR003515V



Cover cap
M6
093088



Venting filter
CFILT00052



Sealing pin
SPZ112BV-B

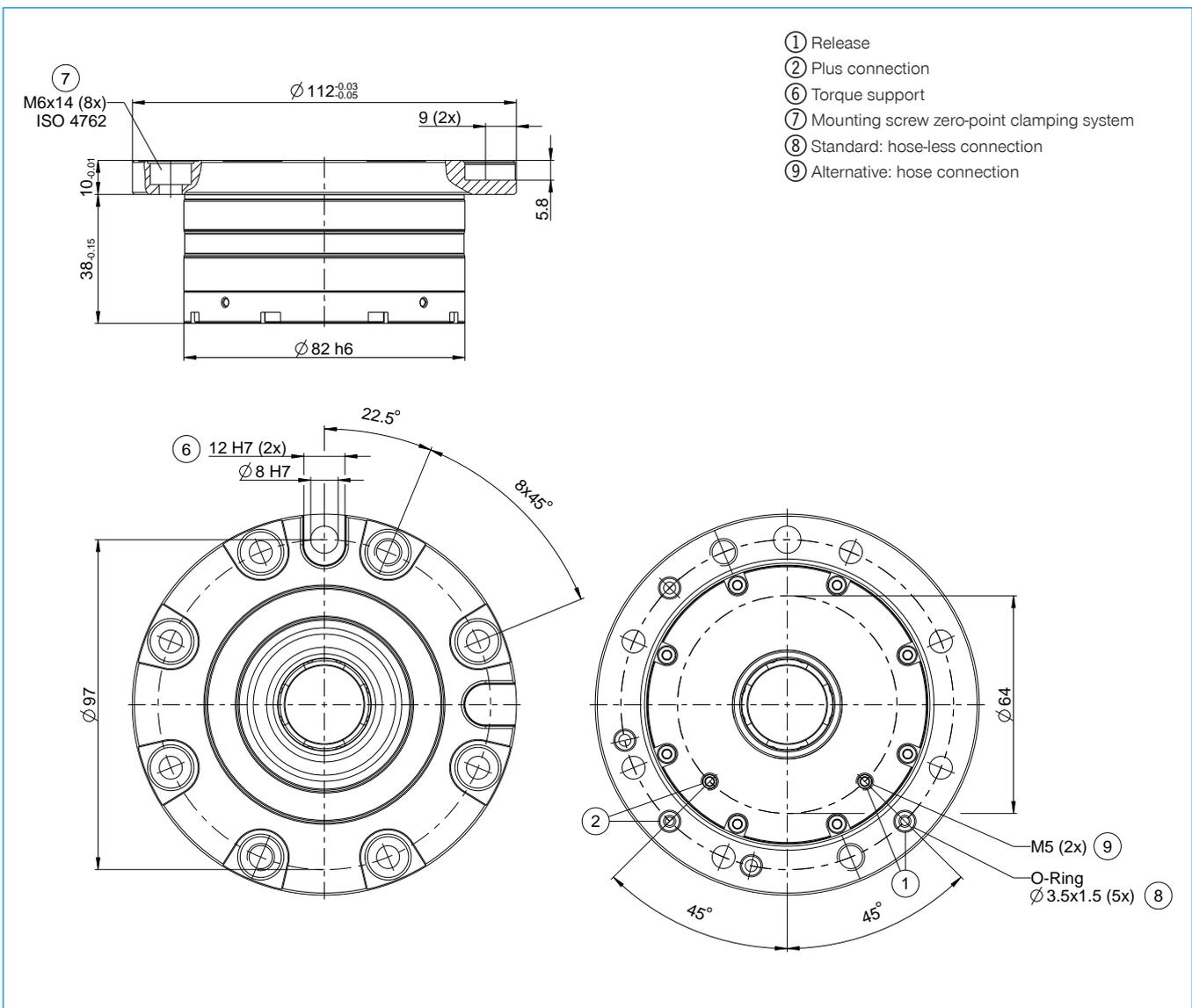
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ112AV-B

▶ TECHNICAL DATA

Order no.	▶ Technical Data	
	SPN112E6SD-B	SPN112E4SD-B
Holding force max.	M10/M12	M10/M12
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	6	4
Pull-in force with PLUS connection [kN]	15	10
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Contact monitoring	No	No
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	1.67	1.67



SPN ZERO-POINT CLAMPING SYSTEM

SPN112P2 - CLAMPING PLATE

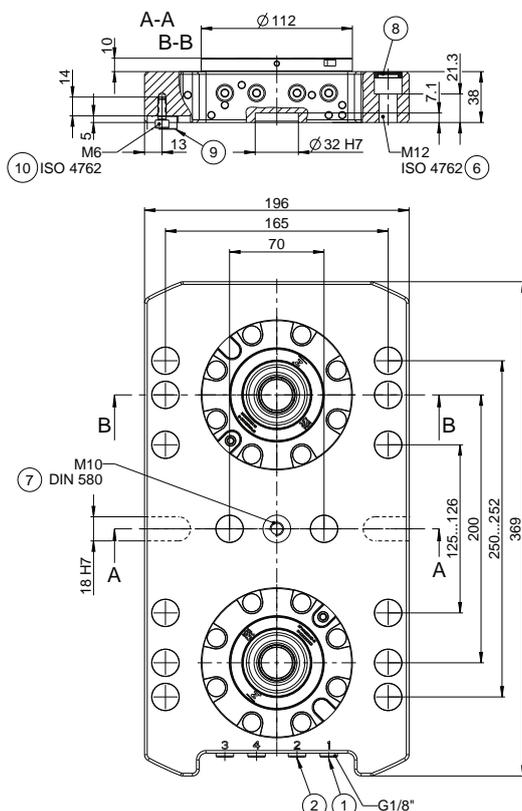
► 2-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

► Technical Data

Order no.	SPN112P2E6SD-B	SPN112P2E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	2xM10/M12	2xM10/M12
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	2x6	2x4
Pull-in force with PLUS connection [kN]	2x15	2x10
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	19.8	19.8



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery

SPN ZERO-POINT CLAMPING SYSTEM

SPN112P4 - CLAMPING PLATE

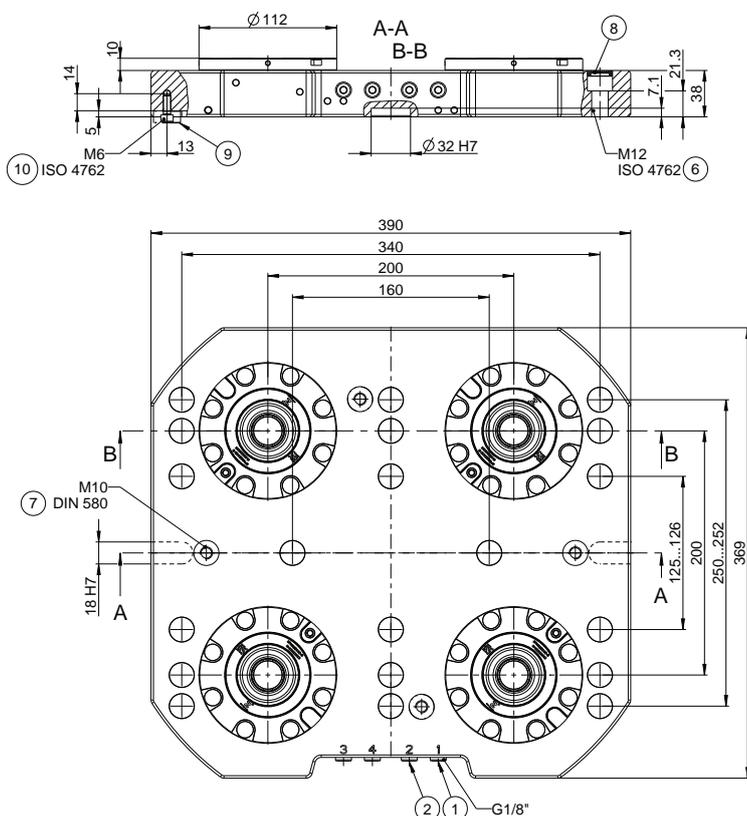
► 4-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

► Technical Data

Order no.	SPN112P4E6SD-B	SPN112P4E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	4xM10/M12	4xM10/M12
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	4x6	4x4
Pull-in force with PLUS connection [kN]	4x15	4x10
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	38.9	38.9



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery

SPN ZERO-POINT CLAMPING SYSTEM

SPZ112 - CLAMPING PINS

► TECHNICAL DATA

Order no.	► Technical Data					
	SPZ112BZ10-B	SPZ112BZ12-B	SPZ112BE10-B	SPZ112BE12-B	SPZ112BS10-B	SPZ112BS12-B
Ød1 [mm]	18	18	18	18	18	18
Ød2 [mm]	30	30	29.85	29.85	30	30
Ød3 [mm]	26.8	26.8	26.8	26.8	26.8	26.8
ØD1 [mm]	18	18	18	18	18	18
a [mm]	4.9	4.9	4.9	4.9	4.9	4.9
l [mm]	25.5	25.5	25.5	25.5	25.5	25.5
SW [mm]	20	20	20	20	20	20
T [mm]	5	5	5	5	5	5
M *	M10	M12	M10	M12	M10	M12
Mx **	M8	M10	M8	M10	M8	M10

*ISO 4762

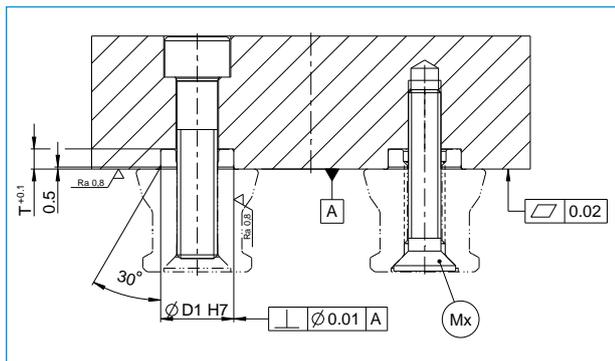
Holding force 12.9 max. [kN]: M6 = 15 ; M8 = 25 ; M10 = 35 ; M12 = 50 ; M16 = 75

Holding force 10.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 30 ; M12 = 40 ; M16 = 60

**ISO 10642

Holding force 12.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 28 ; M12 = 40 ; M16 = 60

Holding force 10.9 max. [kN]: M6 = 9,5 ; M8 = 16 ; M10 = 24 ; M12 = 32 ; M16 = 48



SPZ112BZ10-B

Centering pin

SPZ112BZ12-B

Centering pin

SPZ112BE10-B

Retention pin

SPZ112BE12-B

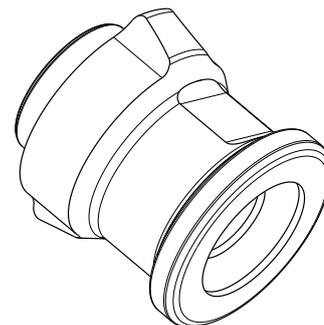
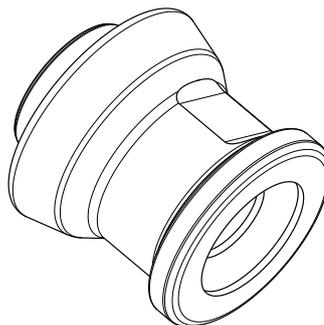
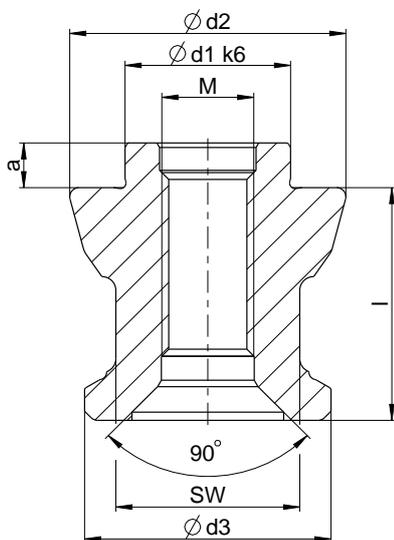
Retention pin

SPZ112BS10-B

Sword pin

SPZ112BS12-B

Sword pin



SPN ZERO-POINT CLAMPING SYSTEM

SPN138 ADVANCED

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 28 mm before reaching end position
- ▶ Automatic centering and pull-in already 1 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		Piston position sensing / positioning check

▶ INCLUDED IN DELIVERY



Mounting screw
M6x14 12.9
C0912060144D



O-ring
3,5x1,5
COR003515V



Cover cap
M6
093088



Venting filter
CFILT00052



Sealing pin
SPZ138BV-B

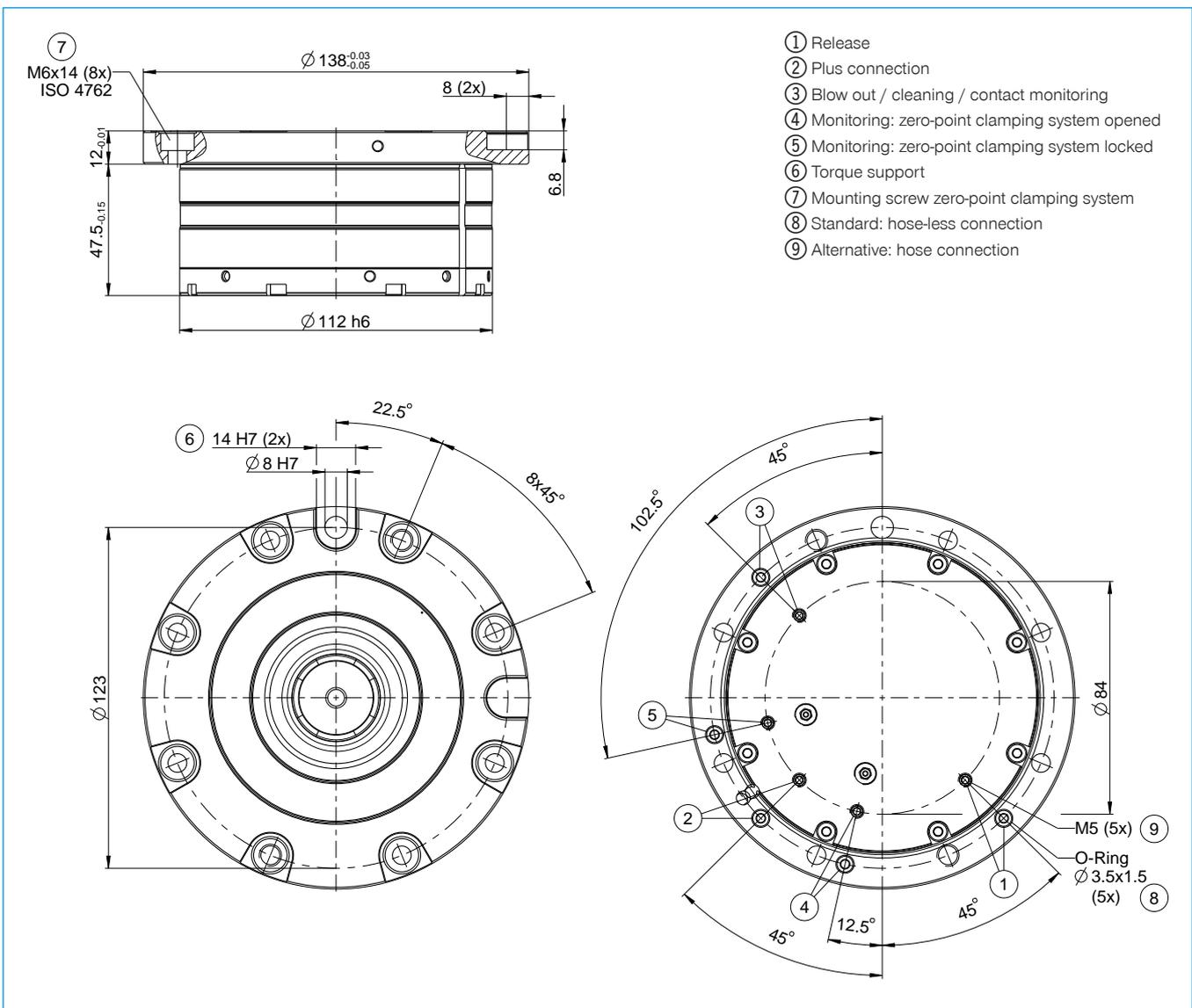
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ138AV-B

► TECHNICAL DATA

Order no.	► Technical Data	
	SPN138E6AD-B	SPN138E4AD-B
Holding force max.	M12/M16	M12/M16
Operating pressure [bar]	6	4
Retraction force [kN]	18	12
Pull-in force with PLUS connection [kN]	36	24
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	Yes	Yes
Contact monitoring	Yes	Yes
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	3.7	3.7



SPN ZERO-POINT CLAMPING SYSTEM

SPN138 STANDARD

▶ PRODUCT ADVANTAGES



- ▶ Pre-positioning 28 mm before reaching end position
- ▶ Automatic centering and pull-in already 1 mm before reaching end position
- ▶ Resistant against contamination
- ▶ Mechanical locked in clamping position
- ▶ Low operating pressure of 4 or 6bar
- ▶ Maintenance free

▶ EQUIPMENT FEATURES

	Pneumatic		Stainless steel
	Form fit		Pins compatible with reference system
	PLUS connection		Low height
	Tubeless connection		Repeatability
	Torque support		Hardened
	Automatic seal		

▶ INCLUDED IN DELIVERY



Mounting screw
M6x14 12.9
C0912060144D



O-ring
3,5x1,5
COR003515V



Cover cap
M6
093088



Venting filter
CFILT00052



Sealing pin
SPZ138BV-B

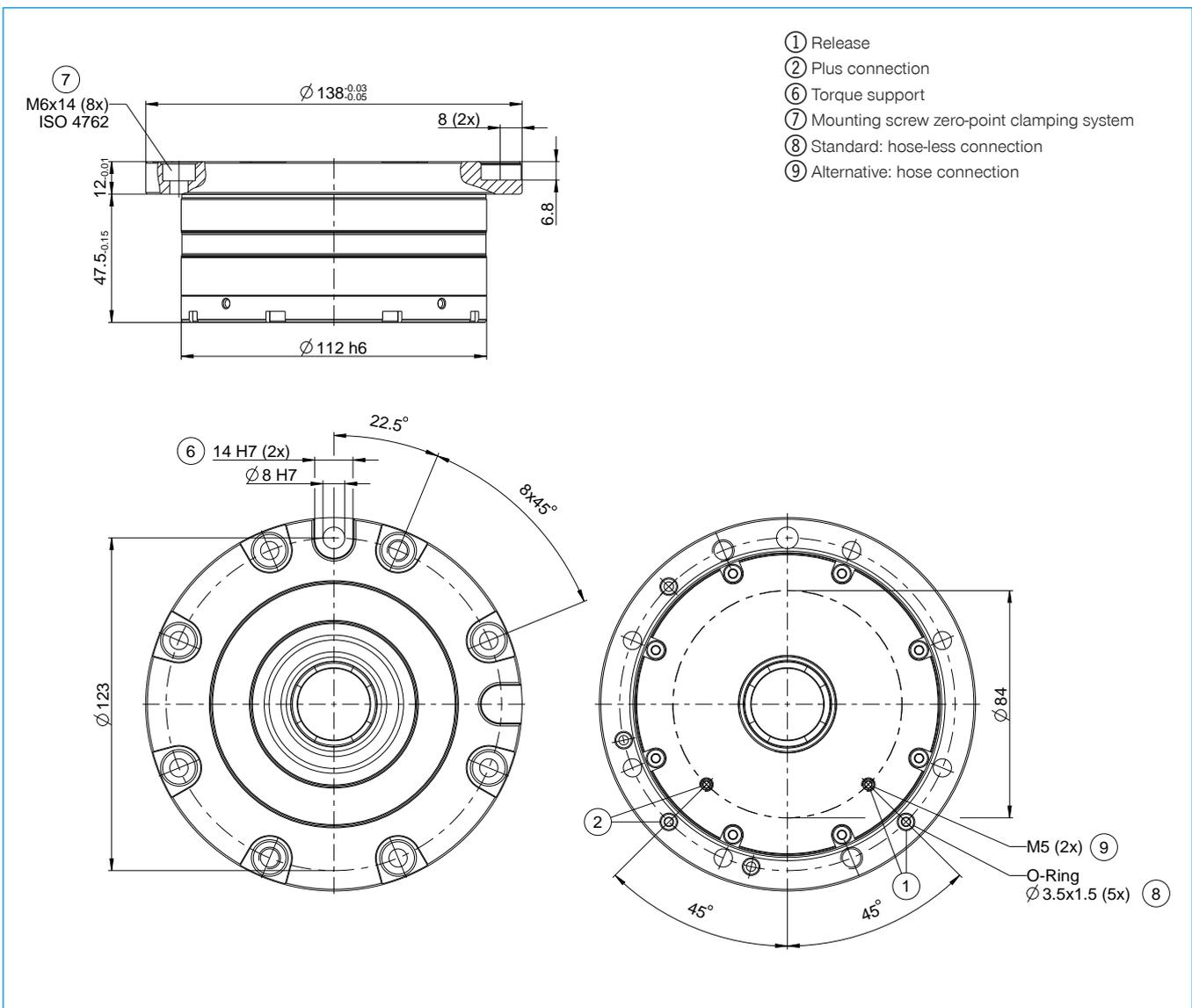
▶ OPTIONAL ACCESSORIES



Automatic seal
SPZ138AV-B

▶ TECHNICAL DATA

Order no.	▶ Technical Data	
	SPN138E6SD-B	SPN138E4SD-B
Holding force max.	M12/M16	M12/M16
Operating pressure [bar]	6	4
Retraction force [kN]	18	12
Pull-in force with PLUS connection [kN]	36	24
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Contact monitoring	No	No
Contact seal	Yes	Yes
Repetition accuracy [mm]	0.005	0.005
Material	Tempered stainless steel	Tempered stainless steel
Weight [kg]	3.7	3.7



SPN ZERO-POINT CLAMPING SYSTEM

SPN138P2 - CLAMPING PLATE

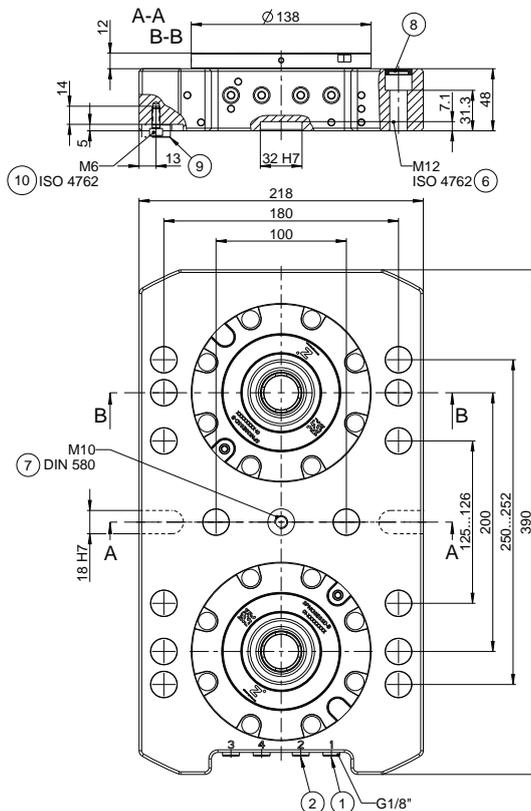
► 2-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

► Technical Data

Order no.	SPN138P2E6SD-B	SPN138P2E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	2xM12/M16	2xM12/M16
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	2x18	2x12
Pull-in force with PLUS connection [kN]	2x36	2x24
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	29.6	29.6



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery

SPN ZERO-POINT CLAMPING SYSTEM

SPN138P4 - CLAMPING PLATE

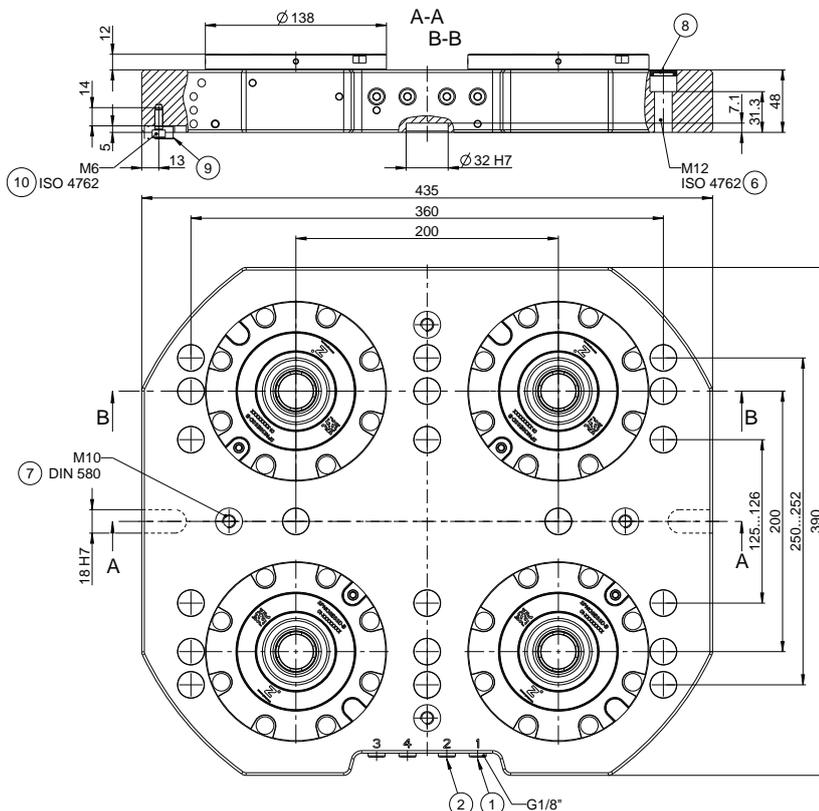
► 4-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

► Technical Data

Order no.	SPN138P4E6SD-B	SPN138P4E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	4xM12/M16	4xM12/M16
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	4x18	4x12
Pull-in force with PLUS connection [kN]	4x36	4x24
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	56.6	56.6



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery

SPN ZERO-POINT CLAMPING SYSTEM

SPN138P6 - CLAMPING PLATE

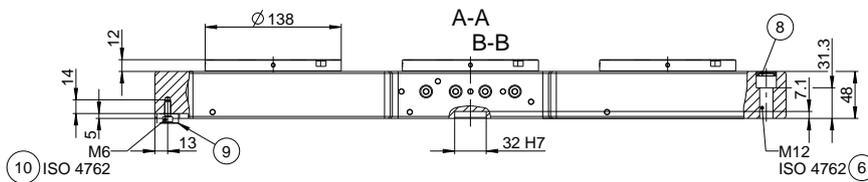
► 6-FOLD



- Compact design with optimized design height
- System assembly with high precision
- Integrated air supply/distribution
- Integrated PLUS connection
- Available with the advanced zero-point clamping system on request
- Variable mounting options

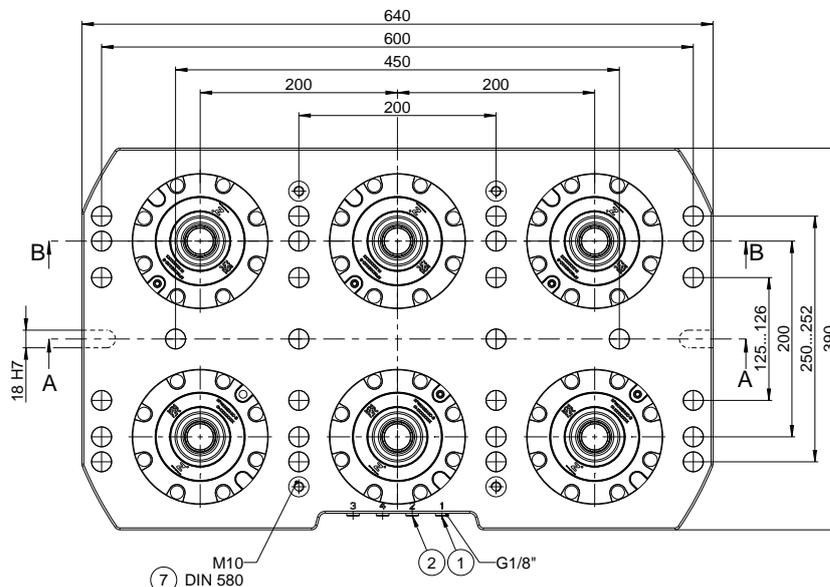
► Technical Data

Order no.	SPN138P6E6SD-B	SPN138P6E4SD-B
Operation mode	Pneumatic	Pneumatic
Holding force max.	6xM12/M16	6xM12/M16
Operating pressure [bar]	6 ... 7	4 ... 7
Retraction force [kN]	6x18	6x12
Pull-in force with PLUS connection [kN]	6x36	6x24
Operating temperature [°C]	-10 ... +70	-10 ... +70
Rotation prevention	Yes	Yes
PLUS connection	Yes	Yes
Air cleaning	No	No
Piston position sensing	No	No
Contact monitoring	No	No
Material	Tempered stainless steel/steel	Tempered stainless steel/steel
Weight [kg]	88.4	88.4



- ① Release
- ② Plus connection
- ⑥ Mounting screw*
- ⑦ Thread bore transport
- ⑧ Sealing cap
- ⑨ T-slot nut*
- ⑩ T-slot nut mounting screw*

*Not included in delivery



SPN ZERO-POINT CLAMPING SYSTEM

SPZ138 - CLAMPING PINS

► TECHNICAL DATA

Order no.	► Technical Data					
	SPZ138BZ12-B	SPZ138BZ16-B	SPZ138BE12-B	SPZ138BE16-B	SPZ138BS12-B	SPZ138BS16-B
Ød1 [mm]	25	25	25	25	25	25
Ød2 [mm]	35	35	34.85	34.85	35	35
Ød3 [mm]	31.2	31.2	31.2	31.2	31.2	31.2
ØD1 [mm]	25	25	25	25	25	25
a [mm]	4.9	4.9	4.9	4.9	4.9	4.9
l [mm]	32	32	32	32	32	32
SW [mm]	22	22	22	22	22	22
T [mm]	5	5	5	5	5	5
M *	M12	M16	M12	M16	M12	M16
Mx **	M10	M12	M10	M12	M10	M12

*ISO 4762

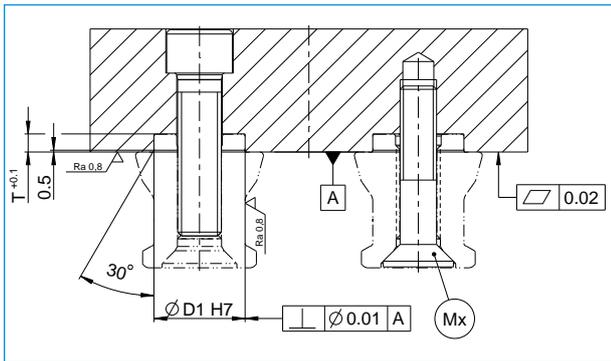
Holding force 12.9 max. [kN]: M6 = 15 ; M8 = 25 ; M10 = 35 ; M12 = 50 ; M16 = 75

Holding force 10.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 30 ; M12 = 40 ; M16 = 60

**ISO 10642

Holding force 12.9 max. [kN]: M6 = 12 ; M8 = 20 ; M10 = 28 ; M12 = 40 ; M16 = 60

Holding force 10.9 max. [kN]: M6 = 9,5 ; M8 = 16 ; M10 = 24 ; M12 = 32 ; M16 = 48



SPZ138BZ12-B
Centering pin

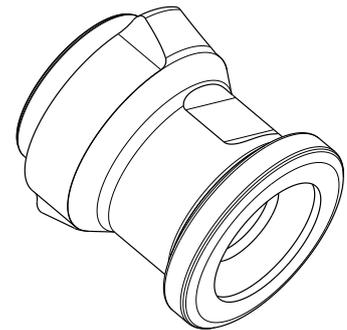
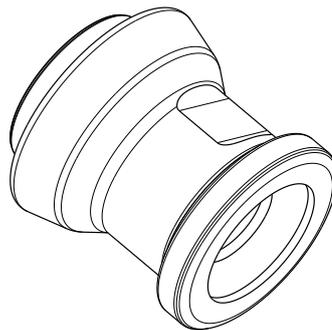
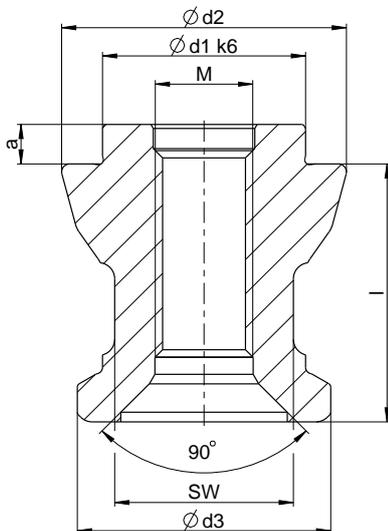
SPZ138BZ16-B
Centering pin

SPZ138BE12-B
Retention pin

SPZ138BE16-B
Retention pin

SPZ138BS12-B
Sword pin

SPZ138BS16-B
Sword pin



SPN ZERO-POINT CLAMPING SYSTEM

FAQ

▶ Can clamping pins be integrated directly into the workpiece?

The clamping pins can be integrated directly into the workpiece using the Zimmer zero-point clamping system to clamp the workpiece with precision, repeatability and cost efficiency. This approach makes it possible to perform complete 5-side machining in one workpiece clamping setup.

▶ Why are there different clamping pins available?

The various clamping pins ensure the desired precision clamping behavior in different three-dimensional axes. The centering pin defines the reference point for the workpiece and provides precision in the X, Y and Z direction. The sword pin provides precision in the X or Y and Z direction and the clamping pin clamps only in the Z direction.

▶ Do the zero-point clamping systems feature temperature compensation?

The Zimmer zero-point clamping systems can be implemented to provide temperature compensation if you only use sword pins.

▶ Which distance tolerances should be observed for in-house production?

For safe operation, a distance tolerance of ± 0.015 mm from clamping pin to clamping pin must be kept. The same applies to the zero-point clamping system.

▶ What is a PLUS connection or how does a PLUS connection work?

Zimmer zero-point clamping systems come standard with an additional pneumatic connection. This connection can be used to increase the clamping force significantly.

▶ How does the contact monitoring work?

The contact monitoring makes it possible to check whether the workpiece or clamping pallet is laying flat on the surface of the zero-point clamping system by using a connected flowmeter or Pitot tube.

▶ How are the clamping force and the holding force of a zero-point clamping system defined?

The clamping force describes the force that is used for clamping the clamping pins and for form fit clamping in the zero-point clamping system. The holding force of the zero-point clamping system is limited by the maximum permitted pulling force of the pin mounting screw.

▶ How is the repeatability defined?

Repeatability defines the tolerance zone within which the reference points defined on the workpiece can be clamped, released and clamped again. On Zimmer zero-point clamping systems, this repeatability is less than or equal to 0.005 mm.

CHECKLIST

SPN ZERO-POINT CLAMPING SYSTEM

Customer number	<input type="text"/>	Phone number	<input type="text"/>
Company	<input type="text"/>	Fax number	<input type="text"/>
Contact Mr. <input type="checkbox"/> Ms. <input type="checkbox"/>	<input type="text"/>	E-mail	<input type="text"/>
Sales database		Article	<input type="text"/>
Processed by	<input type="text"/>	Desired price	<input type="text"/>
Desired delivery date	<input type="text"/>	Other	<input type="text"/>
Amount	<input type="text"/>	Pot. amount (annually)	<input type="text"/>
		Date	<input type="text"/>

Area or application

Clamping device Milling Drilling Measuring Other
 Rotate Rubbing Laser processing

Process force N Compressed air system bar
 pressure

Insertion force necessary N Lever arm between process force and clamping system mm

Holding force necessary N Number of plannes clamping system per clamping device piece

Alignment Sketch 3D Model Other

Environment Temperature min. °C max. °C
 Chips Dirt Oil/Fat Cool lubrication Other

Number of clamping cycles per hour cycles

Handling Manual Automatic

Additional functions Flat-surface cleaning / positioning check

Notes/comments

USAGE NOTE

GENERAL

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Zimmer Group has a quality management system certified in accordance with ISO 9001:2008. Zimmer Group has an environmental management system certified in accordance with ISO 14001:2004.

USAGE NOTE

INDIVIDUAL

DECLARATION OF INCORPORATION IN TERMS OF THE EC DIRECTIVE 2006/42/EC ON MACHINERY (ANNEX II 1 B)

We hereby declare that our elements meet the following basic requirements of the Machinery Directive 2006/42/EC as an incomplete machine

No.1.1.2., No.1.1.3., No.1.1.5., No.1.3.2, No. 1.3.4, No. 1.3.7, No.1.5.3, No.1.5.4, No.1.5.8., No.1.6.4, No.1.7.1, No.1.7.3, No.1.7.4.

We also declare that the specific technical documents were produced in accordance with Annex VII Part B of this Directive. We undertake to provide the market supervisory bodies with electronic versions of the incomplete machine's special documents via our documentation department should they have reason to request them.

The incomplete machine may only be commissioned if the machine or system in which the incomplete machine is to be installed has been determined to satisfy the conditions of the Machinery Directive 2006/42/EC and the EC Declaration of Conformity has been produced in accordance with Annex II A.

