553720, 553721
INSTALLATION MANUAL

Jergens ZPS
ZERO.POINT.SYSTEM

ZERO POINT SYSTEM (ZPS)
Installation clamping module with sensor monitoring, mounting flange
K10.3, K20.3 Pneumatic

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GENERAL INSTRUCTIONS

This installation manual will assist you in becoming familiar with your new product. For that reason, we recommend that you read the documentation carefully and follow all instructions.

If you require additional information, we would ask you to contact our Technical Service.

THIS MANUAL

Please consider this installation manual as an important constituent part of the delivered system. It should be protected during the entire time the system is in use.

A copy of this installation manual must be made available to the installation, operating and maintenance personnel.

Please ensure that all additional documents delivered are integrated into this manual. If your system is transferred to a third party, we request that you also pass on this manual.

SAFEKEEPING OF THE MANUAL

Always treat this manual with care.

You must not tear out pages or make modifications.

Please keep these documents protected from heat and humidity.

Jergens Inc. reserves the right to replace parts of the instructions contained herein at any time in the course of product improvement, or if construction or commercial changes so demand, without immediately providing a new edition.

As the author of this manual, Jergens Inc. forbids reproduction of this manual in whole or in part as well as making it available to third parties without written permission. Any modification of the product requires the manufacturer's consent.

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0. Introduction

CAUTION:

The original configuration of this system must not be altered under any circumstances.

Using this system for purposes other than those which the manufacturer intended can damage the system or harm the operator. The manufacturer's consent must be obtained before working on materials other than those described in these instructions.

Symbols used

Machining processes, which represent a risk and which can cause injuries or harm to health, if they are not properly performed.

Machining processes that may be performed only by qualified specialist personnel. The possibility of residual risks cannot be ruled out.

0.1 Operating personnel

As mentioned above, certain operations must be performed exclusively by qualified or trained personnel. The following standard features are used to describe the qualification level:

Qualified personnel have sufficient technical knowledge or work experience to be able to recognize and prevent possible dangers (engineers and technicians).

Trained personnel are appropriately instructed and/or monitored by qualified persons to be able to recognize the dangers and prevent them (personnel assigned to operation or maintenance). They must have the following qualifications:

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1. They must be trained and authorised to safely operate the product, to feed or interrupt the operating pressure, and to label the equipment in accordance with the standard safety provisions.
2. they must be trained in the correct procedure for maintaining and using the safety equipment in accordance with the standard safety provisions.

Before commissioning the equipment, the customer is obliged to make sure:

1. That the personnel have received, read, and understood the installation manual;
2. That the personnel observe the given instructions.

0.2 Trained personnel

MACHINE OPERATOR: One or more persons who, based on appropriate instructions from the owner of the Zero Point System (ZPS), are assigned and authorized to operate it and connected devices. Another prerequisite is the complete knowledge and unrestricted understanding of the contents of this manual.

0.3 Individual protective equipment

The personnel mentioned in the previous section must wear the appropriate protective clothing required for the use of the processing machine on which the Zero Point System (ZPS) is installed.

Safety shoes are required; the need to wear hearing protection, safety helmets and safety goggles must be judged by the operating company.

The wearing of loose clothing, which could become caught in the moving machine components, is not permitted.

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0.4 General safety instructions

The following regulations and recommendations correspond to the applicable legal regulations and are largely based on the observance of such safety regulations.

JERGENS INC. is not liable for any harm to persons or property, which can be traced back to a disregard for the applicable safety regulations and/or the instructions contained in this manual. The latest version of the installation manual shall apply.

All operators concerned are therefore urged to follow and apply the instructions below, and to strictly comply with the applicable accident protection regulations of the country, where the system is installed and used.

All ordinary and extraordinary maintenance steps must be undertaken with the pressure supply cut off.

Before connecting the pressure, check whether the operating pressure is in accordance with the maximum allowable operating pressure.

Transportation, installation, operation and ordinary or extraordinary maintenance of the Zero Point System may be undertaken only by personnel meeting the requirements stated in sections 0.1 and 0.2.

0.5 Behavior in emergencies

In emergencies, it is recommended that the procedures from the operating and maintenance instructions of the machine on which the Zero Point System (ZPS) is installed should be followed in emergencies.

In particular, measures must be taken so that no danger to persons or property can arise in case of a defect.

In case of fire, take the designated extinguishing measures and make sure no operating pressure is present.

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0.6 Restrictions on use

The Zero Point system (ZPS) may be used solely for the uses specified in the installation manual, and only in combination with the components recommended and approved by JERGENS INC.

Permitted use of the Zero Point System (ZPS): The ZPS is a spring-actuated single-acting clamping element that clamps a clamping plate or a workpiece pressure-free and self-locked with the Jergens Pull Stud. It is intended for installation on or in machines or systems, and may be used only within the scope of its technical data. The maximum loads and operating pressures specified by the manufacturer must not be exceeded. All other types of use must be agreed with the manufacturer.

The ZPS is suitable only to a limited extent in certain explosive environments. Further information regarding this application is contained in separate installation instructions.

0.7 Type plates

A label or the type plate of the manufacturer is affixed to the Zero Point System.

CAUTION:
Labels must not be removed under any circumstances, even if the equipment is to be resold.

Should any label be damaged or become detached, please contact JERGENS INC. to obtain a copy.

In all communications with JERGENS INC., please always mention the model stamped on the label. Disregarding these provisions releases JERGENS INC. from any liability for damage or accidents caused thereby. In this case, the operating company is solely liable to the authorities.

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1. Transport

Every Zero Point System (ZPS) is carefully tested before shipping. Upon receipt of the product, please check the integrity of the packaging and contents (subject to other instructions on the part of JERGENS INC.), to ensure that the equipment was not damaged during transport and that the delivery corresponds to the specification of the order. Please report any defects or damage immediately to JERGENS INC. and the carrier, who is liable for the transport damage.

CAUTION:
Any defects or damage must be claimed within 10 days of the receipt of the product.

2. Description of the system

Technical data sheet

	Unit	K10.3	K20.3
Pull-in and locking force in the system up to	kN [lbs]	10 [2248]	17 [3821.75]
Holding force	kN [lbs]	25 [5620]	55 [12364.49]
Min. opening operating	**Bar [psi]**	5 [72.51]	4.5 [65.267]
Max. opening operating	**Bar [psi]**	12 [174.04]	12 [174.04]
Opening volume	cm^3 [in^3]	17 [1.037]	37 [2.257]
Pre-positioning	Mm [in]	6.5 [0.255]	12 [0.472]
Repetition accuracy	Mm [in]	<0.005 [<0.001]	<0.005 [<0.001]
Max. permissible lateral	kN [lbs]	20 [4496.17]	20 [4496.17]
Max. operating temperature	°C [°F]	70 [158]	70 [158]

CAUTION:
It must be ensured, by means of a pressure regulation valve for example, that the maximum operating pressure is not exceeded. The safety factor is not included in the holding force value. It must be taken into account individually, depending on the application concerned.

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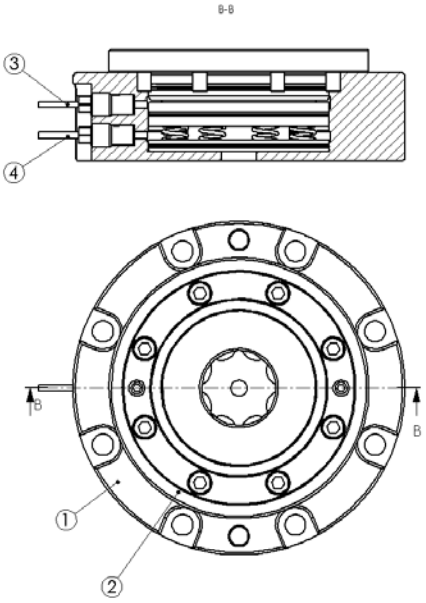
The lateral force refers to zero point and timing stud. The clearance stud must not be taken into account for the lateral forces.

Note for compressed air with pneumatic design: Prepared with service unit, (dry air, water separator filter, vapour oiler). Use only oils of viscosity class VG32 according to ISO 3448

2.1 Structure of the Zero Point System (ZPS)

Mounting flange for pneumatic version



1. Housing
2. Installation clamping module
3. Inductive sensor “Piston at top – Zero Point System clamped”
4. Inductive sensor “Piston at bottom – Zero Point System unclamped”

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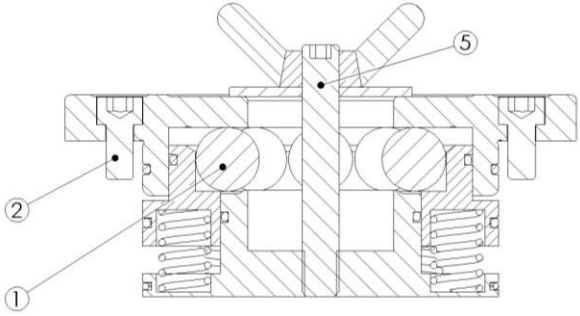
Installation clamping module

- Mounted in mounting flange



1. Ball
2. Cylinder screw
3. Threaded pin as forcing screw (not shown in the drawing)
5. Disassembly tool

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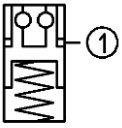
2.2 Technical data for inductive sensor

		Unit
Operational voltage range U	10...30	VDC
Output current	<100	mA
Voltage drop at outputs	<2	V at 100 mA
Idle current	<10	mA
Switching frequency	<3000	Hz
Protection class	IP 67	
Cable length	0.2	m
Connection plug	S8	
Design	Closer PNP	

Mounting flange for pneumatic version

2.3 Circuit diagram of the Zero Point System (ZPS)

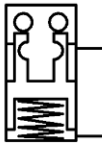


1 = Open pneumatically

2.4 Operation of the Zero Point System (ZPS)

Opening procedure:

Pressurise ZPS.



The ZPS will release the pull stud, enabling it to be moved in and out of the system. The ZPS will remain open as long as pressure is applied to the Open connection.

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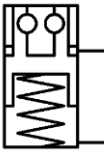
Clamping procedure:

Depressurise ZPS.

The ZPS locks positively and is mechanically clamped by spring force. The ZPS will remain closed as long as no pressure is applied to the Open connection. Pressure line can be decoupled after the clamping process – the ZPS remains positively interlocked and self-locking.



⚠ **CAUTION:**
Do not reach into the Zero Point System

Manual blow-out:

The interior of the ZPS can be blown out with an ordinary commercial compressed air blow gun or suctioned out with a vacuum device.

During operation, there is danger of eye injury, since shavings can arise from the blow-out.

⚠ **CAUTION:**
Wear safety goggles

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3. Installation

3.1 General

Safety is only guaranteed if the Zero Point System (ZPS) is properly connected according to applicable safety regulations.

CAUTION:
Only qualified personnel may connect the ZPS to the pressure supply.

If several ZPS are installed side by side, care must be taken that the height variation of the contact surfaces remains within 0.02 mm.

The spacing tolerances between the ZPS should not exceed +/- 0.01 mm. If the tolerances are exceeded, please consult with Jergens.

The change pallet to be clamped with the integrated pull studs must always rest against the contact surface of the Zero Point Systems in the clamped state (a slanted position of the change plate must be prevented).

K10.3:

The integrated sensors display the status of the ZPS (opened, clamped) in the mounting flange. To check that the change pallet is in process-secure contact, it must be separately detached. **The presence of the clamping nipple is not sensed.**

K20.3:

The integrated sensors display the status of the ZPS (opened, clamped) in the mounting flange. To check that the change pallet is in process-secure contact, it must be separately detached. **The presence of the pull stud is not queried, that is, the sensor (clamped) gives a signal only when the pull stud is present.**

Attention when using in the welding area: Excessively high welding currents can lead to malfunctions of the inductive sensors. In this case, a suitable bypass for the currents must be arranged.

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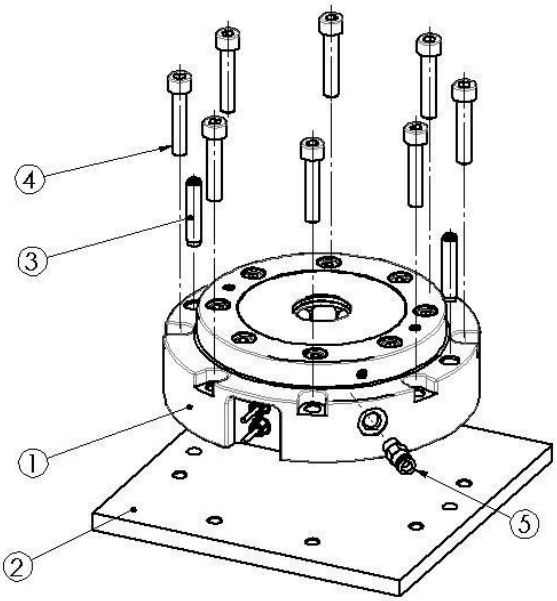
3.2 Installation of the mounting flange



1. Zero point system, mounting flange
2. Base plate
3. 2x cylinder pin for positioning
4. 8x cylinder screw
   - K10: M6
   - K20: M8

5. Pneumatic connection “Open”

3.3 Removal of the installation clamping module from the mounting flange

CAUTION:
The ZPS must be completely depressurised before starting to dismantle

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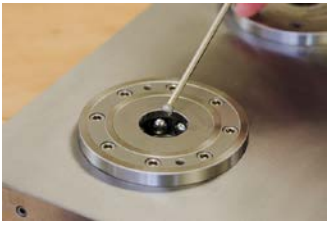

Remove threaded pin

Insert assembly tool (5), loosen cylinder screws (2) evenly

CAUTION Spring is pre-tensioned in the installed state.

Screw in threaded pins (3) so you can press down the clamping system

Uniform and tilt-free extraction of the clamping system

Note on installation tool (5): Screw a long cylinder screw with a large washer that covers the central hole for the pull stud into the base of the ZPS. In this way, the ZPS can be held together before removal so that it can be taken out as a unit. The supply holes for the pressure medium must be free during removal, as otherwise a vacuum could arise in the mounting hole.

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3.4 Installation of the clamping module in the mounting flange

Tilt-free insertion

Uniform insertion of 4 opposing cylinder screws (2), up to flat contact.

The threaded pins (3) must not be screwed in too far, or the cover cannot lie flat.

CAUTION: The spring is pre-tensioned during mounting.

Uniform tightening of the cylinder screws (2) to torque:

K10 : (M5) 5 Nm

K20 : (M6) 8 Nm

After installation, the balls must be able to move freely in the track

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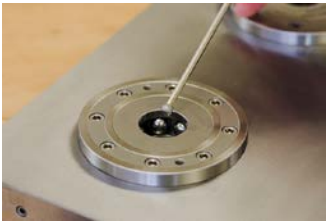
Remove installation tool (5)

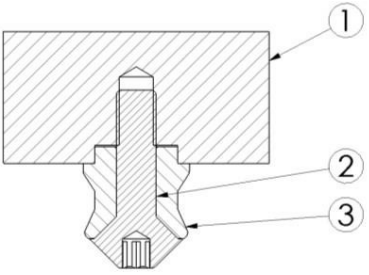


Screw threaded pin (4) into ZPS base and glue it in with soluble thread lock for stainless steel.

Caution: Do not lift the base of the ZPS via the threaded pin. For this purpose, it can be screwed back again by one-half turn after contact with the bottom of the mounting hole.

4. Pull Stud

4.1 Design



1. Interchangeable pallet
2. Engagement screw
3. Pull stud

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4.2 Installation Instructions

The pull stud with the engagement screw is to be inserted into the provided hole of the pallet. Please observe the arrangement of the various nipple shapes and the arrangement of the ZPS timing stud.

Tighten engagement screw with the **torque wrench** and defined torque.

K10 : (M8) 34 Nm

K20 : (M12) 120 Nm

4.3 Tolerances and pull stud arrangement

The pull studs have the following designs:

Zero-point pull stud (1) - for full centring

Timing stud (2)
- for centring the remaining free axis

Clearance stud (3)
– exclusively for holding and clamping function

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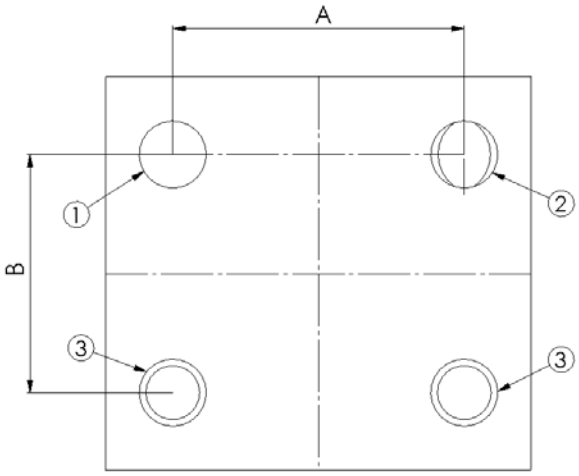
Bottom view of a change pallet with representation of the arrangement of the various pull studs (drawing simplified):



Note: The form of the timing stud must lie at an angle of 90° to the axis of connection between itself and the zero-point stud.

Distance tolerance:

A = Zero-point to timing stud: +/-0.01

B = Zero-point/timing stud to clearance stud: +/-0.03

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5. PERFORMANCE AND RESTRICTIONS ON USE

5.1 Pull-in and locking force

The pull-in and locking force describes the force with which the stud is pulled in and clamped with positive interlocking in the clamping module.

5.2 Holding force

The holding force specifies the maximum permissible axial pull force of the engagement screw. A safety value suitable for the application must additionally be taken into consideration.

Elevated tensile forces can cause a material-induced elastic deformation of the components.

5.3 Safety precautions

Safety catch: An additional mechanical safety catch must be attached for vertically and horizontally suspended clamping. For this usage, the user must consider a risk analysis of the forces occurring and then carry out an accident risk assessment in order to take appropriate protective measures. People are not permitted to be present in the danger zone.

Rotating applications: For rotary clamping, piston location sensing and contact monitoring are mandatory for safety reasons. For rotary usage, the user must consider a risk analysis of the shearing, centrifugal and imbalance forces occurring and then carry out an accident risk assessment in order to take appropriate protective measures. People are not permitted to be present in the danger zone.

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6. MAINTENANCE

6.1 Introduction

Appropriate maintenance is important for a long service life of the system and its components under proper functional and operating conditions, and it also guarantees the required operating safety over the long term.

6.2 Safety during maintenance

CAUTION:

All maintenance steps must be undertaken by qualified personnel (see chapter 0.1).

Here are the most important points for the performance of maintenance measures:

Maintenance and repair measures must be undertaken with a depressurized system. The entire operating, maintenance and cleaning personnel must also strictly observe the applicable accident prevention regulations in the country where the machine is installed.

The ZPS is constantly under high spring pressure. Due to the pre-tensioning of the spring stack, serious, even life-threatening injuries can result from improper maintenance.

Always wear safety shoes and all other required individual safety gear as well as clothing that covers the body as completely as possible.

Do not wear any rings, watches, necklaces, bracelets or loose clothing.

To guarantee flawless functioning, use only original replacement parts.

Do not use abrasive or corrosive materials for cleaning the ZPS as they may impair the legibility of the markings

or type plates.

6.3 Daily maintenance

Check the interior of the ZPS for contamination. It can be cleaned with an ordinary commercial compressed air gun (wear safety goggles) or with a chip vacuum.

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6.4 Monthly maintenance

- Visual inspection of the condition of the ZPS
- Checking the mounting screws and engagement screws for firm seating
- Removal of deposits on the module surface
- Check for integrity and functioning of the system
- Check of the pressure hoses or tubing
- Check the oil level, change oil if needed

6.5 Maintenance

Annual maintenance, but at least according to the following cycles:

Size	Clamping cycles
K10.3	4,000,000
K20.3	4,000,000

Dismantling of the ZPS and renovation of the O-rings and the spring stack

Exchanging both elements is recommended as preventive repair. Preventive repair should be done at shorter intervals in case of very frequent clamping processes. The procedure for this should be coordinated with JERGENS INC.

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7. POSSIBLE PROBLEMS AND HOW TO REMEDY THEM

The information contained in this section supports the user in identification of malfunctions that can occur during operation of the system.

Malfunction	Cause	Remedy
The ZPS no longer opens completely	- Opening pressure is too low. - "Reclamping" connection is not free of pressure	- Check operating pressure at the pressure generator

8. DECOMMISSIONING AND DISPOSAL

8.1 Decommissioning

If the equipment is no longer going to be used, cut off the system from the pressure supply and remove it from the production machine on which it is installed.

8.2 Placing into storage

The following points should be considered:

Clean and grease the surface of the Zero Point System.

Keep the system in a dry environment at +10°C(32°F) ÷ 55°C.

8.3 Disposal

If the ZPS is to be scrapped, the oil in it must be emptied and disposed of in accordance with the applicable legal regulations in the respective country.

The remaining parts of the pump unit should be sorted by material and then also disposed of in accordance with the legal regulations.

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