

# INSTALLATION MANUAL



## ZERO POINT SYSTEM (ZPS)

### Installation of K5 clamping module

### Hydraulic and pneumatic

## ZPS-K5 CLAMPING MODULE

### TABLE OF CONTENTS

<b>GENERAL NOTES</b>	<b>3</b>
<b>0.0 INTRODUCTION</b>	<b>4</b>
0.1 Operating personnel.....	4
0.2 Trained personnel .....	4
0.3 Individual protective equipment.....	4
0.4 General safety instructions.....	5
0.5 Behavior in emergency .....	5
0.6 Usage restrictions .....	5
0.7 Type plates .....	6
<b>1.0 TRANSPORT</b>	<b>6</b>
<b>2.0 DESCRIPTION OF THE SYSTEM</b>	<b>6</b>
2.1 Structure of the Zero Point System (ZPS).....	7
2.2 Circuit diagram of the Zero Point System (ZPS) .....	8
2.3 Operation of the Zero Point System (ZPS).....	8
<b>3.0 INSTALLATION</b>	<b>9</b>
3.1 General .....	9
3.2 Installation in a mounting hole.....	10
3.3 Removal from a mounting hole .....	10
<b>4.0 PULL STUDS</b>	<b>11</b>
4.1 Structure .....	11
4.2 Installation Instructions.....	12
4.3 Tolerances and pull stud arrangement.....	12
<b>5.0 PERFORMANCE AND RESTRICTIONS ON USE</b>	<b>13</b>
5.1 Pull-in and locking force .....	13
5.2 Holding force .....	13
5.3 Safety precautions .....	13
<b>6.0 MAINTENANCE</b>	<b>13</b>
6.1 Introduction .....	13
6.2 Safety standards during maintenance.....	13
6.3 Daily Maintenance.....	14
6.4 Monthly maintenance .....	14
6.5 Annual maintenance, but at the latest after 150,000 cycles .....	14
<b>7.0 POSSIBLE PROBLEMS AND REMEDYING THEM</b>	<b>14</b>
<b>8.0 DECOMMISSIONING AND DISPOSAL</b>	<b>14</b>
8.1 Decommissioning.....	14
8.2 Storage .....	14
8.3 Disposal .....	14

# INSTALLATION MANUAL

## ZPS-K5 CLAMPING MODULE



Workholding Solutions

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877.426.2504

### **GENERAL NOTES**

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

For additional information we request that you contact Jergens Workholding Solutions Group at 877-426-2504

### **THIS MANUAL**

Please consider this installation manual an important component of the delivered system. It should be well taken care of during the entire time the system is in use.

A copy of the present 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

### **STORAGE OF THE MANUAL**

Always handle this manual with care.

It is not permissible to tear out pages or modify it.

Please store 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 these instructions, Jergens Inc., forbids the reproduction in whole or even in part of these instructions, as well as any provision to third parties without written permission. Any modification of the product requires permission of the manufacturer.

## ZPS-K5 CLAMPING MODULE

### 0. Introduction

**CAUTION:**

The original configuration of this system may not be modified under any conditions.

The use of this system for purposes other than those which the manufacturer intended can cause harm to the system or to the operator himself. Advance permission from the manufacturer must be obtained before machining materials other than those described in these instructions.

#### Symbols used



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



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

### 0.1 Operating personnel

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

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

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

1. Trained and authorized to operate the product safely and supply it with operating pressure or interrupt the supply, and to mark it in accordance with the standard safety regulations.
2. Trained in the correct procedure for maintenance and use of safety equipment in accordance with the standard safety regulations.

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

1. Personnel has obtained, read and understood the installation manual;
2. Personnel follows the instructions provided.

### 0.2 Trained personnel

**MACHINE OPERATORS:** Personnel 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 unlimited understanding of the contents of the present handbook.

### 0.3 Individual protective equipment



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

Safety shoes are required, whereas the necessity of wearing hearing protectors, safety hats and safety goggles must be judged by the operating company.

The wearing of loose clothing that could become caught in the movable machine components is not permitted.



### 0.4 General safety instructions

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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 that can be traced back to disregarding the applicable safety regulations and/or the instructions contained in the present handbook. The respective most recent version of the installation manual is applicable.

All affected operators are therefore urged to follow and apply the instructions below and to strictly comply with the applicable accident protection regulations in the respective 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 it must be checked 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 mentioned in sections 0.1 and 0.2.

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### 0.5 Behavior in case of emergency

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It is recommended that the operating and maintenance instructions of the machine on which the Zero Point System is installed be applied 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 take care that operating pressure is no longer present.

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### 0.6 Restrictions on usage

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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.

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**Allowed usage 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 ZPS pull-stud. It is intended for installation and removal for machines or systems and may only be used 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.

## ZPS-K5 CLAMPING MODULE

### 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 conditions, even if the equipment is to be resold.

Should the 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.

### 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 assure 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 shipper who is liable for the transport damage.



**CAUTION:**

Any defects or damage must be protested within 10 days of the receipt of the product.

### 2. Description of the system

**Technical data sheet – Hydraulic version:**

	<b>Unit</b>	<b>K5</b>
Pull-in and locking force in the system up to	[lbs]	1100
Holding force	[lbs]	2900
Maintenance after ....clamping cycles		150,000
<b>Min. operating pressure</b>	<b>[psi]</b>	<b>725</b>
<b>Max. operating pressure</b>	<b>[psi]</b>	<b>870</b>
Opening volume	[in <sup>3</sup> ]	.092
Pre-positioning	[in]	.157
Repeatability	[in]	<0.0002
Max. permissible lateral forces*	[lbs]	1100
Max. operating temperature	[°F]	176

## ZPS-K5 CLAMPING MODULE

### Technical data sheet – Pneumatic version:

	Unit	K5
Pull-in and locking force in the system up to	[lbs]	330
Holding force	[lbs]	2900
Maintenance after ....clamping cycles		150,000
<b>Min. opening operating pressure</b>	<b>[psi]</b>	<b>116</b>
<b>Max. opening operating pressure</b>	<b>[psi]</b>	<b>175</b>
<b>Min. operating pressure for retensioning</b>	<b>[psi]</b>	<b>75</b>
<b>Max. operating pressure for retensioning</b>	<b>[psi]</b>	<b>90</b>
Opening volume	[in <sup>3</sup> ]	.092
Pre-positioning	[in]	.157
Repeatability	[in]	<0.0002
Max. permissible lateral forces*	[lbs]	1100
Max. operating temperature	[°F]	176

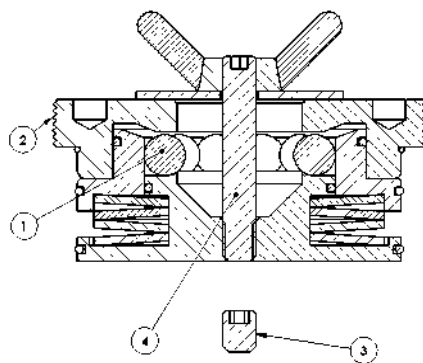


#### CAUTION:

It must be assured, by means of a pressure regulation valve for example, that the maximum operating pressure is not exceeded. The safety factor is not contained in the specification of the operating pressure. It must be further taken into account individually, depending on the application case. The lateral force refers to zero point and slit nipple. The undersized nipple must not be taken into account for the lateral forces.

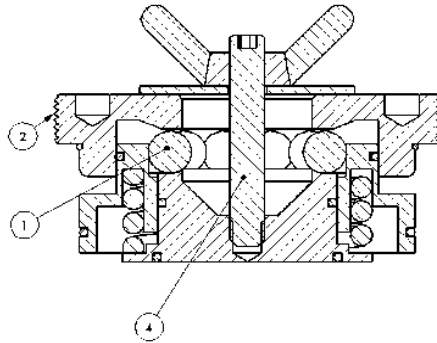
### 2.1 Structure of the Zero Point System (ZPS)

#### Hydraulic version



## ZPS-K5 CLAMPING MODULE

### Pneumatic version

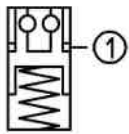


1. Ball
2. Outside thread on cover
3. Threaded stud (only for hydraulic version)
4. Assembly tools preinstalled

### 2.2 Circuit diagram of the Zero Point System (ZPS)

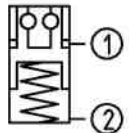
**Description of the required connections:**

#### Hydraulic version



1 = Open hydraulically

#### Pneumatic version



1 = Open pneumatically  
 2 = Retension pneumatically

### 2.3 Operation of the Zero Point System (ZPS)

**Vent:** After installation of the hydraulic ZPS modules in a base, the entire system must be vented.

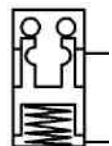
#### Hydraulic version

##### Opening procedure:

Pressurize 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.



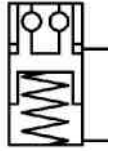


## ZPS-K5 CLAMPING MODULE

### Clamping procedure:

Depressurize 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.



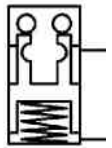
### Pneumatic version

#### Opening procedure:

Pressurize ZPS.

Retensioning connection must be pressure-free.

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

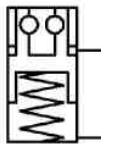


#### Clamping procedure:

Depressurize ZPS.

Pressurize retensioning connection briefly, then remove pressure.

The ZPS is positively locked and 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.



#### 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

### 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.  
**Follow the installation manual for the pressure intensifier in this regard.**

**The spacing tolerances between the ZPS should not exceed +/- 0.01 mm. (0.00039")**

## ZPS-K5 CLAMPING MODULE

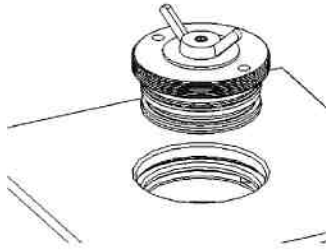
The change pallet to be clamped with the integrated pull studs must always rest against the contact surface of the ZPS base plate in the clamped state.

### 3.2 Installation in a mounting hole

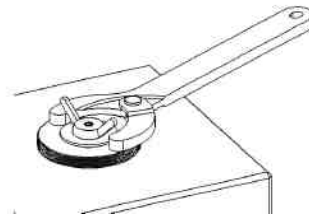
Do **not** remove assembly tool ④ for the hydraulic and pneumatic version

**Important:**

**Neatly deburr mounting holes, clean hole and contact surface, check elements for greased state**



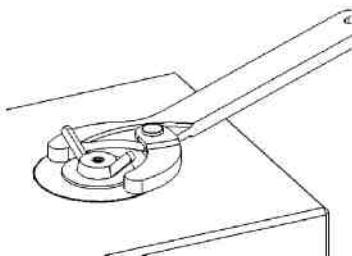
Tilt-free introduction



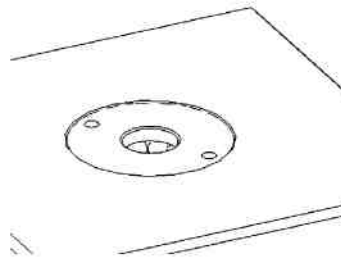
Uniform screw tightening of the Zero Point System with installation tool, e.g., face spanner



**CAUTION: The spring is pre-tensioned at installation.**



Uniform tightening up to flat contact of the cover on the support surface. Distance of cover from support surface of the base plate approx. 0.2mm



Remove installation tool and Screw threaded stud ③ (hydraulic version) with soluble and glue with thread locker for stainless steel into ZPS base

**After installation, the bearings must be able to move freely in the track.**

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

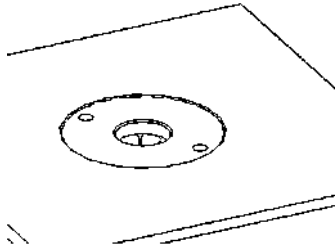
### 3.3 Removal from a mounting hole



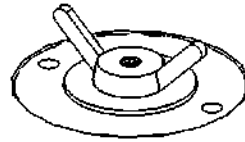
**CAUTION: The system must be completely depressurized before starting the dismantling.**

# INSTALLATION MANUAL

## ZPS-K5 CLAMPING MODULE

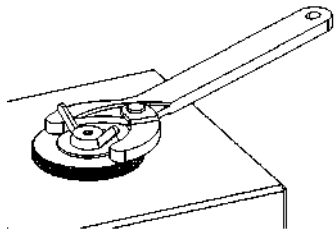


Remove threaded stud ③ (hydraulic version)

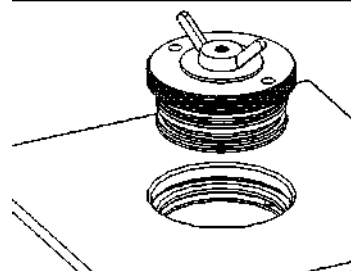


Insert assembly tool ④

**⚠ CAUTION Spring is pre-tensioned in the installed state.**



Uniform unscrewing with installation tool, e.g., face spanner



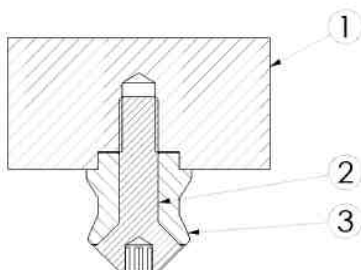
Uniform and tilt-free extraction

**Note on assembly tool ④:** Screw long cylinder screw with 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.

### 4. Pull Studs

#### 4.1 Structure



1. Pallet to be changed
2. Engagement nipple screw
3. Pull Stud

## ZPS-K5 CLAMPING MODULE

### 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 stud shapes and the arrangement of the ZPS timing stud slit.

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

**K05: (M6) 14 Nm (10.3 ft. lbs)**

### 4.3 Tolerances and pull stud arrangement

The pull studs have the following designs:



Zero-point stud (1)  
- for full centring

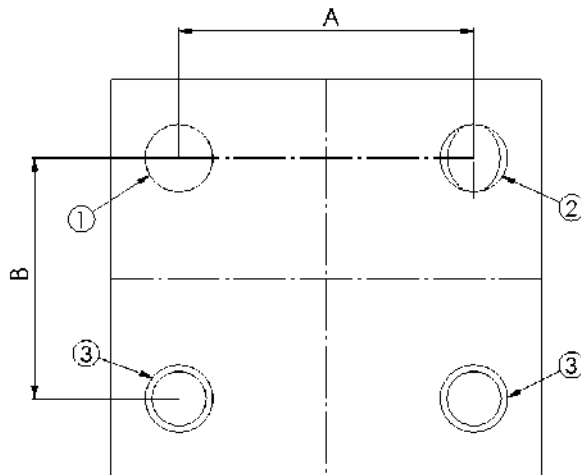


Timing stud (2)  
- for the centering of the still-free axis



Clearance Stud (3)  
- only holding and tensioning function

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



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

**Distance tolerance:**

A = Zero-point to timing stud: +/- 0.01mm (0.00039")  
 B = Zero-point/timing stud to clearance stud: +/- 0.03mm (0.0011")

## ZPS-K5 CLAMPING MODULE

### 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 be additionally 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 vertical 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.

### 6. MAINTENANCE

#### 6.1 Introduction

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

#### 6.2 Safety standards 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 functionality, 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.

---

## ZPS-K5 CLAMPING MODULE

### 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.

### 6.4 Daily maintenance

- Visual inspection of the condition of the ZPS
- Checking the mounting screws and stud 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 Annual maintenance, but at the latest after 150,000 cycles

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.

## 7. POSSIBLE PROBLEMS AND REMEDYING THEM

The information contained in this section supports the user in the 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 - Oil level in the pressure generator	- Check operating pressure at the pressure generator and add oil if needed
Visible oil in the interior of the ZPS	- Seals defective	- Dismantle ZPS, replace seals

## 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 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° (50°F) ÷ 55°C (131°F).

### 8.3 Disposal

If the ZPS unit will 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.

**INSTALLATION MANUAL**  
**ZPS-K5 CLAMPING MODULE**



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