

**REFERENCE SYSTEM  $\mu$ -PrisFix *nano***  
high precision part production



**$\leq 0,1 \mu\text{m}$  repetitive accuracy**  
 **$\leq 0,5 \mu\text{m}$  changing accuracy**

# ■ Company

- We about us

## Confidence in reference systems

We have developed and produced innovative high precision products around clamping technologies for more than 50 years. Our customers around the world trust our system solutions because of new approaches and continuous development. HIRSCHMANN REFERENCE SYSTEMS represents "Quality made in Germany"

## Ideas for customer benefits

As your partner we search together with you for the best solution for your workpiece / tool clamping problem. Here we create the standard for an optimal and future-oriented workflow. We offer system components with excellent cost-benefit saving ratios in the highest quality with long running times. Our qualified staffs in our design, manufacturing and sales departments work hand in hand in accordance to international quality standards (ISO9001/EN9100).



## ■ General

### Operation

Most tools are supplied with an operating guide. Correct operation cannot be ensured and danger to personnel and machine cannot be excluded unless these operating instructions or information given in this catalogue are observed.

### Accuracy

The individual tool planes incorporate hardened and precision ground X & Y centering prisms and separate Z-supports.

### Service and Maintenance

Since the Reference System is subject to mechanical and chemical influences, maintenance and service has to be performed with special care.

### Technical Changes

All products shown in this catalogue are subject to on-going improvements and developments; we reserve the right to make modifications without notice.

### Quality ISO 9001 and EN9100

All products of HIRSCHMANN GmbH are manufactured using the latest production methods. All products are submitted for ISO 9001 and EN9100 (air and space industry standard) quality assurance.

### Warranty

We provide a 12 month warranty for all Fixturing system parts; starting from invoice date, and assuming correct use and maintenance as specified have been observed. The warranty is restricted to replacement or repair, free of charge, of any defective parts. Claims arising from improper use or handling shall not be considered. Warranty claims must be submitted in writing.

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## ■ Reference System $\mu$ -PrisFix *nano*

- Precision in the process chain

The repeatability of positioning in the process chain is a main criterion for the selection of a clamping system. The repetitive accuracy (same pallet on same clammer) in standard clamping systems is around 2  $\mu\text{m}$ . But the changing accuracy (same pallet on different clammer) is 8-15  $\mu\text{m}$ .

When using standard clamping systems the maximum allowed manufacturing tolerance in the process chain (from Machine to (measuring) Machine) has already been reached or exceeded at re-clamping without having a manufacturing failure.

Although this is sufficient for many manufacturing processes it is not acceptable in the manufacturing of high precision small parts. This requires manufacturing tolerances of  $<5 \mu\text{m}$ .

The high precision HIRSCHMANN Reference System  $\mu$ -PrisFix*nano* guarantees a average changing accuracy (clamper to clamper) of  $\leq 0,5 \mu\text{m}^*$ .

### - Definition repetitive accuracy / changing accuracy

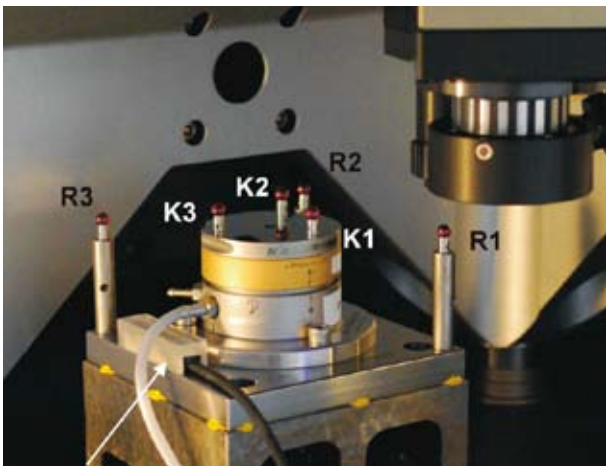
#### Repetitive accuracy

Is the positioning accuracy of a pallet (after sliding, twisting, tipping etc) when clamped repeatedly in the same clamper.

#### Changing accuracy

Is the positioning accuracy of a pallet (after sliding, twisting, tipping etc) when clamped between different clammers.

\*The repetitive and changing accuracies were checked and confirmed by the Federal Institute of Technical Physics (PTB) as a part of a development project. Test results are available upon request.



Test assembly



Zeiss measuring machine F25

### What's left of my allowable design tolerance?

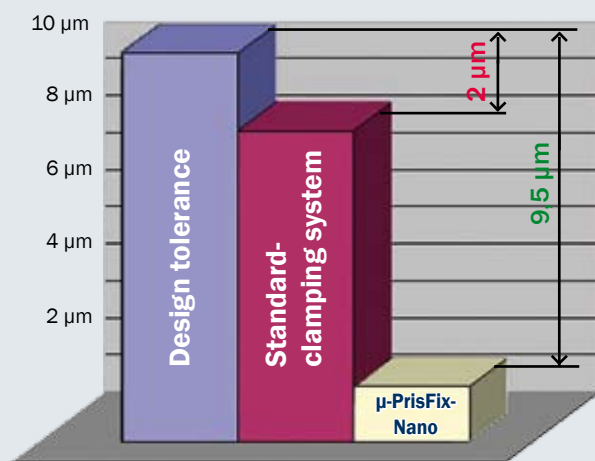
Design tolerance data of  $<10 \mu\text{m}$  are not uncommon in the manufacturing of small parts. If the part can be produced in one set-up and the machine meets the accuracy tolerance this is not a challenge.

However if the workpiece has to be manufactured in a process chain using standard clamping systems (changing accuracy  $8 - 15 \mu\text{m}$ ), using different set-ups and machines, the allowable tolerance is quickly depleted. In this case the solution is the use of the high precision HIRSCHMANN Reference System  **$\mu$ -PrisFixnano** with a average changing accuracy of  $\leq 0.5 \mu\text{m}$ .

#### - Example

Using a design tolerance of  $10 \mu\text{m}$  and a change accuracy of the clamping system of  $8 \mu\text{m}$ , **80 %** of the design tolerance is used up from the clamping system. The allowable design tolerance is quickly exceeded if there are errors in the machine, the tools, set-up or measurement errors.

With the HIRSCHMANN Reference System  **$\mu$ -PrisFixnano** with a guaranteed average **changing accuracy** of  $\leq 0.5 \mu\text{m}$  there is a  $9.5 \mu\text{m}$  tolerance left for the manufacturing. The loss of tolerance is **only 5 %**



	Standard clamping system	$\mu$ -PrisFix-Nano
Drawing tolerance	10 $\mu\text{m}$	10 $\mu\text{m}$
Changing accuracy	8 $\mu\text{m}$	0.5 $\mu\text{m}$
Tolerance left	2 $\mu\text{m}$	9.5 $\mu\text{m}$
<b>Tolerance loss</b>	<b>80 %</b>	<b>5 %</b>

# ■ Reference System $\mu$ -PrisFix *nano*

- for high precision small parts manufacturing

The complete rust-resistant Reference System  $\mu$ -PrisFix*nano* is a high precision mini clamping system for use in the manufacturing of small parts. The average changing accuracy in the process chain (change over accuracy) by  $\leq 0.5 \mu\text{m}$  (0.000019") warranted stable and repeatable production processes. The patented Reference System will be used on machine tools (milling, drilling, grinding, erosion, laser machines and so on) and in measuring technique.

## Features

- 0.1  $\mu\text{m}$  repetitive accuracy
- 0.5  $\mu\text{m}$  average change over accuracy
- Total height with pallet only 42 mm (1.654")
- Completely made of stainless steel
- Completely sealed (IP68)
- Integrated cleaning (HIRSCHMANN "CenterClean")\*
- Integrated pallet detection and clamping check
- Clamping via spring pressure, opening via pneumatic pressure.
- Integrated gripper interface enables automatic change
- precise, securely, efficient



## Integrated functions

- The patented prism system with stable integrated X-, Y-, and Z- references permit high precision positioning
- If no pallet is in the clamber the centre prism and the Z-surfaces will be protected against contamination with a pin sharp air jet. With a clamped pallet the system is completely sealed against dirt
- Part detection by measuring the pneumatic pressure difference
- Clamping control via piston position sensor
- Integrated gripper interface for automatic change



\* Integrated cleaning (HIRSCHMANN "CenterClean")

The pneumatic **μ-PrisFix<sup>nano</sup>** clamper H1.1000 and H1.1000A can be used for manual and automatic loading. Both are equipped with pneumatic cleaning and presence check capabilities. The clamper H1.1000A is also equipped with an integrated sensor to check the position of the clamping piston. With the evaluation of this sensor and pneumatic presence check by the machine or handling system control, automatic pallet changing will guarantee high process reliability.

### H 1.1000 μ-PrisFix<sup>nano</sup> Pneumatic Clamper

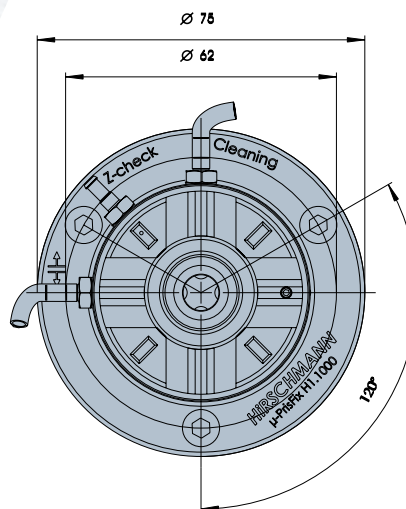
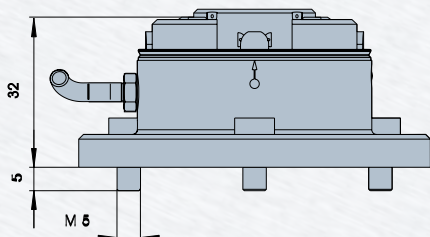
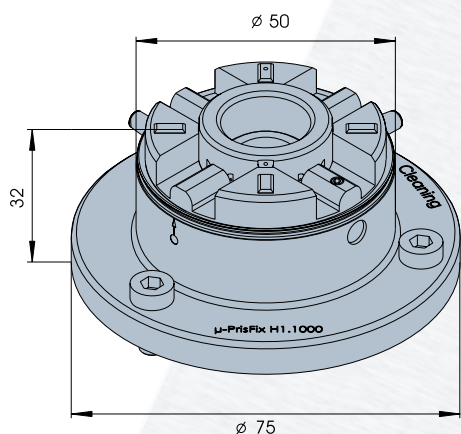
Completely rust-resistant

Clamping via spring pressure, opening via pneumatic pressure. Dirt protected via a sealing ring and cleaning air ("Center Clean"). Part detection by measuring the pressure difference.

Repetitive accuracy	≤ 0,0001 mm (≤ 0,000004")
Average change over accuracy	≤ 0,0005 mm (≤ 0,000019")
Clamping height (without/with pallet)	32/42 mm
Clamping force	500 N
Pneumatic pressure (opening/cleaning)	6 bar

### H 1.1000A μ-PrisFix<sup>nano</sup> Pneumatic Clamper

Same as H.1.000 but equipped with a piston check sensor (clamping control via piston position sensor and part detection by difference pressure measuring)

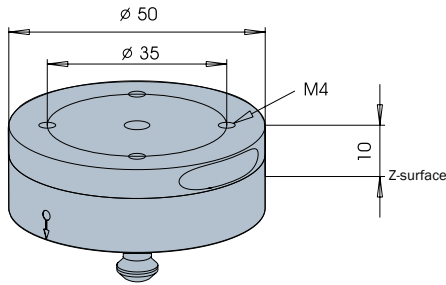


# Reference System $\mu$ -PrisFix *nano*

- pallets

## Common features

- completely made of rust-resistant materials
- integrated gripper interface for automatic change

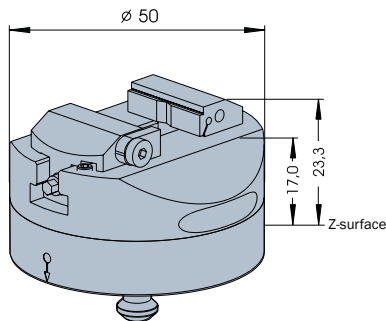


### H 1.1005 $\mu$ -PrisFix *nano* Pallet

Completely rust resistant. With 4 screw threads M4, 5 mm depth for workpiece fastening, hardened and lapped. Integrated gripper interface for automatic handling.

Clamping journal included

Diameter 50 mm



### H 1.1005CC $\mu$ -PrisFix *nano* Center Clamp Pallet

With integrated self-centering clamping chuck for round and cubic workpieces and a hardened clamping jaw with a removable end stop. Complete with journal and integrated gripper interface for automatic handling.

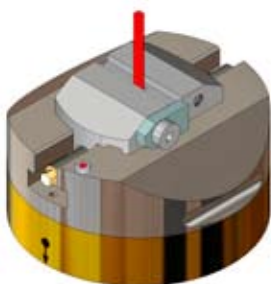
Clamping range (cubic parts) 0-22 mm

Clamping range (round parts) 1-8 mm

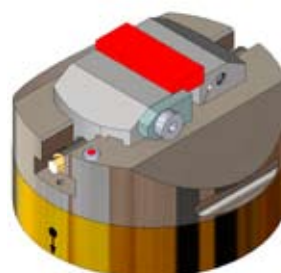
Pallet diameter 50 mm

Height 40 mm

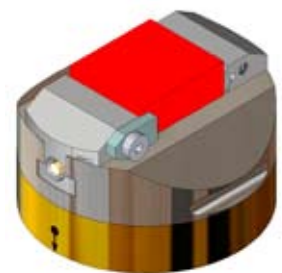
Other versions on request



Ø 1 - 8 mm



Clamping depth 1,5 mm

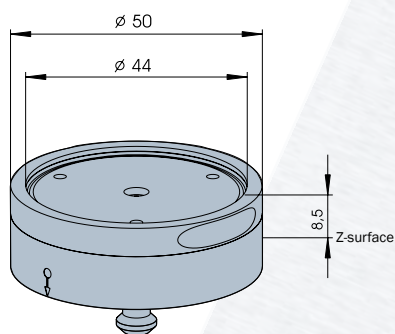


Clamping depth 6 mm



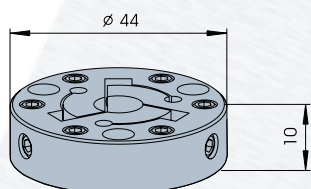
## Adjustable clamping element

These patented components are used as a universal workpiece interface for highest concentricity ( $\leq 1 \mu\text{m}$ ).



### H 1.1005JP $\mu$ -PrisFixnano Clamping Element Holder (rust resistant)

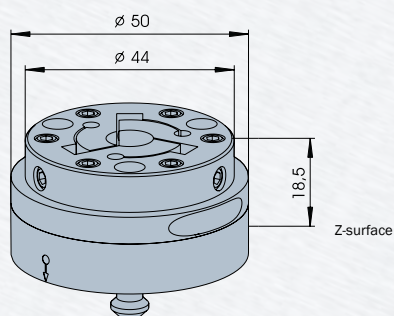
For mounting the H1.1005JE-xx  $\mu$ -PrisFixnano Adjustable Clamping Elements.  
Complete with journal and integrated gripper interface for automatic handling.



### H 1.1005JE-xx Adjustable Clamping Element (Brass)

For accurate alignment of workpiece concentric run-out  
The adjustable clamping elements will be fixed in the Clamping Element Holder H1.1005JE-xx.

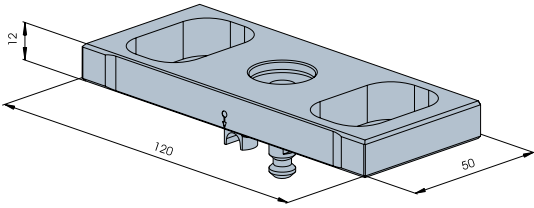
Adjustable concentricity  $\leq 1 \mu\text{m}$   
Clamping diameter (xx)  $\emptyset 1 \text{ mm to } \emptyset 15 \text{ mm}$   
(On orders please specify exact diameter xx)



Dimensions of the H1.1005JP and H1.1005JE-xx assembled

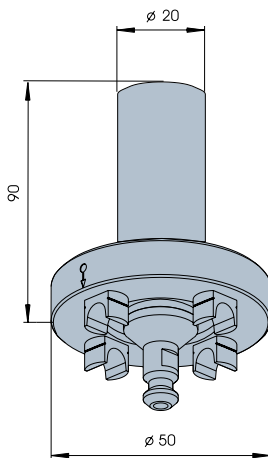
## ■ Accessories

- Alignment tools



### **H1.1005AL μ-PrisFixnano Aligning Gauge**

To align and center the μ-PrisFix clamber in X/Y direction. Completely manufactured of rust resistant materials.



### **H1.1005KD μ-PrisFixnano Test Bar**

To align and control the axial and radial position of mounted μ-PrisFix clammers as well as concentricity when mounted on HIRSCHMANN tables and axes and rotating spindles with μ-PrisFix clammers. Completely manufactured of rust resistant materials.

Notes

# HIRSCHMANN

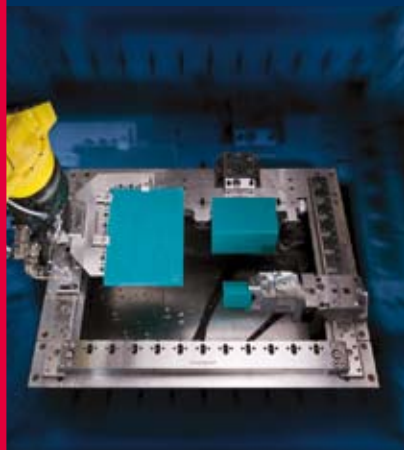
## REFERENCE SYSTEMS

**μ-PrisFix<sup>nano</sup>**  
high precision part production



## PRODUCT OVERVIEW

**FIXTURING SYSTEM 4000**  
for Wire EDM



**FIXTURING SYSTEM 5000**  
for Machine Tools



**REFERENCE SYSTEM 8000**  
for Machine Tools



**REFERENCE SYSTEM 9000**  
Modular Zero-Point Fixturing System



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for Wire and Sinking EDM



Catalogues upon request

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