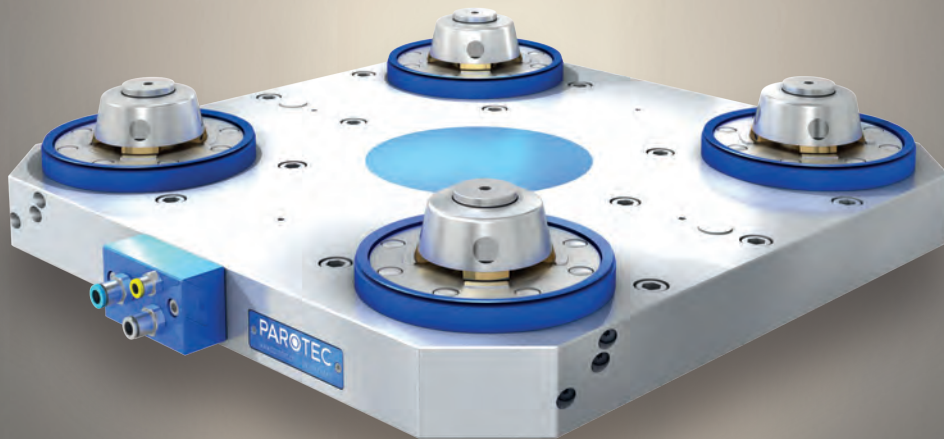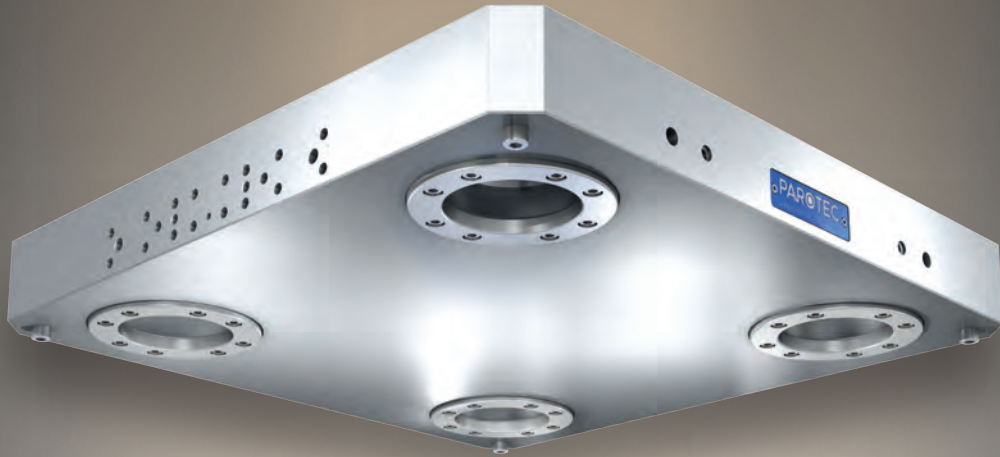# GENIUSGRIP

CLAMPING SYSTEMATICALLY

The Genius-Grip System

The zero point clamping system for large-scale machining centres for milling and turning section

The inventor

PAROTEC
spanntechnik · robotik · engineering

PAROTEC AG
Lerchentalstraße 29
CH-9016 St. Gallen
Tel.: +41 (0)71 394 10 00
info@parotec.ch

PAROTEC has more than 35 years of experience in the field of high precision workpiece clamping.

One of the technical top performers is the development of the zero point palletizing system "Power-Grip". Many notable clients worldwide have trusted the process reliability of this technology for years.

Distribution Germany and Benelux

PARTOOL
Palettieren · Automatisieren · Rationalisieren

PARTOOL GmbH & Co. KG
Edisonstraße 19
D-90431 Nürnberg
Tel.: +49 (0)911 65 65 89- 0
info@partool.de

The company PARTOOL is distributor of the manufacturer PAROTEC for Germany and Benelux.

At the technology and sales center in Nuremberg, you can personally convince yourself of the performance and the precision of the Parotec products at any time.

The zero point clamping system for large-scale machine centres for milling and turning section.

What is a zero point palletizing system?

A **zero point palletizing system** allows you to clamp and position work pieces, clamping media and fixtures **quickly and precisely.**

The standardised interfaces **drastically reduce set-up time, particularly for single workpieces and small batch production, thereby increasing effective machine uptime and productivity.**
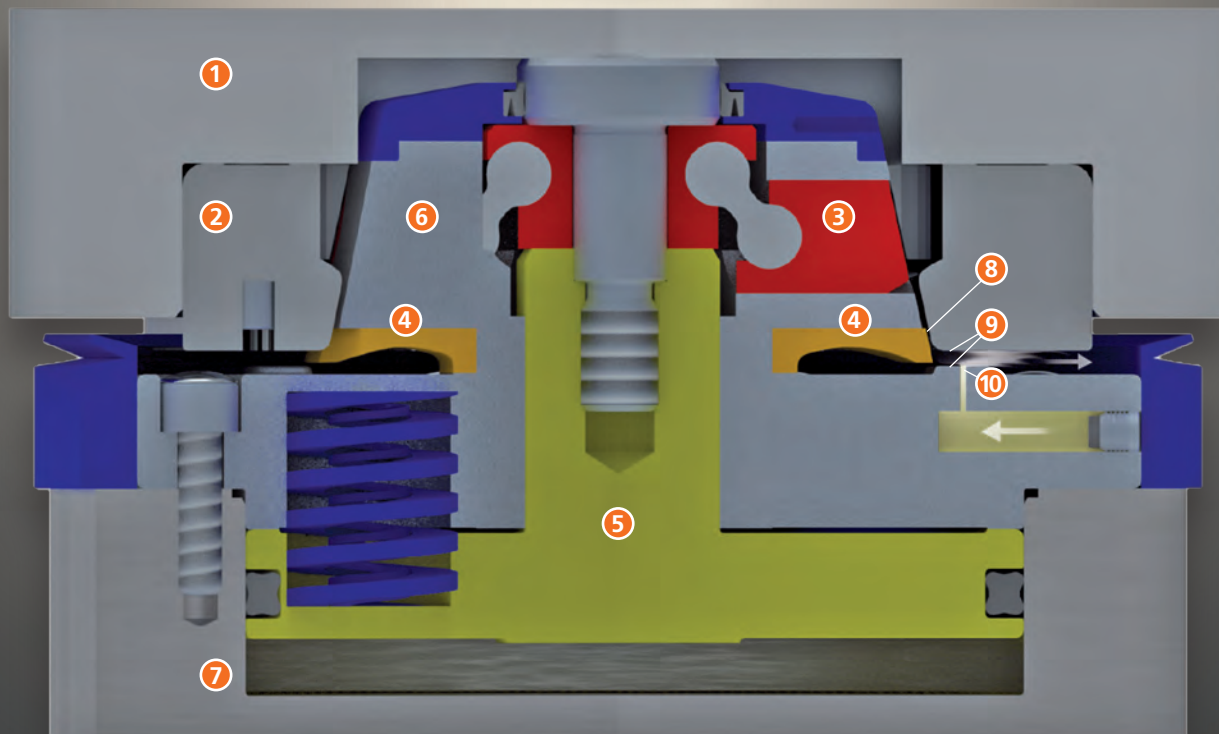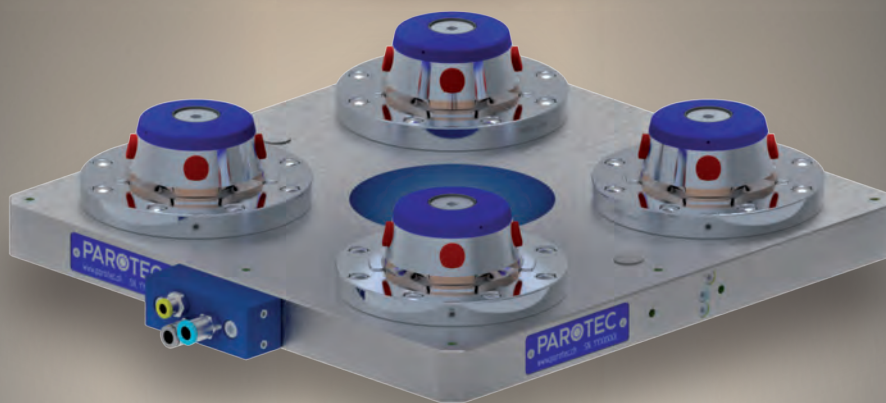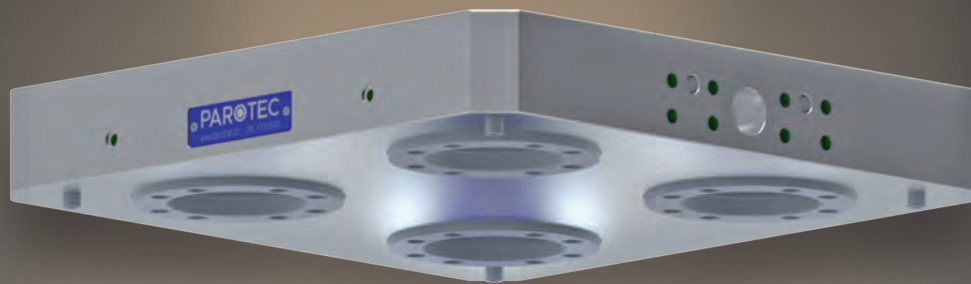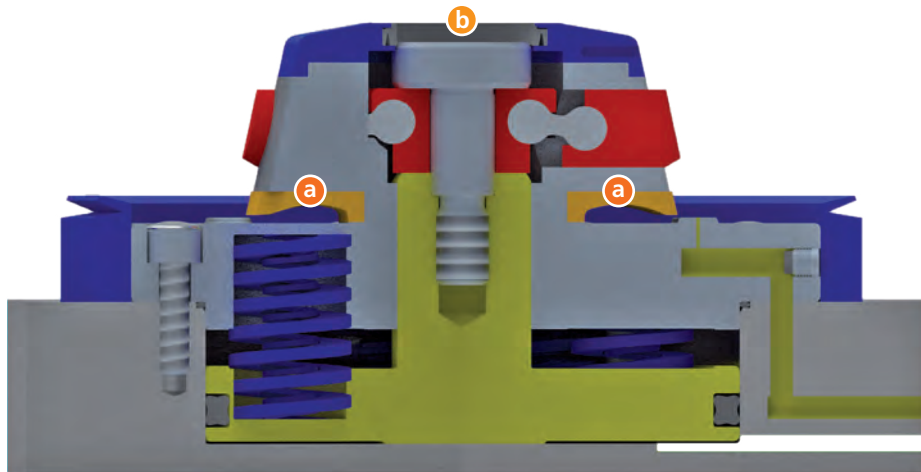
Content

GENIUSGRIP

1. The system

①	Pallet	⑥	Clamping bolt cage
②	Centering and clamping sleeve	⑦	Pallet carrier
③	Clamping mechanism	⑧	XY-reference surfaces
④	Centering spring lugs	⑨	Z-reference surface
⑤	Piston	⑩	Nozzles for Z-reference cleaning

The consistant zero point clamping system for the heavy weight classes.

Disadvantage of classic clamping systems

Many classic clamping systems work with large rigid clamping surfaces without plane support (SK-principle).
The result: Measuring, clamping and aligning the workpieces is done in the machine. **The machine stands still.**

Advantage of Genius-Grip

The clamping system Genius-Grip clamps with an axially resilient centering device (a) and with plan support (b) (HSK-principle).
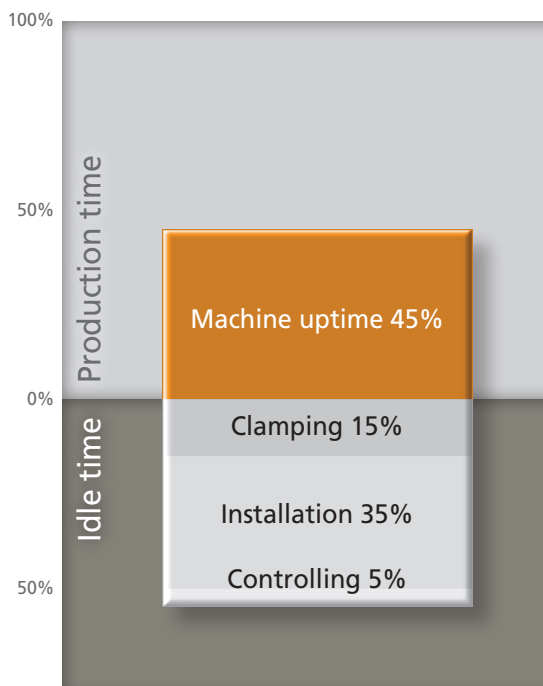**The result:** Measuring, clamping and aligning the workpieces is done outside the machine. **The machine is running.**

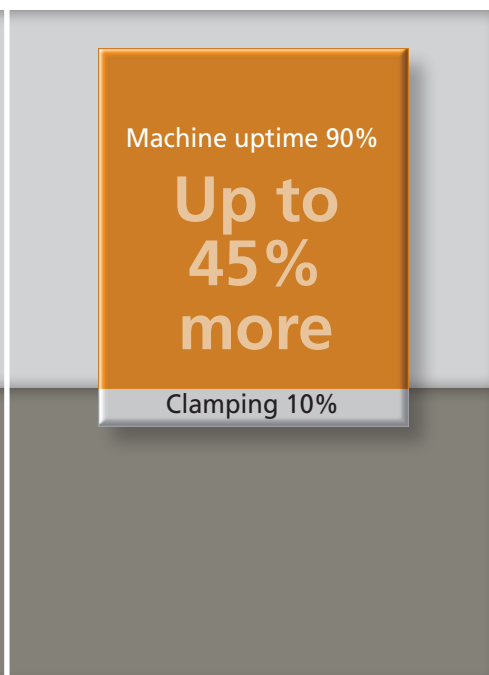# Up to 45% more efficiency of your existing machine outfit.

GENIUSGRIP

Many say: You can't change that.
This is what our routine looks like:

We say: Everything changes with Power-Grip.
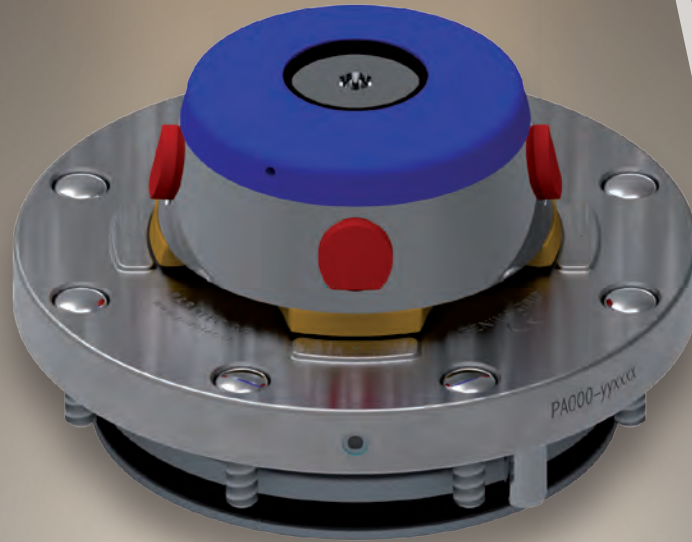*And this is what your Genius-Grip future looks like:*

Genius-Grip allows measuring and alignment outside the machine

With the right palletizing you can clamp within seconds

100%

Production time

50%

0%

Idle time

50%

Machine uptime 45%

Clamping 15%

Installation 35%

Controlling 5%

Machine uptime 90%
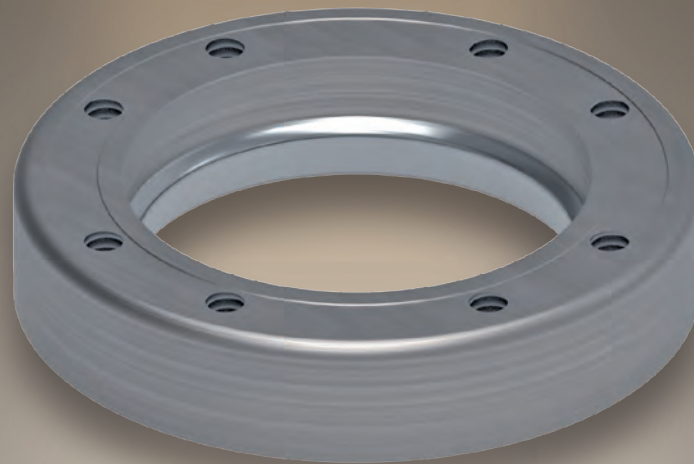
Up to 45% more

Clamping 10%

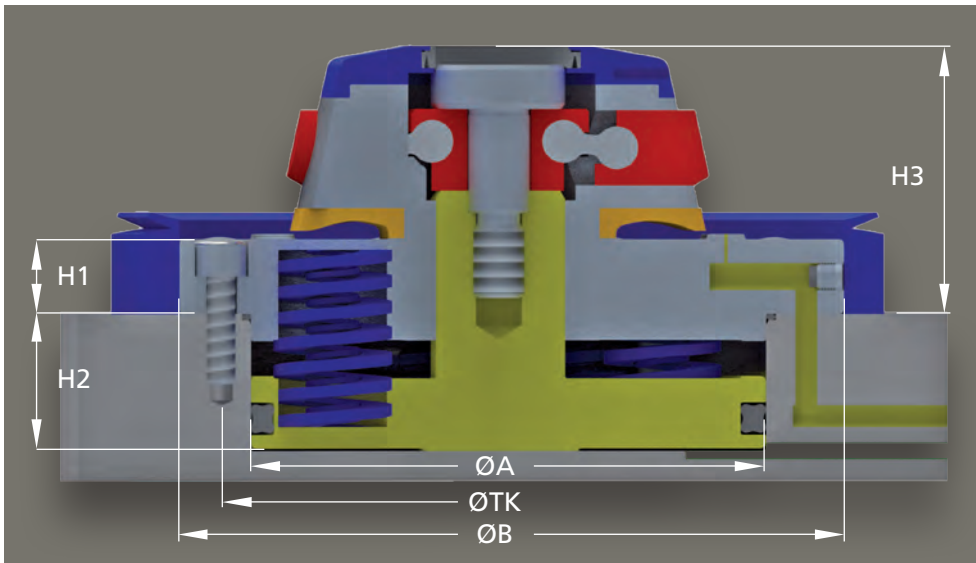# 2. Centering unit

One-of-a-kind worldwide

Centering unit with axial spring centering and face support including Z-reference cleaning.

Centering clamping sleeve

The Genius-Grip centering and clamping sleeves are hardened and corrosion resistant.

The installation dimensions of the Genius-Grip centering unit

H1		H2	H3	Ø A		Ø TK	Ø B
15	+ 0,005 - 0,000	25,5/31	50	100	+ 0,02 + 0,005	112	129

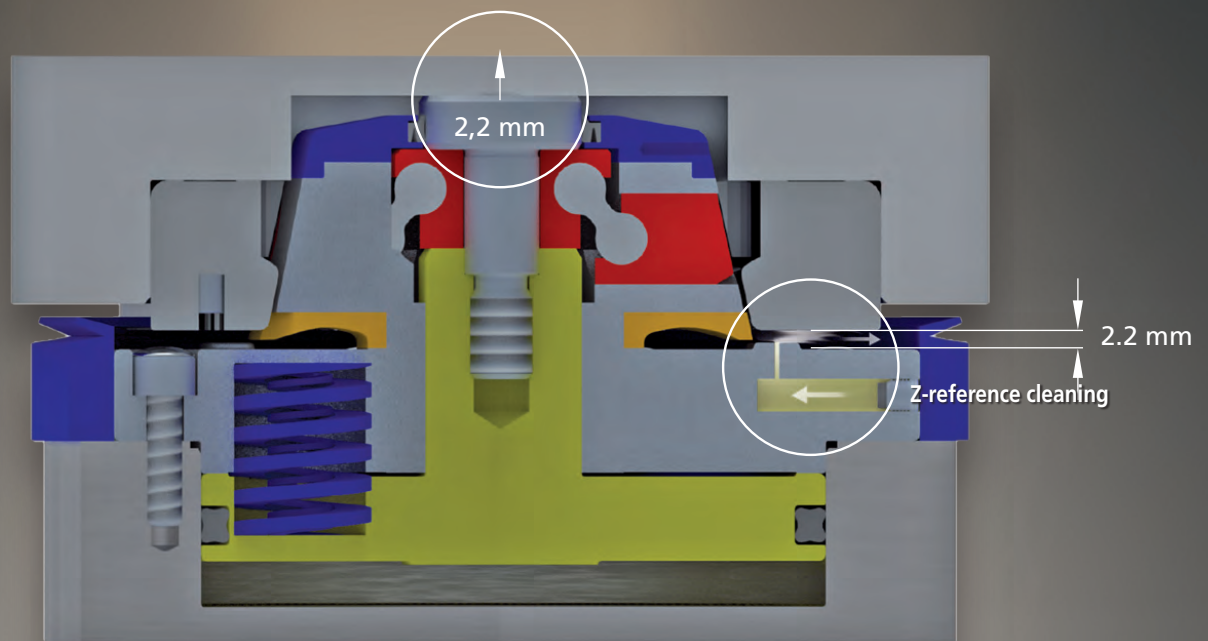# The installation dimensions of the Genius-Grip centering and clamping sleeve.
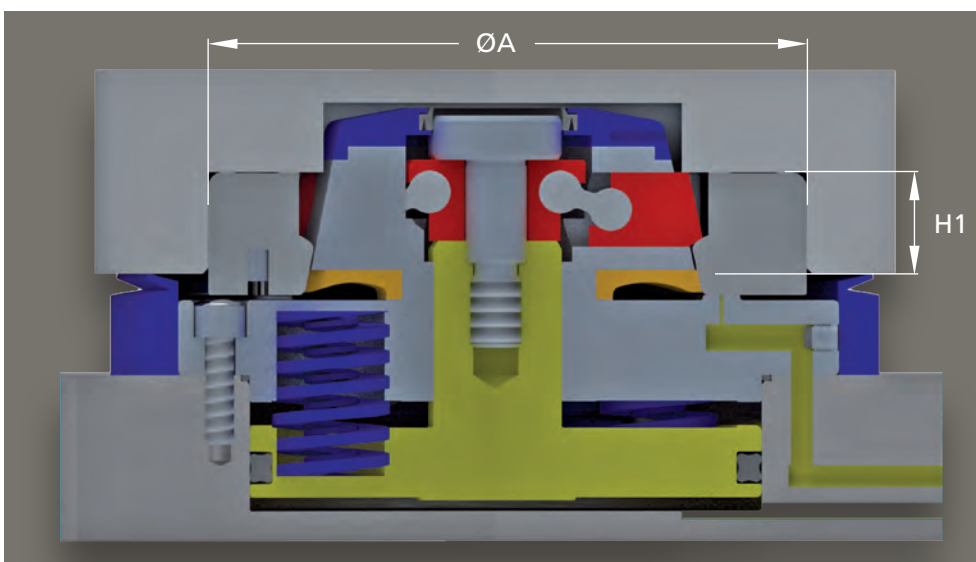
H1		Ø A	
23	+ 0,01 + 0,0	117	- 0,0 - 0,02

3. System unlocked

2,2 mm

2.2 mm

Z-reference cleaning
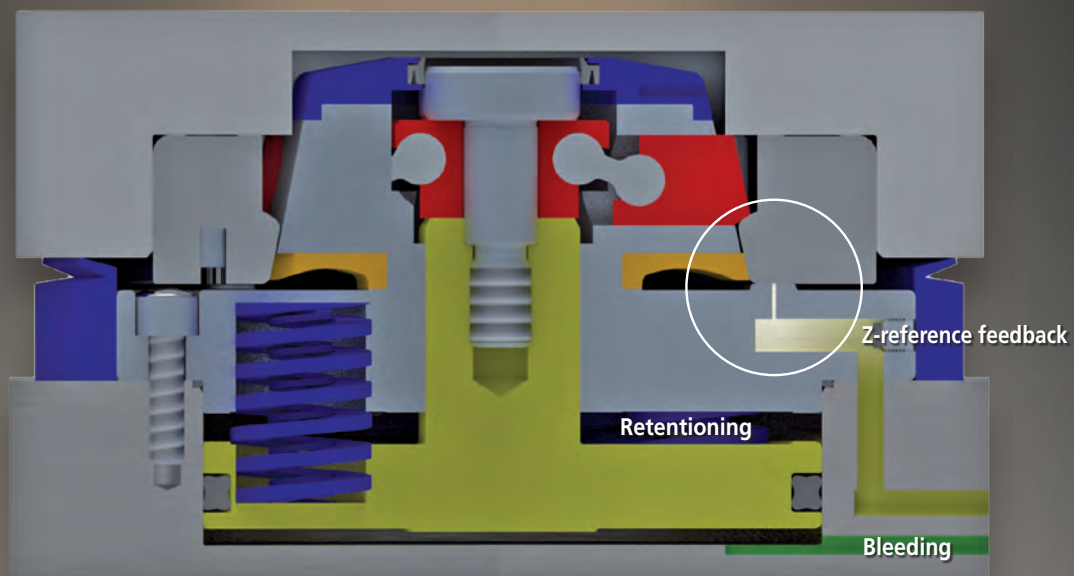
The pallet is lifted by 2.2 mm. Reference surfaces are not in contact.

The reference surfaces are free and permanently cleaned by air flow.
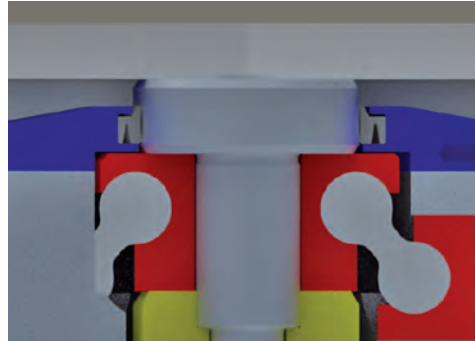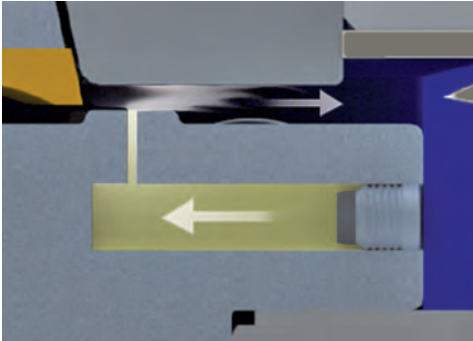
System locked

Z-reference feedback

Retentioning

Bleeding

The centering is tolerance free with axially resilent centering lips (HSK-function).

Z-reference feedback is possible by measuring dynamic pressure.

# Genius-Grip – clamping with integrated self-protection mechanism.

With Genius-Grip you choose doubly integrated safety.

1. With a large pre-centring via the external clamping bolt cage a damage to reference surfaces is excluded.

2. The lift-off function raises the pallets by 2.2 mm. Reference surfaces only come in contact during the clamping process.

Genius-Grip.
Precision always and everywhere.
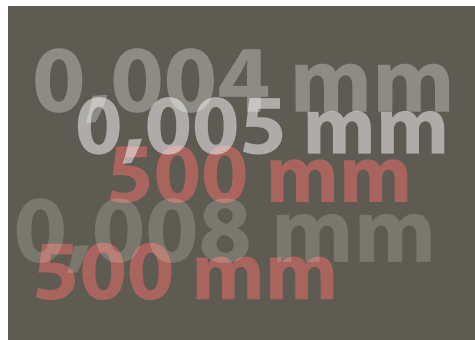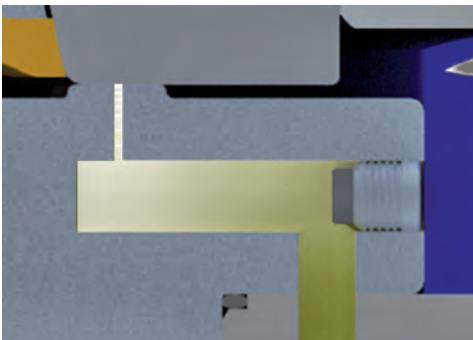
GENIUSGRIP

*Thoughtful
down to the last detail*

With Genius-Grip you choose multiple integrated safety.

Repeatability:	0,004 mm / 500 mm
System accuracy:	< 0,008 mm / 500 mm
Runout accuracy:	< 0,008 mm / Ø 500 mm
Clamping to the system centre:	0,004 mm / 500 mm

4. Loading
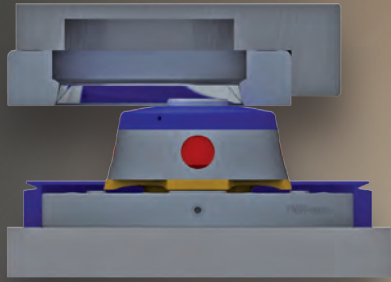
Large lateral offset?
No problem!
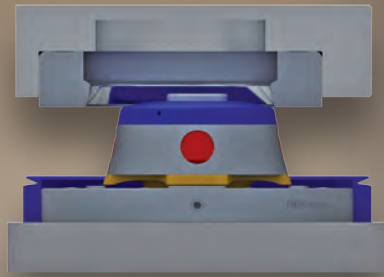
By the large pre-centring
the pallet always finds it's place!
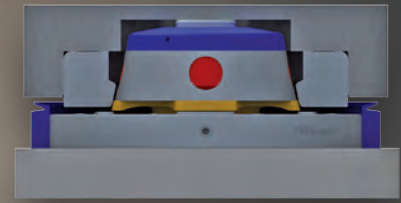
When loosened, the pallets are
lifted by 2.2 mm

Even tilted pallets find their
destination safely during
feeding.
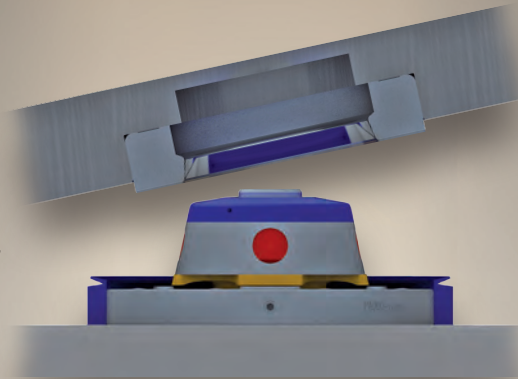
One-of-a-kind
worldwide

5. Tolerance-free centering
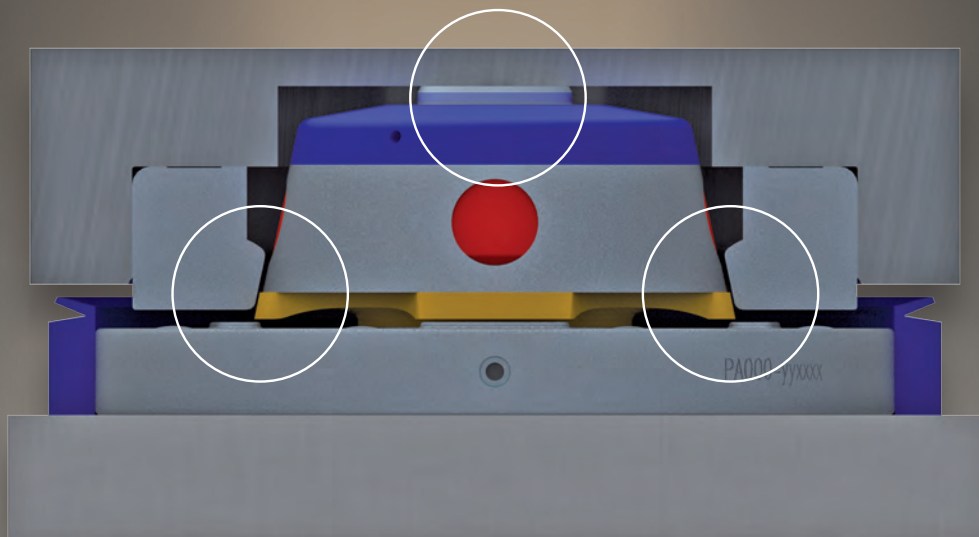
Genius-Grip.
Feeding without accident risk.

Possible backlash with conical chucking bolts
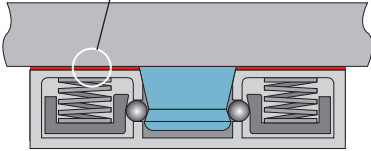
Possible backlash with conical chucking bolts
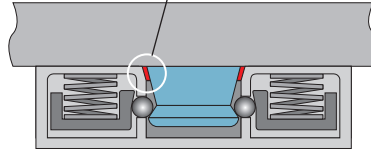
Possible backlash with cylindrical chucking bolts
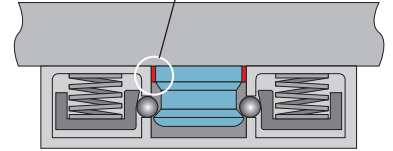
Disadvantage of classical clamping systems.

Many classical clamping systems have rigid, protruding chucking bolts (SK-principle). There is always a risk of damaging Z-reference surfaces during loading and unloading. By placing pallets on the chucking bolts they can easily loose their zero point. Compensation of thermal changes is not possible. The result: permanent zero point displacements.

Genius-Grip.
Far ahead for sure.

GENIUSGRIP

One-of-a-kind worldwide

Advantages of Genius-Grip.

1. With a large pre-centring via the clamping bolt cage, damage to whatever reference surfaces is excluded during loading and unloading.

2. Genius-Grip positions tolerance-free thanks to axially resilient centring lips (HSK-principle). The lift-off function lifts the pallets by 2.2 mm. Reference surfaces only come into contact during the clamping process.

3. Thermal changes are compensated by the Genius-Grip-System without zero point displacements.

4. There is no lost of reference when the pallets are parked or stored.

5. Even tilted or diagonally fed pallets find their destination safely with Genius-Grip.

   No one else in the world offers you these advantages.

6. Thermal expansion

Classical clamping systems

Our technique

2 x ΔL

ΔL
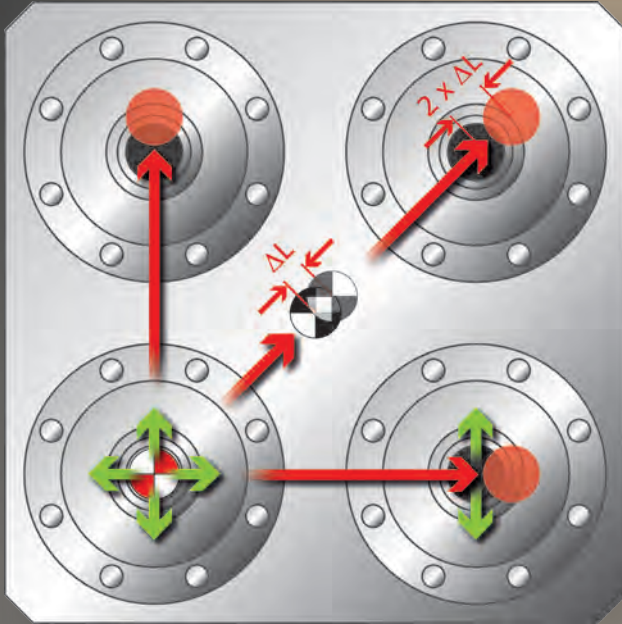
0° positioning

0° positioning

7. Process safety

Permanent Z-reference cleaning by air flow
in unlocked state

Z-reference feedback
in locked state.

Genius-Grip.
The system centre always in focus.

Disadvantages of classic clampings systems.

With classic clamping systems, the centering is floating. The zero point of the system is off-centre. The workpiece zero point therefore shifts with the slightiest thermal fluctuation. This has a very unfavourable effect on 5-axis and mill-turn operations.
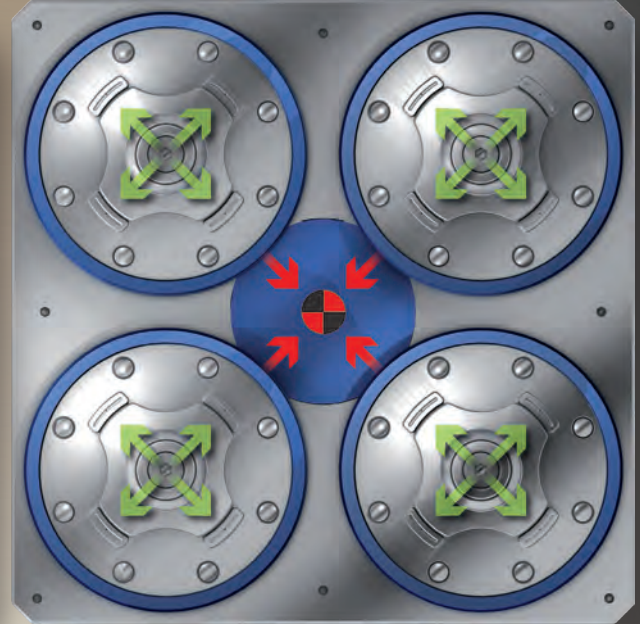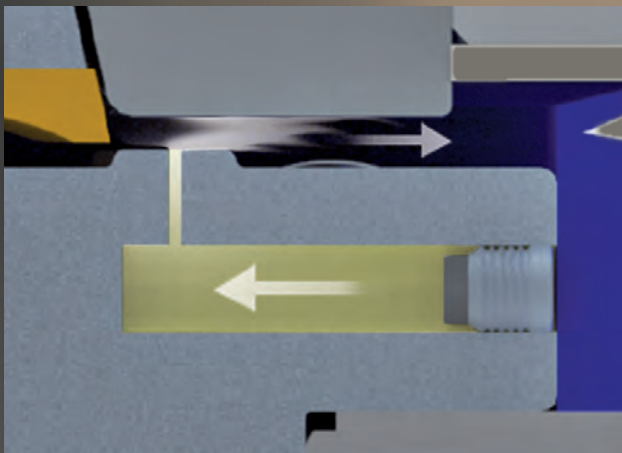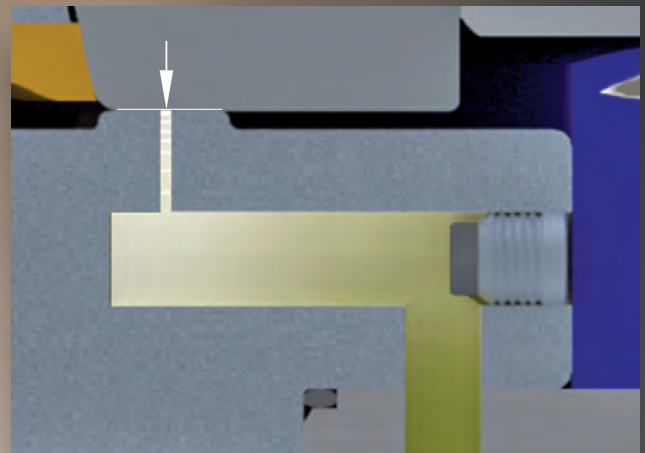

Genius-Grip.
Process reliability brought to the point.

GENIUSGRIP

Accuracy with system

Advantages of Genius-Grip.

1. Genius-Grip centers backlash-free via axially resilient centering lips (HSK-principle).

2. Genius-Grip automatically compensates for thermal warping. The zero point remains unchanged in the centre of the system.

3. The island-shaped Z-reference surfaces are automatically cleaned.

4. High process reliability during automation due to system controll via z-references.

5. No dirt-prone internal clamping mechanism.

6. Doublesided hardened and rust-free reference surfaces both in the pallet and the clamping system.

The result:
Genius-Grip delivers a very high precision, especially in 5-axis and mill-turn operations.

Repeatability:
0,004 mm / 500 mm

System accuracy:
< 0,008 mm / 500 mm

Runout accuracy:
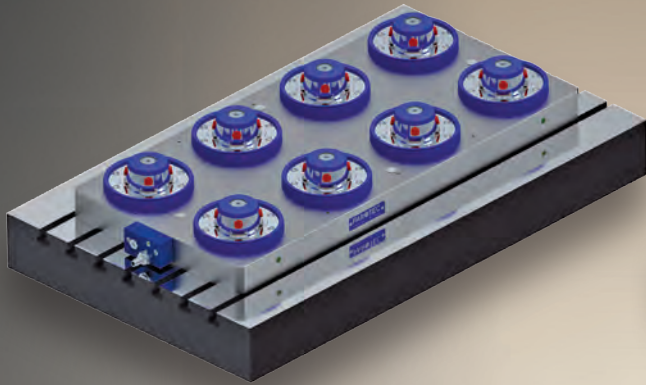*< 0,008 mm / Ø 500 mm*

Clamping to the system centre:
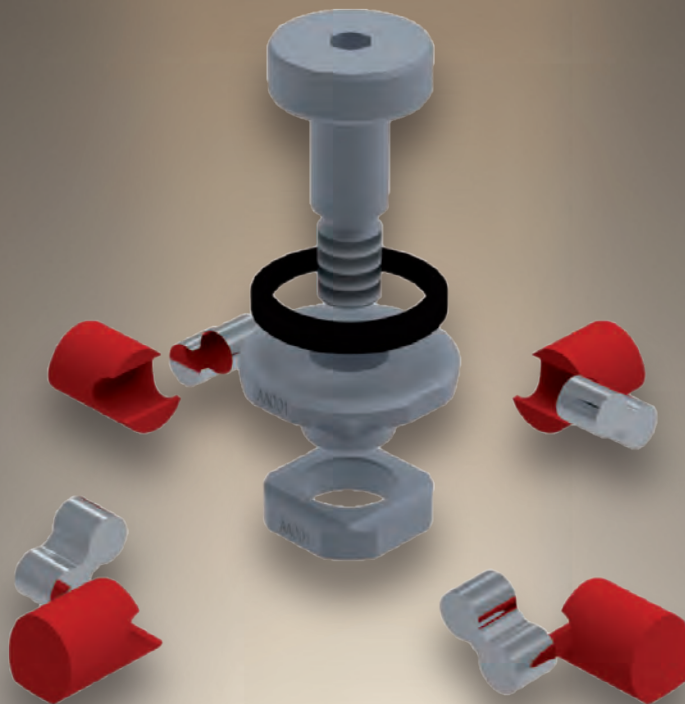*0,004 mm / 500 mm*

8. Modularity

Genius-Grip pallet carrier on machine table

Genius-Grip pallet carrier on machine table
with two pallets x4
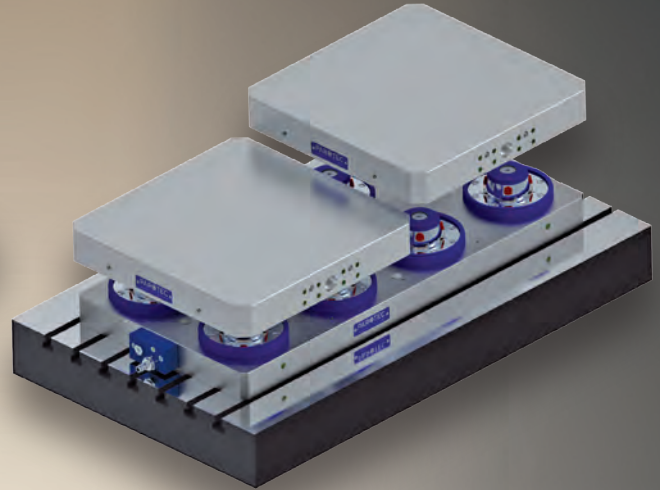
9. Maintenance

Genius-Grip.
The system with adaptability.

Example: Genius-Grip pallet x8   Example: Genius-Grip pallet x12
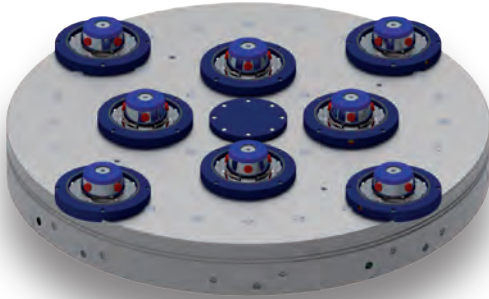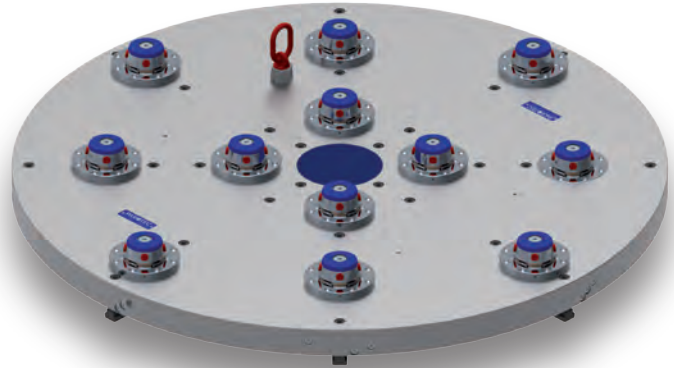
Advantages of Genius-Grip.

1. Genius-Grip clamping systems are available in differnt sizes and designs.

2. Genius-Grip pallets can be combined with each other (see illustration on the left).

3. Genius-Grip can be adapted to machine and workpiece sizes.

Unneeded centering units are covered with the chip guard to protect them from chips

Genius-Grip.
Maintenance with minimum effort.

GENIUSGRIP

Modulatity and functionality down to the last detail

Advantages of Genius-Grip.

1. Cleaning and maintenance of the clamping system is possible from the outside without loss of zero point and disassambly of the clamping system.

2. No expensive specialist personnel is requiered for cleaning and maintenance.
   The work can be carried out in the shortest possible time by the operator of the machine.

3. Genius-Grip is completely rust-resistant – thus no corrosion and minimum wear.

4. Machine downtime due to contamination or wear is almost impossible.

10. Consistency

Milling

Grinding

Turn-milling

Measuring

Genius-Grip.
In the service of your production.

Disadvantages of classic clamping systems.

1. Various and often incompatible systems for different manufacturing and machining processes.

2. Partly fixed system sizes.

Genius-Grip.
Consistancy that one wishes for.

GENIUSGRIP

Workpiece and production
optimally under control

Advantages of Genius-Grip.

1. Various system sizes and stisch dimensions offer maximum modularity.

2. Genius-Grip adepts easily to workpiece sizes and to existing and new machines.

3. Optimum consitency through a single always compatible system for all manufacturing and machining processes such as:

   • 3- or 5-axis milling
   • Measuring
   • Grinding
   • Milling- turning machining

Tensioning force and stability
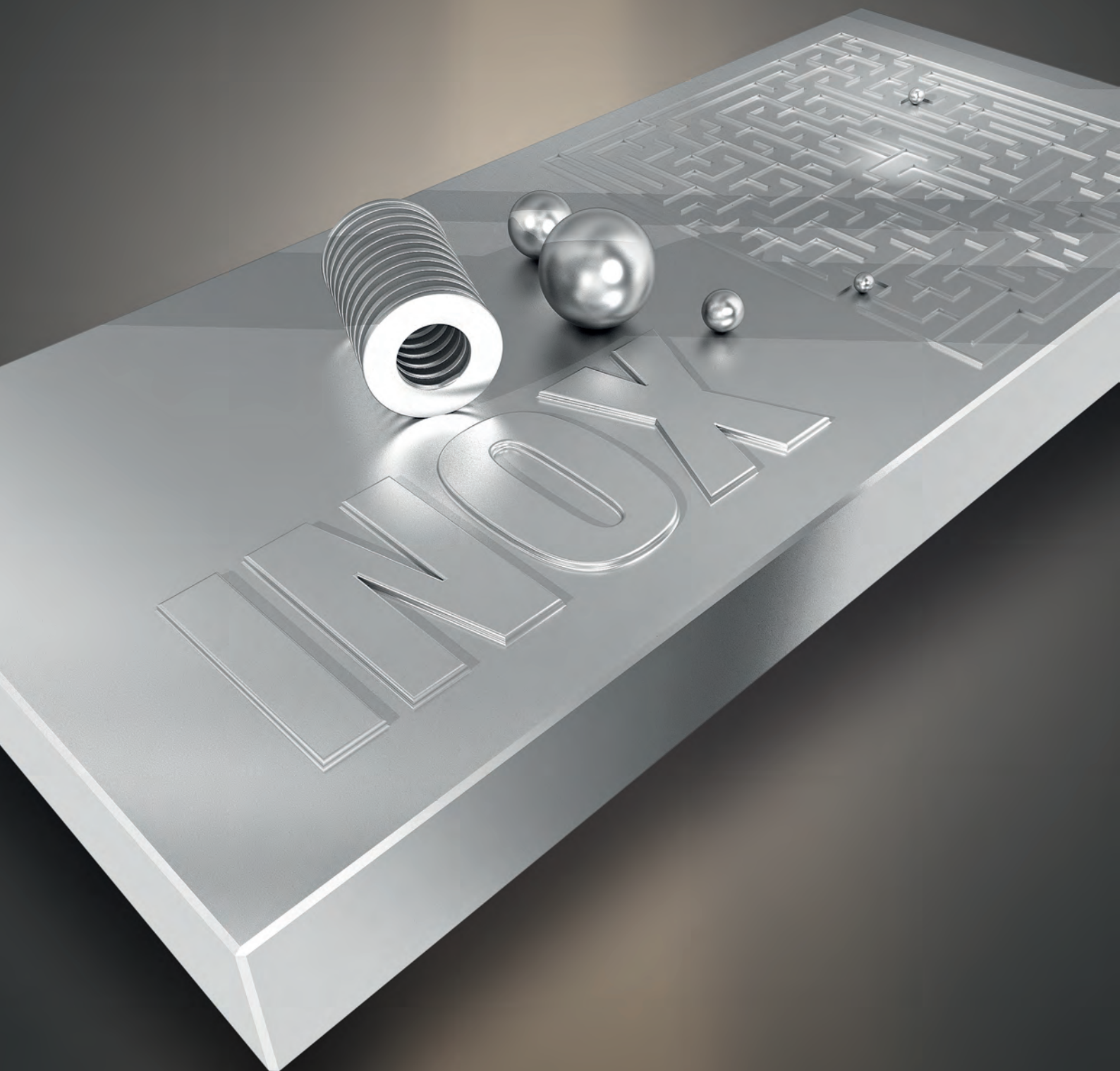
Genius-Grip.
Numbers speak for themselves.

Genius-Grip	Release pressure	Retraction force	Tesioning force
Centering unit hydraulic	60 – 5 / +15 bar	30.000 N	80.000 N

Hydraulic volume piston	CU (pallet) unlocked	CU (with pallet) clamped	CU (without pallet) clamped
	0.283 l	from 0.101 l to 0.079 l	0.016 l

1. Mechanical tensioning by spring assembly with self-locking toggle-lock

2. Optimum retraction force for very high holding force

3. Highest stability and accuracy by tolerance-free centering (HSK-principle)

4. No vibrations and resonances

GENIUSGRIP

*A system that delivers
what it promises*

Yield point screw 8.8	Cheese head screw M8 (8.8)	Max. yield point per centrering unit
$Re = 8 \times 8 \times 10$ N/mm^2 = 640 N/mm^2	Core diameter thread 6.466 mm	Re x F x A
Tensile strength of screw 8.8	F = Cross sectional area (PL x r^2) 32.837 mm^2	640 N/mm^2 x 32.837 N/mm^2 x 8 = <u>168'125 N</u>
Rm = 8 x 100 N/mm^2 = 800 N/mm^2	A = Number of cheese head screws M8 = x8	

Pressure force cylinder	
P Hydraulic pressure	60 bar = 600 N/cm^2
Piston	10 cm
F_K Piston surface (Pl x r^2)	78.54 cm^2
Piston force (P x F_K)	<u>47'124 N</u>

*The result shows a
more than 3-fold
safety factor*

GENIUSGRIP
CLAMPING SYSTEMATICALLY

Please also note the full range of our clamping systems:

GENIUSGRIP
CLAMPING SYSTEMATICALLY

The zero point clamping system for large-scale machining centres for milling and turning section

POWERGRIP
PALLETIZING SYSTEMATICALLY

The consistent zero point palletizing system for all processing operations

MICROGRIP
PRODUCING SYSTEMATICALLY

The modular mini zero point palletizing system for work pieces and gripper technology

SMARTGRIP
WIRE ERODING - SYSTEMATICALLY

The modular zero point palletizing system for wire EDM-ing

POLYGRIP
COMBINING SYSTEMATICALLY

The combined electrode palletizing system

DEFOGRIP
PRODUCING SYSTEMATICALLY

The workpiece clamping system

ROTOGRIP
PRODUCING SYSTEMATICALLY

The palletizing system for rotative machining

Headquarters • worldwide distribution

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spanntechnik · robotik · engineering

Distribution Germany and Benelux

PARTOOL
Palettieren · Automatisieren · Rationalisieren

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