

Welcome to Allmatic training

Clamping technologie with high pressure vice

Dipl. Ing. (FH) Uwe Lorenz

Employees: approx. 450

Location: Allmatic approx. 63



automatic tooling systems



safety couplings

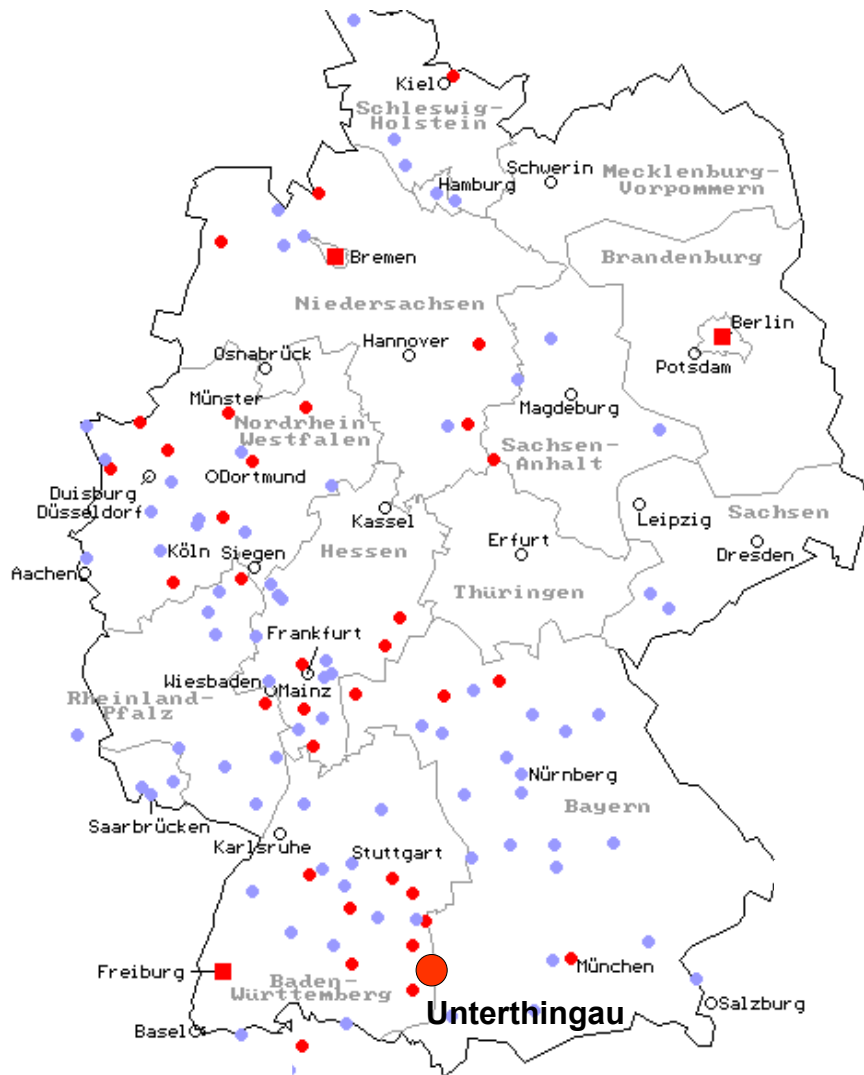


servo couplings



HSK- power drawbars + accessories

Allmatic location



milling division



grinding division



assembly



history

1973:

the first Allmatic – vice left our factory.
With a high pressure spindle and a
pure mechanical power intensifier.



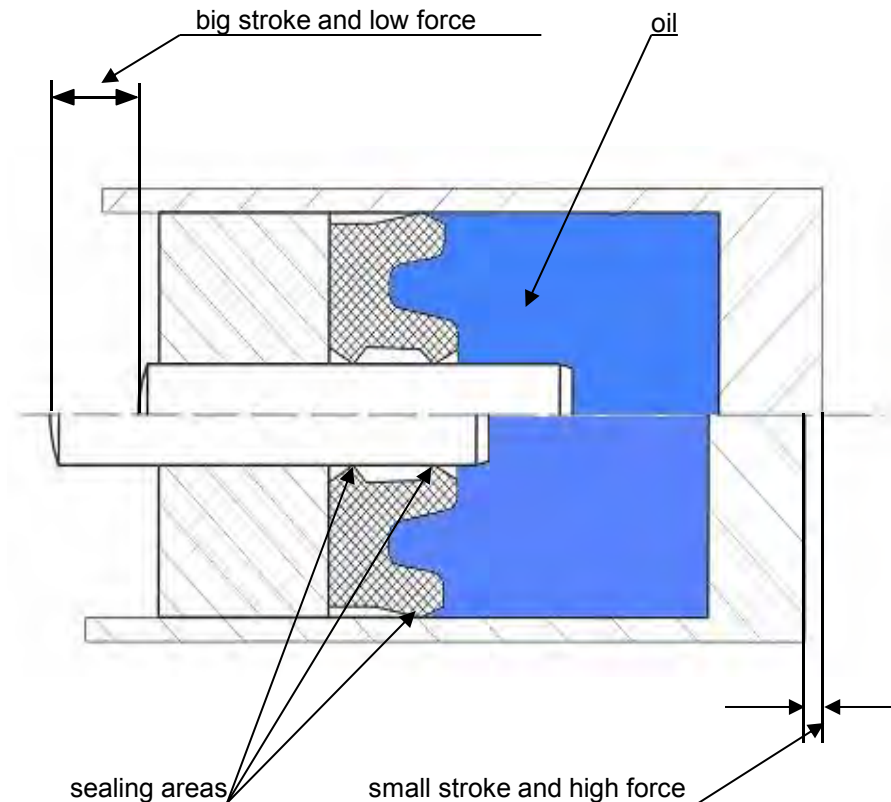
Nearly all Allmatic–vices – till this day –
have a spindle with a built-in mechanical
power intensifier.

Power intensifier – the heart of the spindle

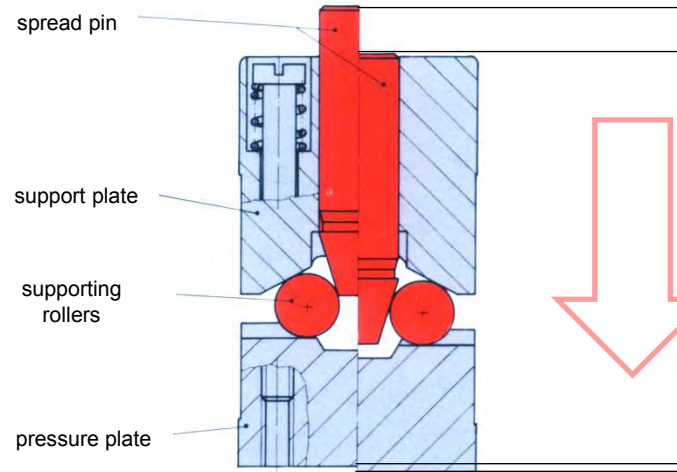
hydraulic version – built in from many manufacturers

The available space in the high pressure spindle is limited.

In order to get sufficient clamping force a very high internal pressure is necessary (500 – 600 bar). The reliability of the spindle depends from the (limited) lifespan of the sealings.



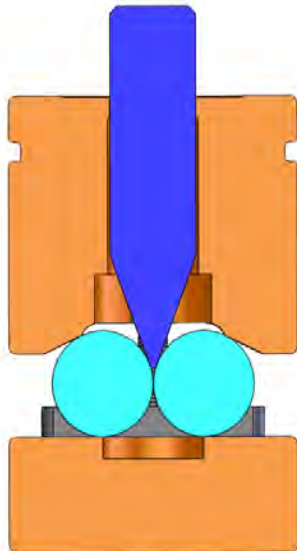
mechanical power intensifier



big stroke and low
force

ratio of power

small stroke and big
force
=
power stroke

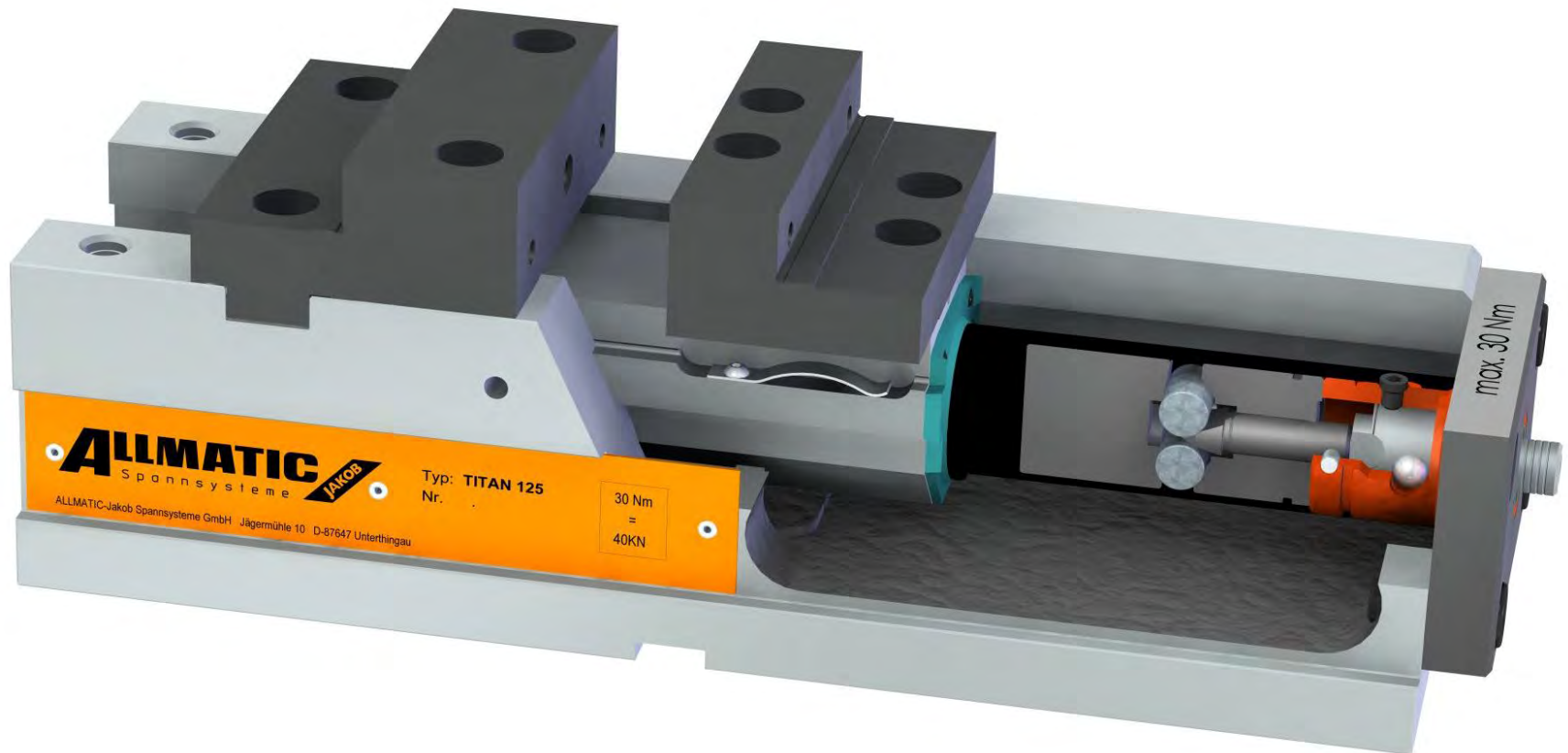


mechanical power intensifier



- pure mechanical system
- power stroke up to 4,3 mm
- maintenance free

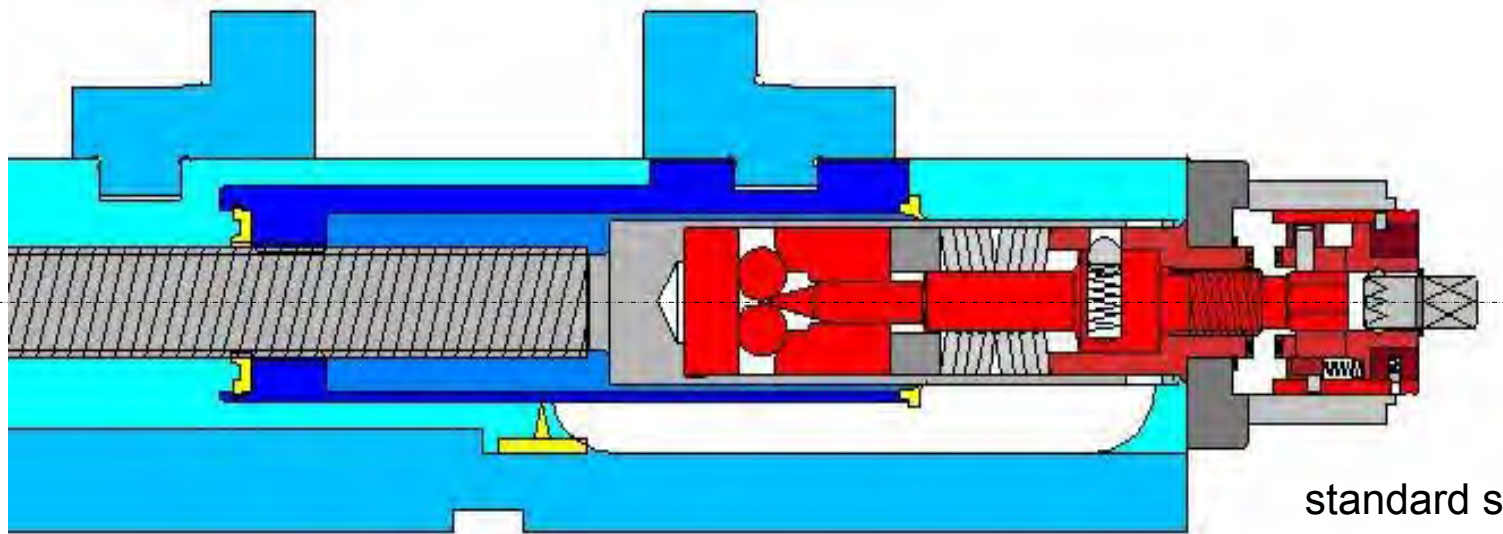
Function: mechanical high pressure spindle



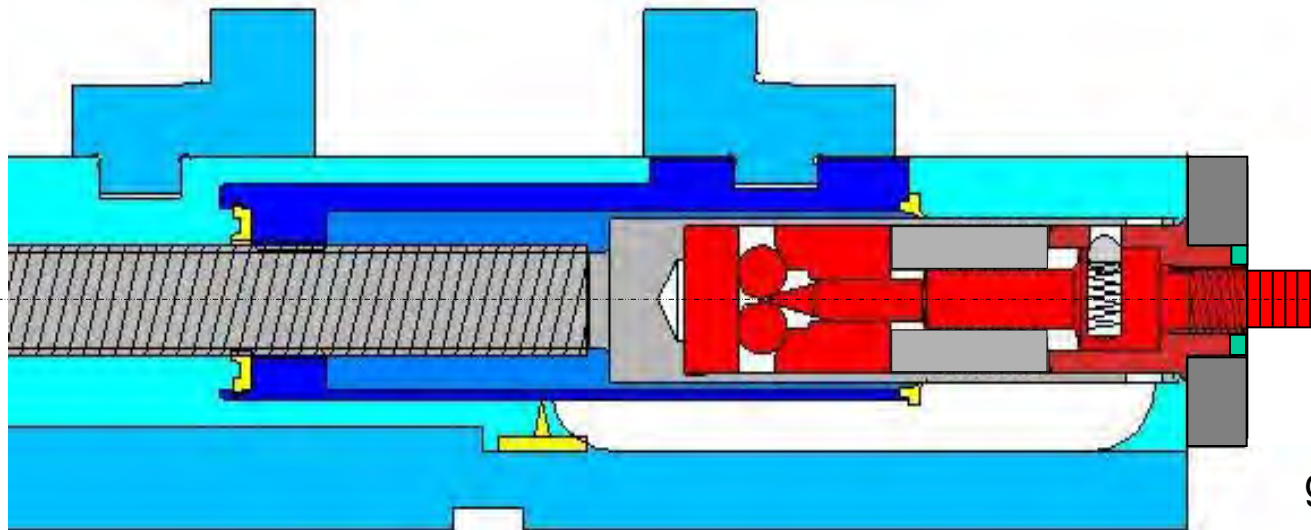
Function: mechanical high pressure spindle



mechanical high pressure spindle

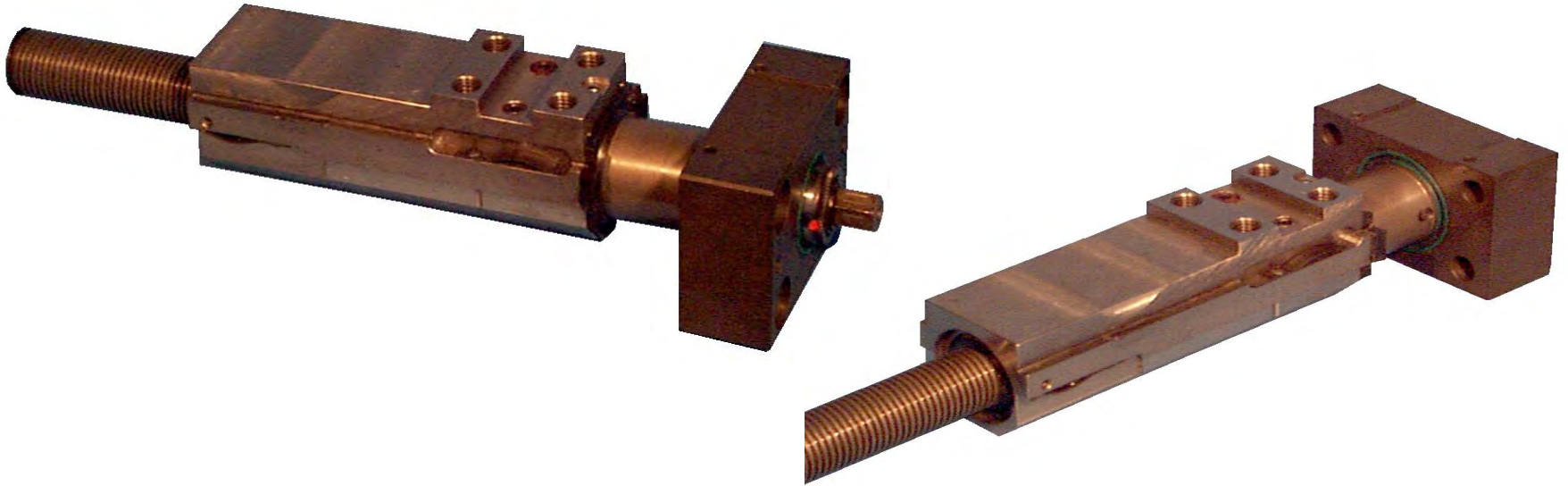


standard spindle



grip spindle

ALLMATIC - spindle protection



sealings all around the spindle guarantee
troublefree use of the vice



pressure setting

1: conventional spindle: operation with handle. Pulling and rotating the adjusting sleeve or rotating the adjusting ring with an allen key. Controlled clamping is guaranteed by an integrated dead stop.

Max. clamping pressure	kN	pressure setting
type		
NC 70	20	11
LC/TC 90	28	11
LC/TC 125	40	4
LC/TC 160	60	4
LC 200	60	4
TC 200	80	4
NC DUO 90	28	6
HD 100	30	2
HD 125	40	4
HD 160	60	4



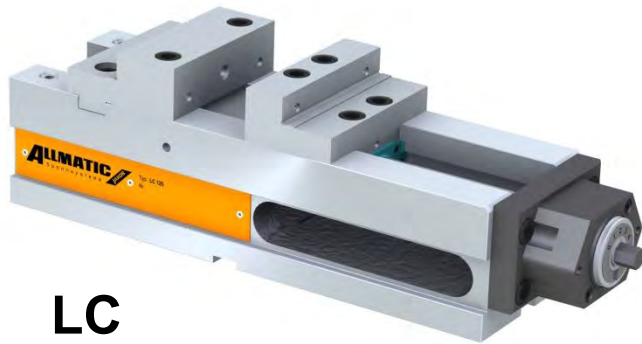
2 : high pressure spindle with grip technologie : No pressure setting. Clamping pressure can be adjusted continuously with the torque wrench.

Allmatic range

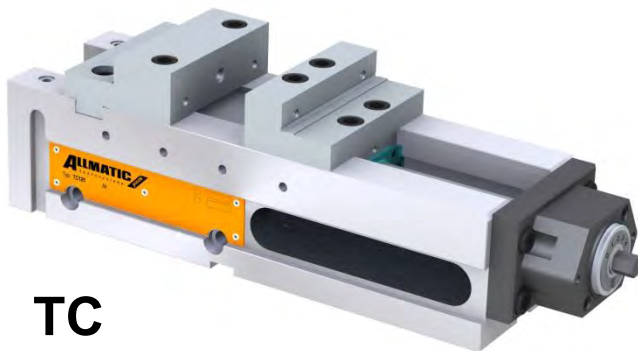
grip vice DUO-Plus



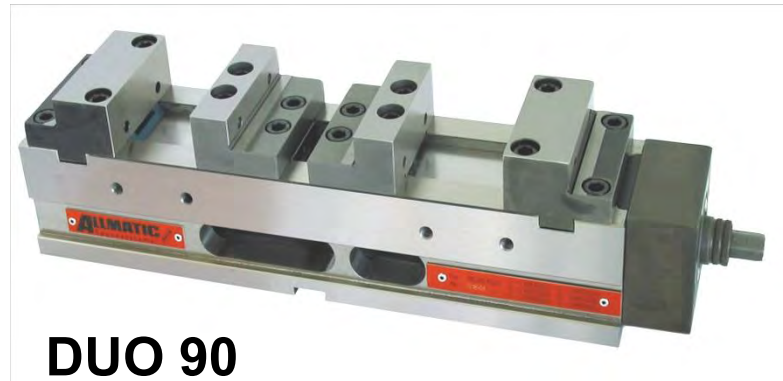
ALLMATIC NC conventional high pressure spindle



LC

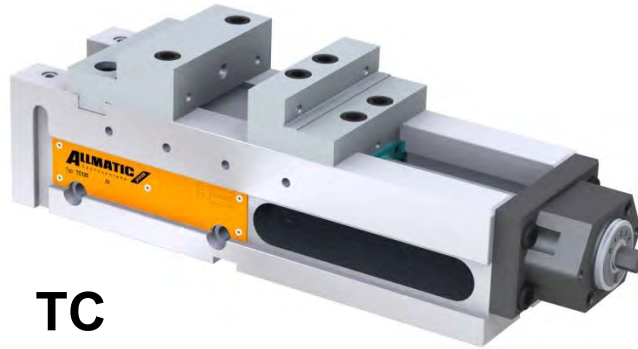


TC



DUO 90

ALLMATIC LC/TC application



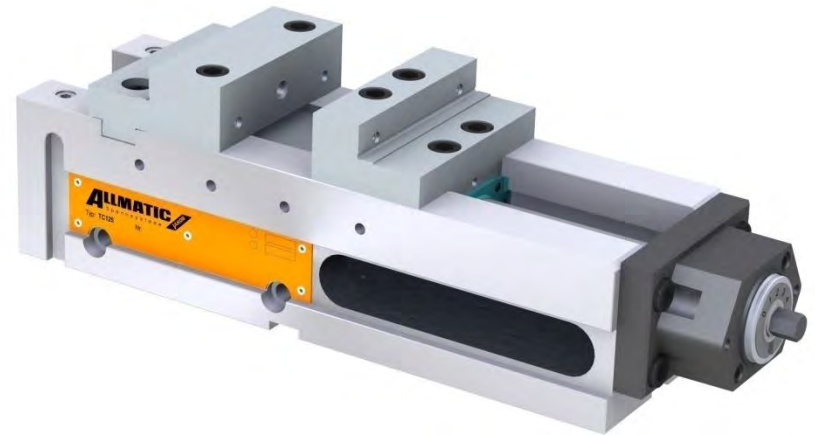
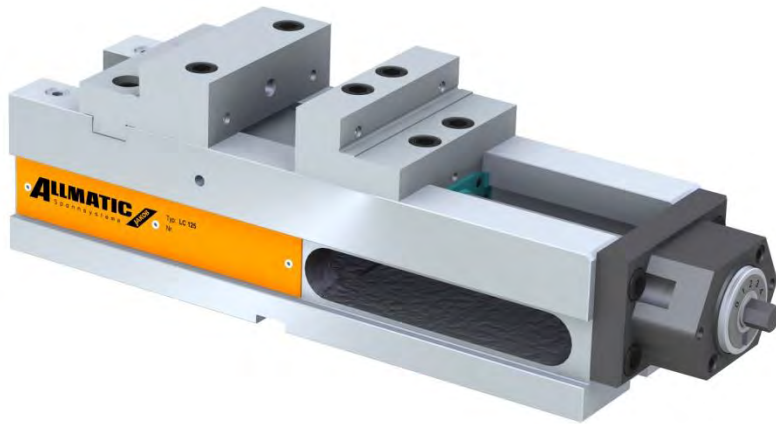
TC



LC

FFS	BAZ - H	Universal- WZM	BAZ - V	conventional milling machine
NC Single TC				
		NC Single LC + (TITAN 2)		

ALLMATIC LC/TC differences



base:

- both sides fine milled (right angle 0,1)

face:

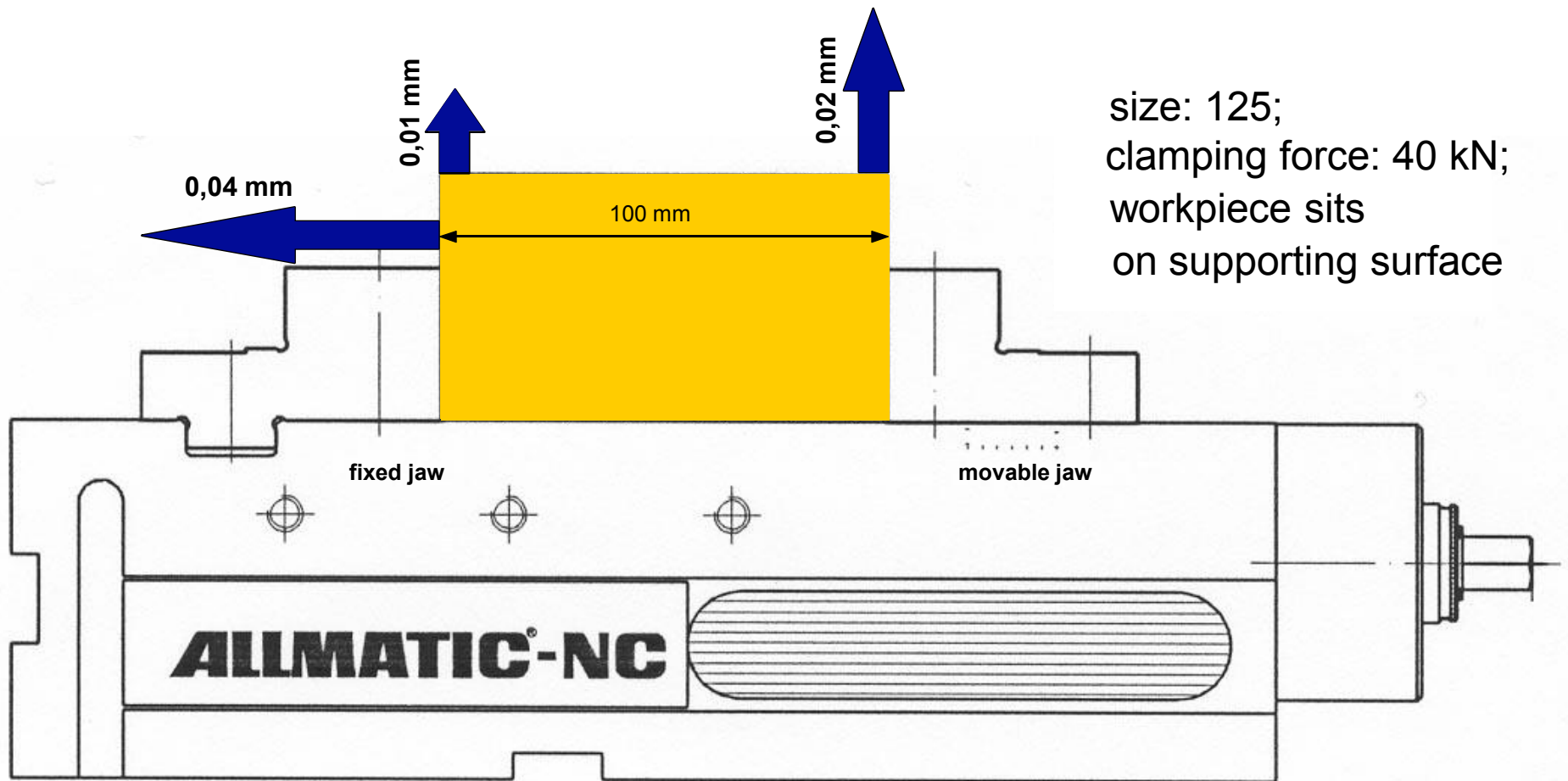
- front side fine milled without threads

**threads for
workpiece stop :**

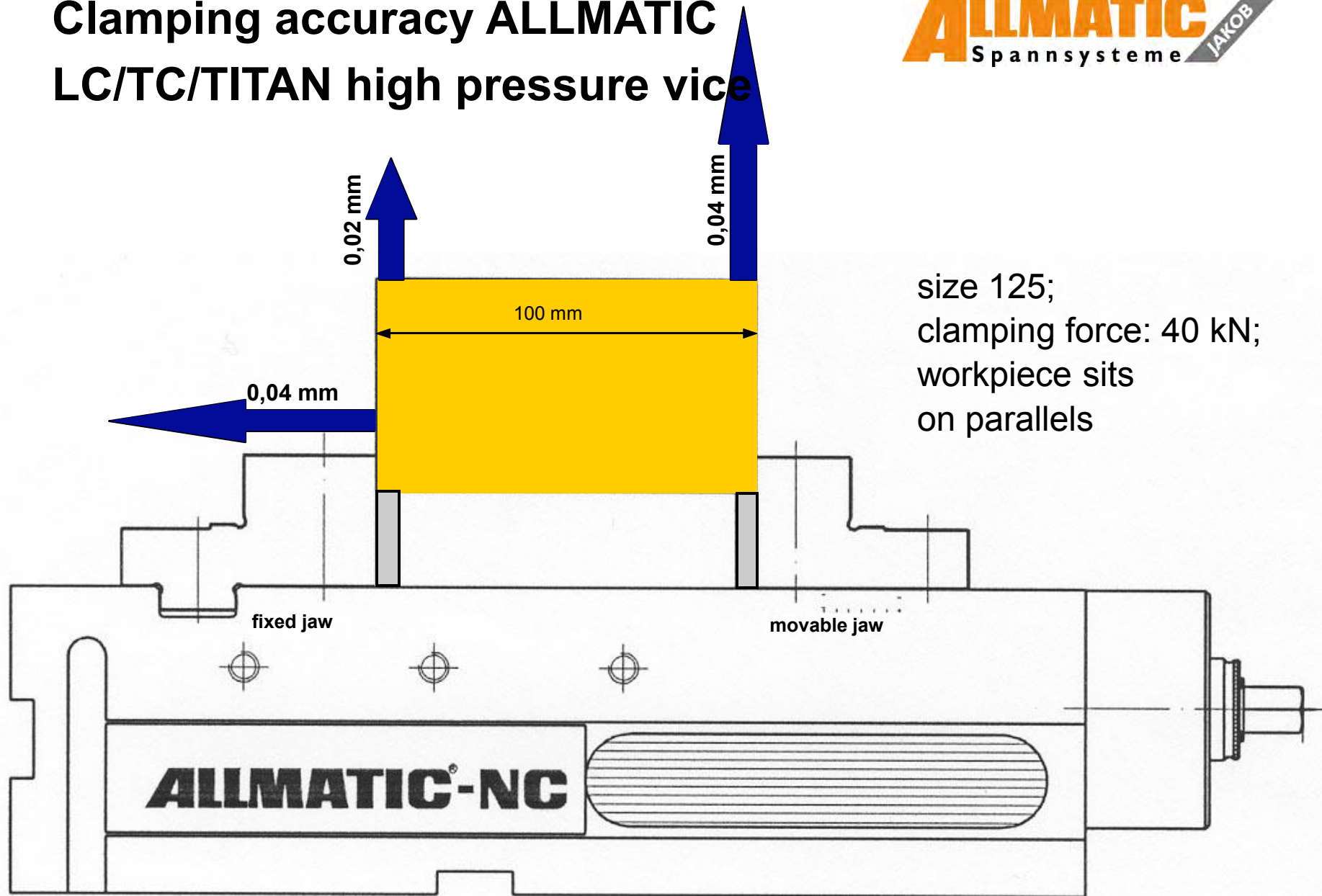
- both sides 1 thread for workpiece stop

- fine milled on all faces (right angle 0,02)
- usable in each position
- 2 holes sideways to fit the vice on both sides to the machine table (size 90 + 125)
- fine milled with 2 locating holes and fitting threads
- both sides 3 threads (width 90), 4 (width 125 and 160)

Clamping accuracy ALLMATIC LC/TC/TITAN high pressure vice

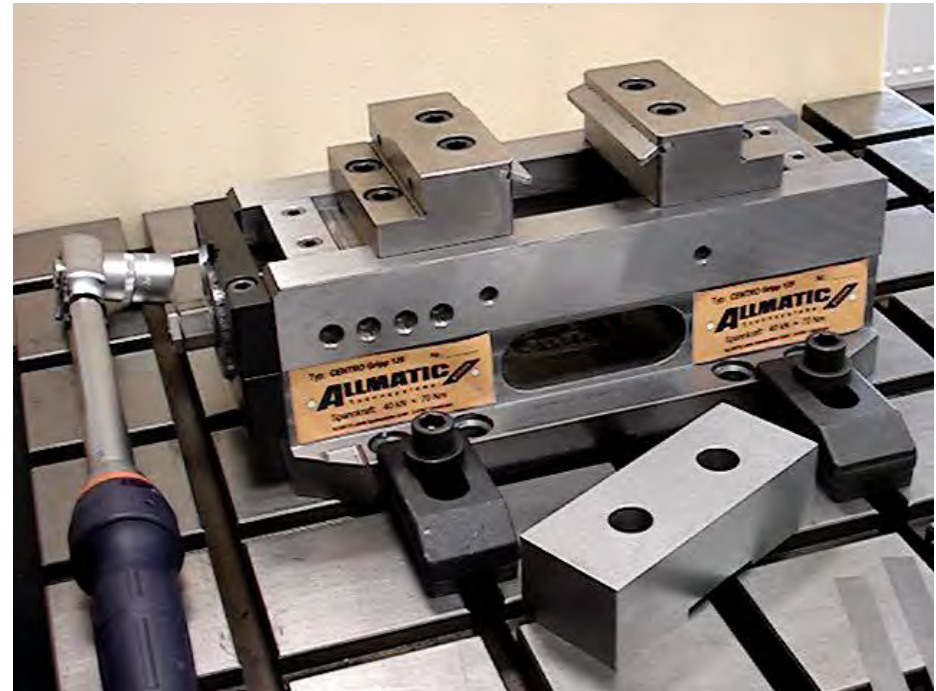


Clamping accuracy ALLMATIC LC/TC/TITAN high pressure vice



Pull down jaws

Pull- down jaws are used in order to pull down the workpiece to the supporting surface. The top side of the component is then absolute parallel to the machine table or the vice support surface. Hardened and precise ground spring leaves serve the purpose. No damage is seen at the workpiece (material: steel). Spring leaves are exchangeable with 1 – click.



Universal vice with grip technologie



Grip technologie is used more and more in addition to the conventional technologie. The application spectrum of high pressure vices is clearly extended.

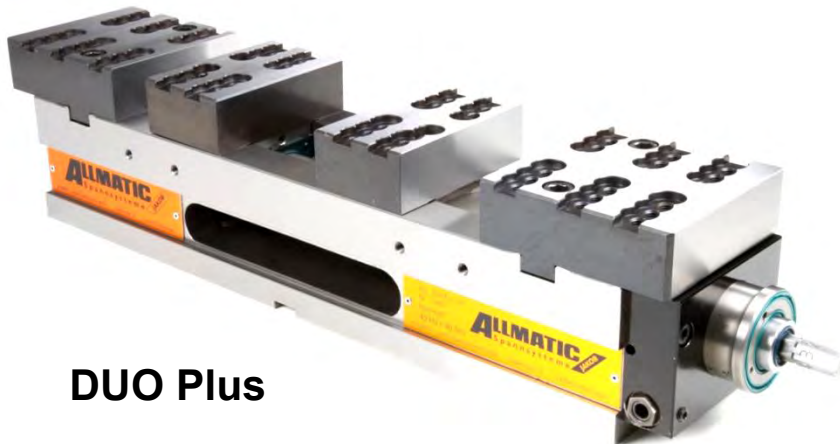
summary technologie grip



Titan 2 K,M,L



T-Rex



DUO Plus



CENTRO

High pressure vices for 5 – axis machine tools



T – Rex + CENTRO-Gripp customer demand

- **5 – sided machining on modern 5 – axis machine tools**
- **safe and quick clamping of different materials and surfaces: e.g. steel, cast-iron, aluminium with sawn and not parallel surfaces**
- **optimal accessibility to the workpiece with the tools and as little as possible restriction concerning the clamping device**
- **best utilisation of the available workspace = a lot of space for the workpiece**

T - Rex



Solid high pressure vice with fixed jaw and movable pivot jaw (no centric function)



T - Rex



Function:

Clamping of raw parts, thermal cut parts and sawn off material is possible in only one step by embedding of hardened and exchangeable gripper studs into the surface of the workpiece.



Allmatic achieve this with a special high pressure spindle with mechanical power intensifier. The spindle is operated with a torque wrench (max. 2 turns or 30 Nm torque).

Competitor system: Lang stamping system



1. Pre- stamping of workpiece with external hydraulic pressure.
2. Clamping of workpiece using the pre- stamped marks.

Pictures from Lang system are removed
copyright reason

Grip jaws for T- Rex

- **fixed version**



- **movable version**

with incorporated pivot function

necessary to compensate parallel faults (rough material or flame cut material)



- **fixed version**



- **movable version**

with incorporated pivot function

necessary to compensate parallel faults (rough material or flame cut material)



Grip inserts

- **grip insert for universal set**



- **grip insert with 2 teeth**

grip height 3,0 – 4,5 mm or

grip height 4,5 – 6,0 mm



- **grip insert round with teeth**

support height of workpiece 6,0 mm



Grip insert

- **grip insert with 4 teeth**

special for soft material e.g.
aluminum

grip height 4,5 – 6,0 mm



- **grip insert with carbide insert**

for clamping of high- strength material



- **grip insert smooth**

for clamping of premilled components
(no visible marks)



Universalset „Gripp“

Multi-part complete system

consisting of:

- grip insert
- gripper stud mounting
- support elements
- washers and screws

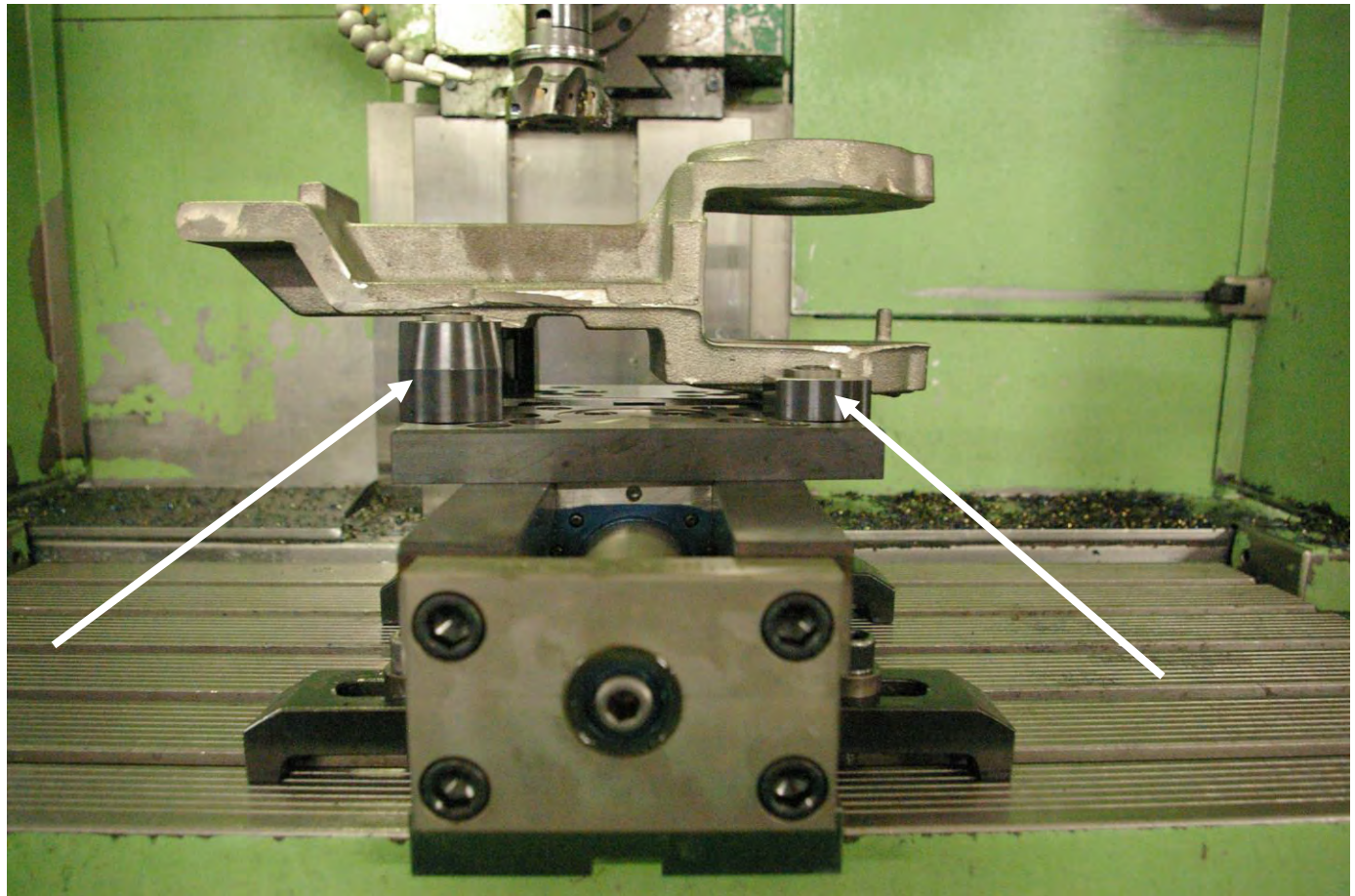


delivery:

complete in a stable plastic box



example of use



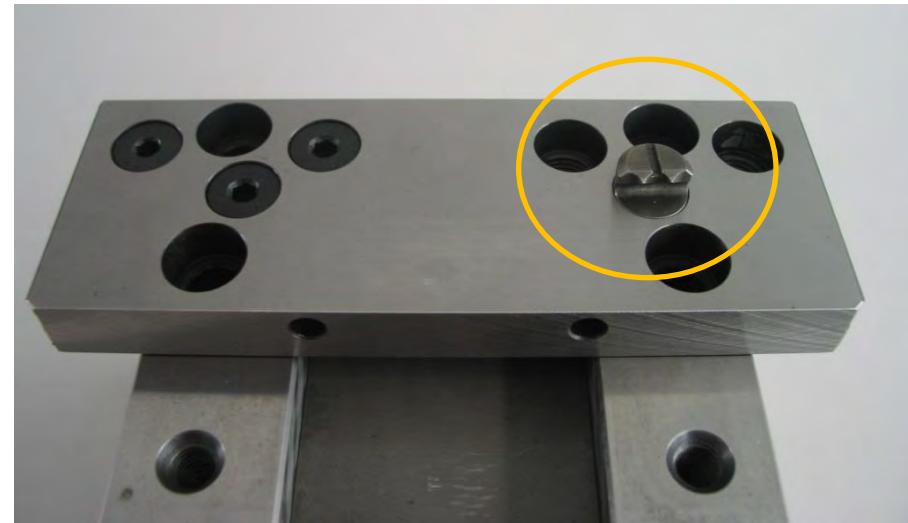
T - Rex

The studs are screwed.

Therefore the jaws can be adapted very quick to different workpiece dimensions.

The wear of the studs is minimal.

Material: hardened tool-steel



Grip technologie

Visible marks guarantee safe clamping



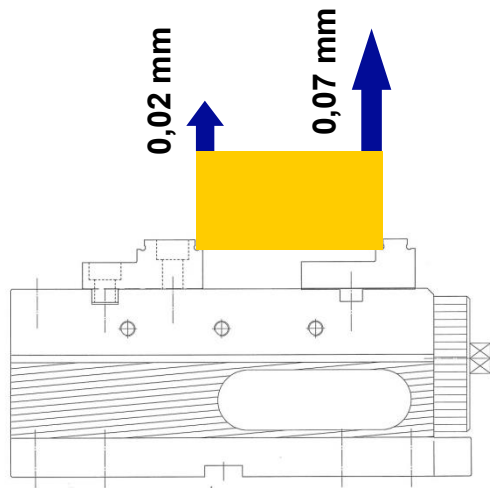
Grip technologie

usable for material:

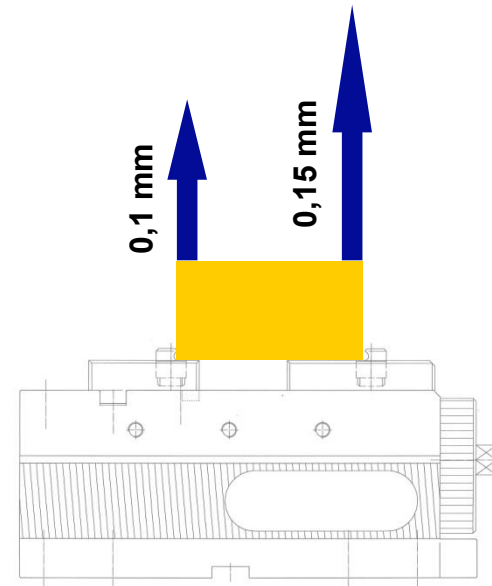
- till strength of material
approx. 1000 N/mm²
- till hardness of material
approx. 35 HRC



clamping accuracy ALLMATIC T- Rex high pressure vice



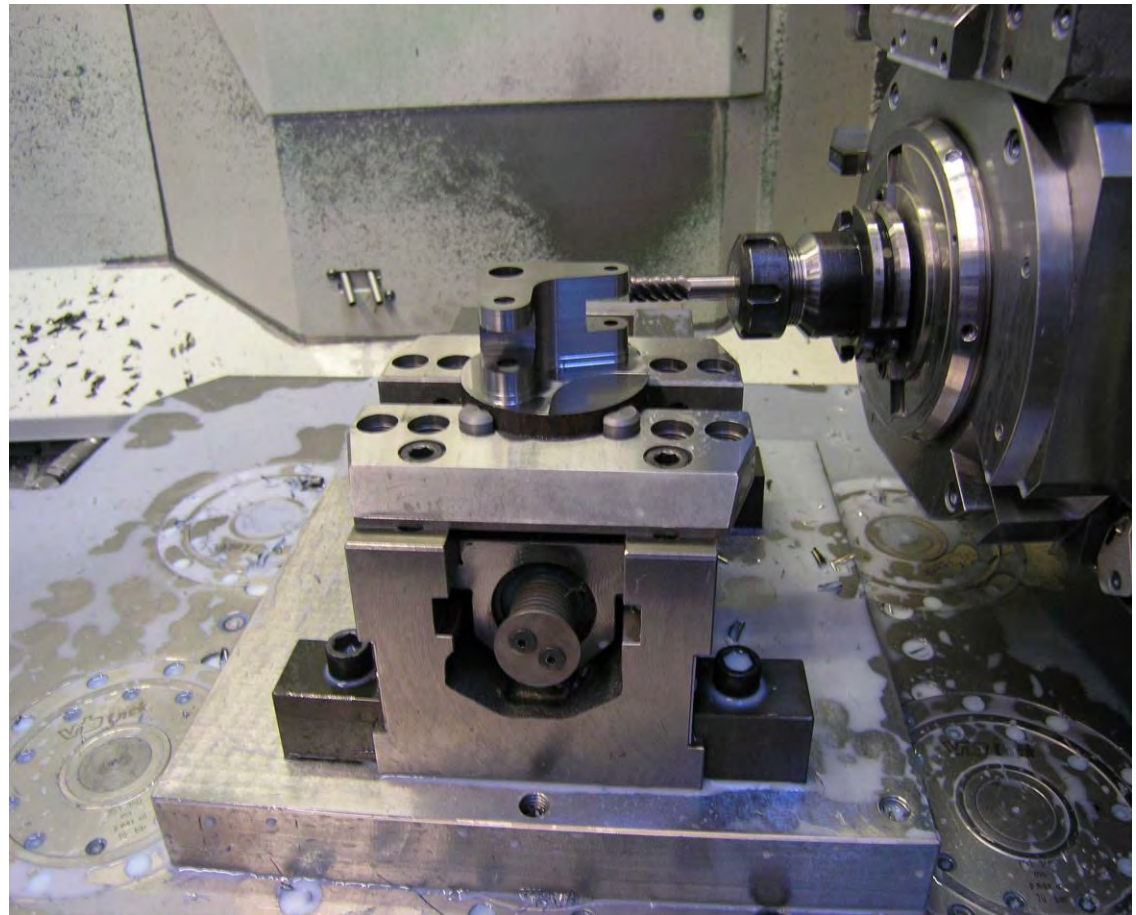
clamping force: 40 kN



clamping force: 40 kN

T - Rex

application:



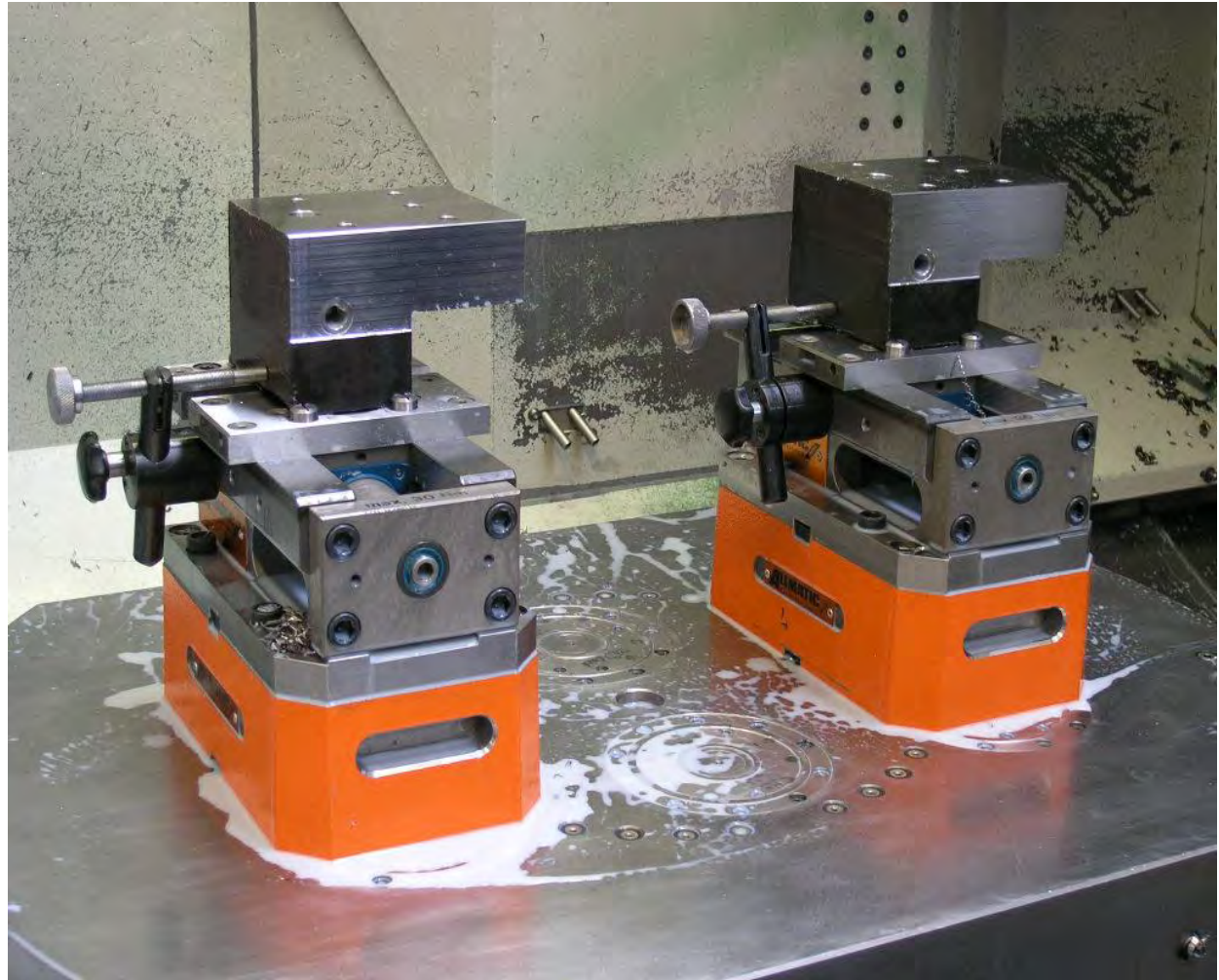
T - Rex

application:



T - Rex

application:



T - Rex

application:



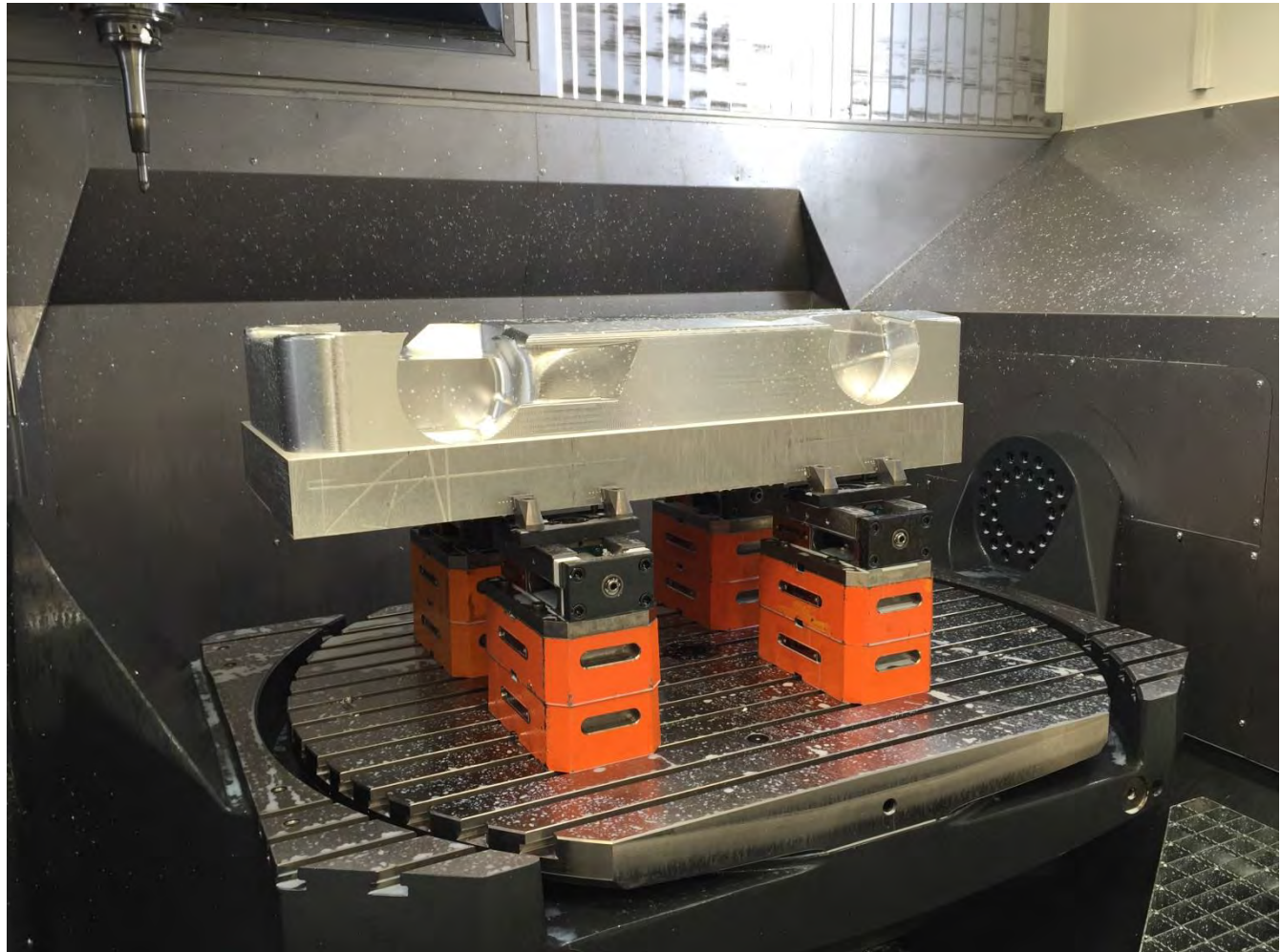
T - Rex

application:



T - Rex

application:

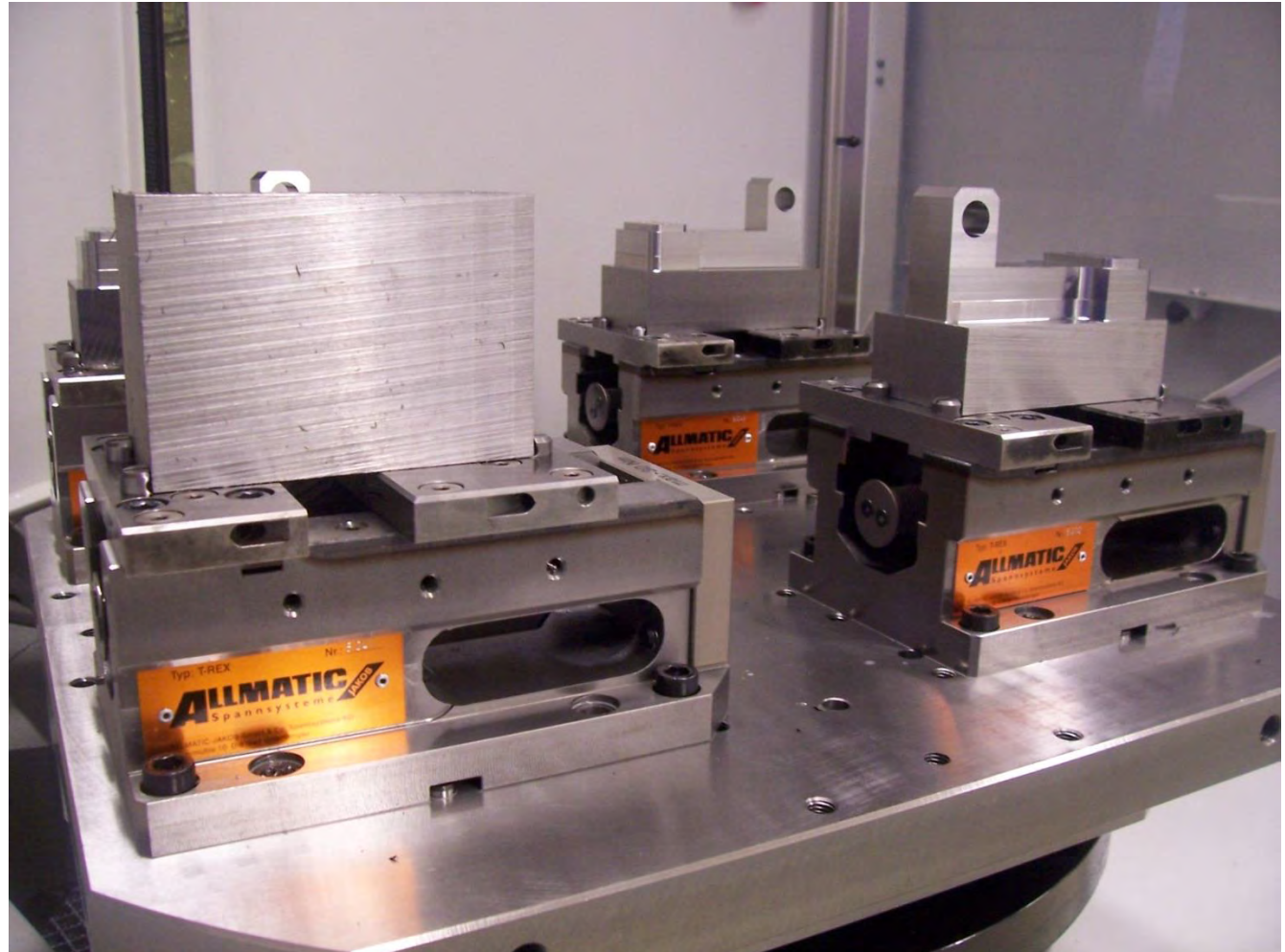


T - Rex

application



application



application



CENTRO – grip vice

Compact high pressure vice with 2 movable jaws and spindle nuts = centric function



CENTRO- grip



basic:

The CENTRO- grip is a vice in the product range 'universal compact vice' and related to the T- Rex vice.

All jaws (movable version) and all accessories incl. grip inserts are the same and usable for both products.

Additional functions of the vice are very interested for many users.

CENTRO - grip



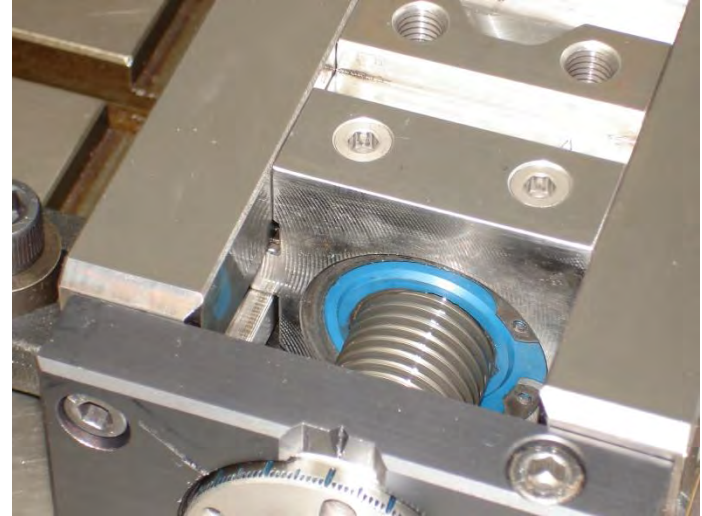
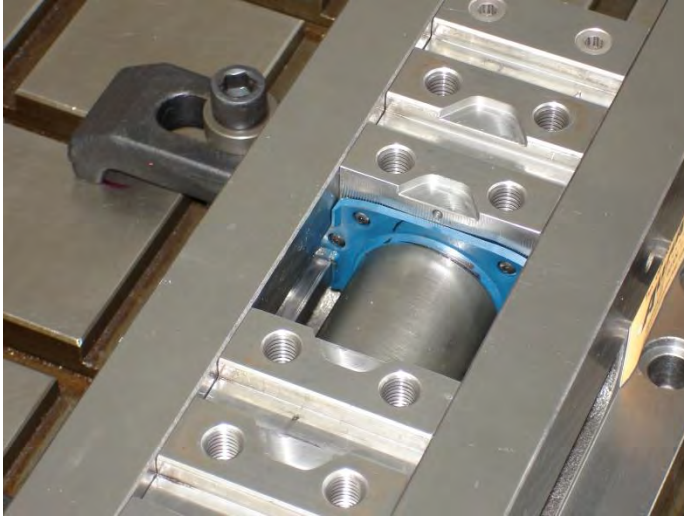
key-points:

- compact dimensions – perfect to fit on round machine tables Ø 320 mm
- high pressure spindle – high clamping pressure and secure clamping
- centric function with 2 movable jaws – workpiece is always in the middle of the round machine table
- high clamping accuracy – guarantee for precise machining
- grip vice – finishing of a workpiece in only 1 operation
- precision vice – suitable to clamp sensitive workpieces (clamping pressure adjusting)
- flexibility – different kind of jaws are available

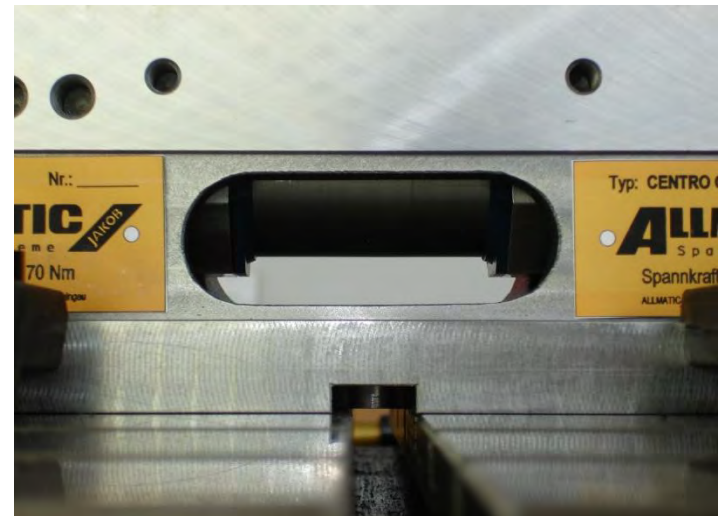
CENTRO- grip



CENTRO- grip



Totally sealed high pressure spindle and a base with big openings on each side prevent chip jam, troubles and mal functions



CENTRO- grip

disassembling of
the spindle is
done quick and
easily.



CENTRO - grip



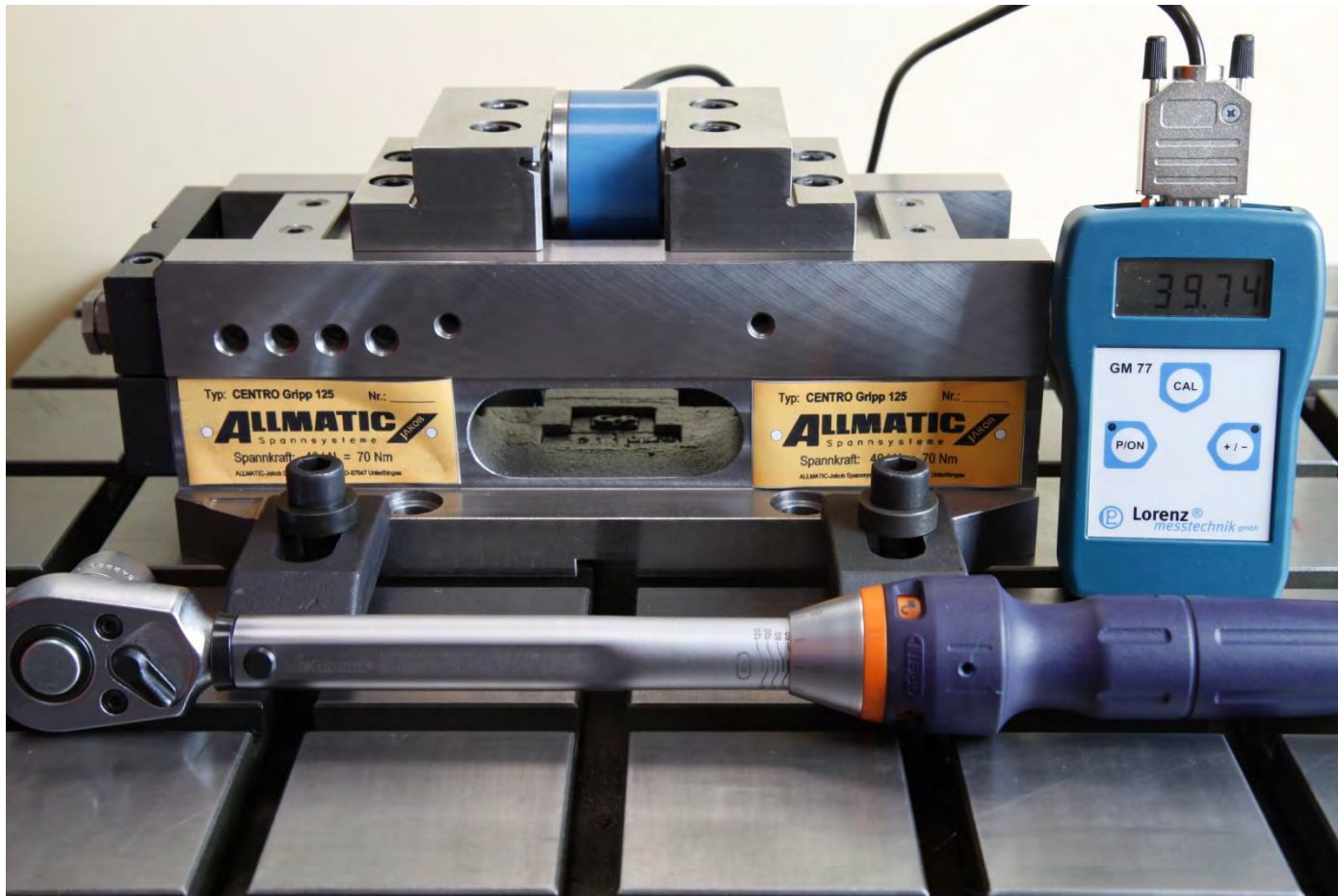
operation:

- with adjustable torque wrench (18 – 70 Nm)
- torque wrench is not included in the basic scope of supply.

Please order separately.

CENTRO - grip clamping pressure

maximum clamping pressure: 40 kN at torque 70 Nm



CENTRO - grip clamping pressure

only for personal use

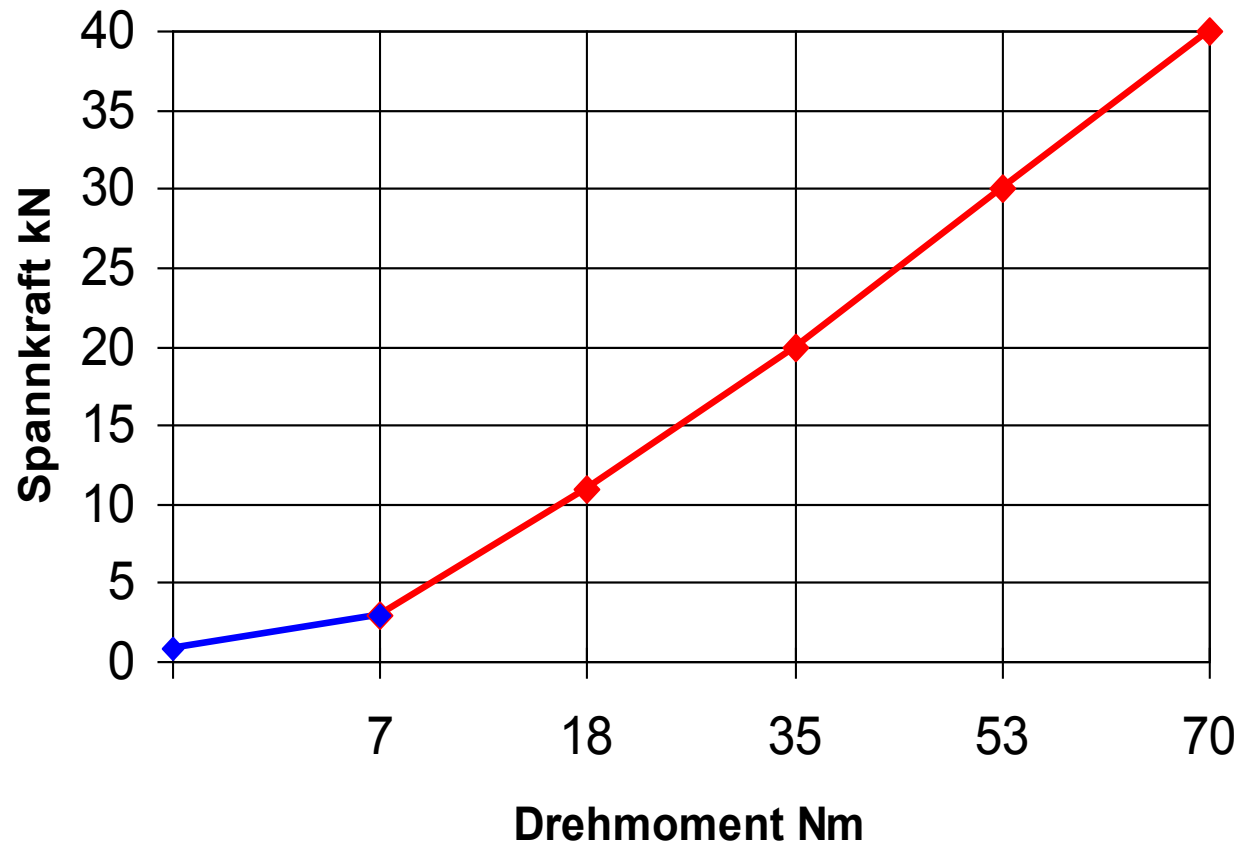


Clamping pressures are proportional to the preselected torque

minimal clamping
pressure: ca. 3 kN =
without power intensifier

clamping of parallel
premilled workpieces:
maximal rotation angle
with wrench up to the
max. clamping pressure:
approx. 60 degrees

clamping of rough
workpieces: maximal
rotation angle with wrench
up to the max. clamping
pressure: approx. 320
degrees



CENTRO - gripp clamping accuracy

Only for personal use



clamping pressure: 40 kN at 70 Nm torque

lifting of the workpiece:

left: 0,04 mm

right: 0,035 mm

from center: < 0,01 mm



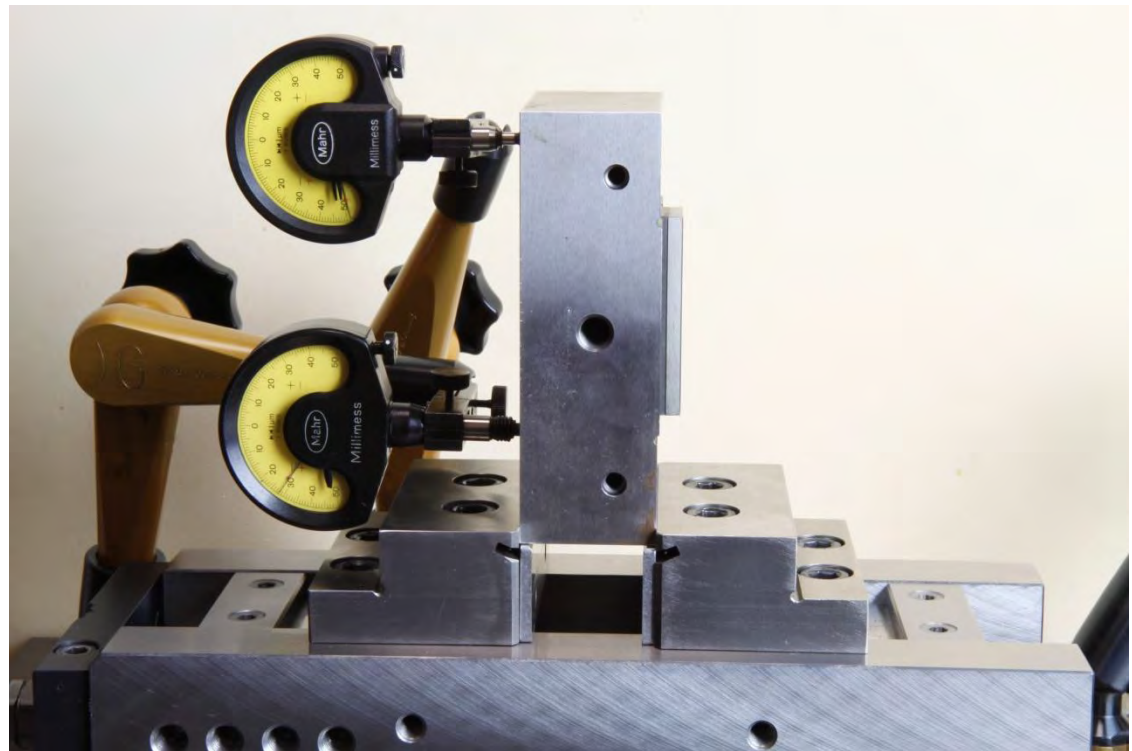
CENTRO - gripp clamping accuracy

Only for personal use

clamping pressure: 40 kN at 70 Nm torque

deflection on top:
0,05 mm

deflexion on bottom:
0,03 mm

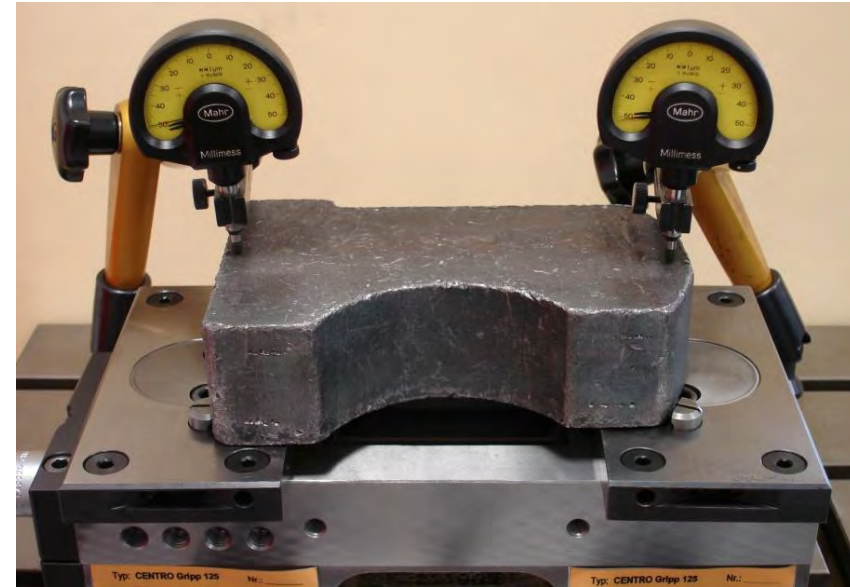
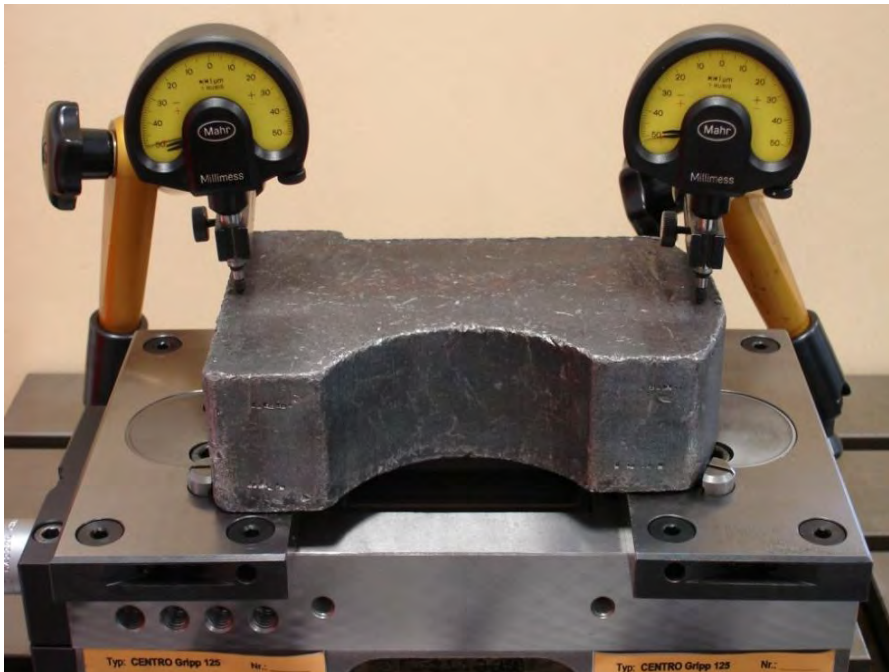


CENTRO - grip clamping accuracy

Only for personal use

clamping pressure: 40 kN at 70 Nm torque

lifting of workpiece: approx. 0,1 mm



CENTRO - grip clamping accuracy

Only for personal use

clamping pressure: 40 kN at
70 Nm torque

jaws: stepped jaws high side

workpiece: width 78 mm,
parallel ground

workpiece support: parallels
height 29 mm

deflexion sideway is
approx. 0,02 mm with
max. clamping
pressure



CENTRO - grip clamping accuracy

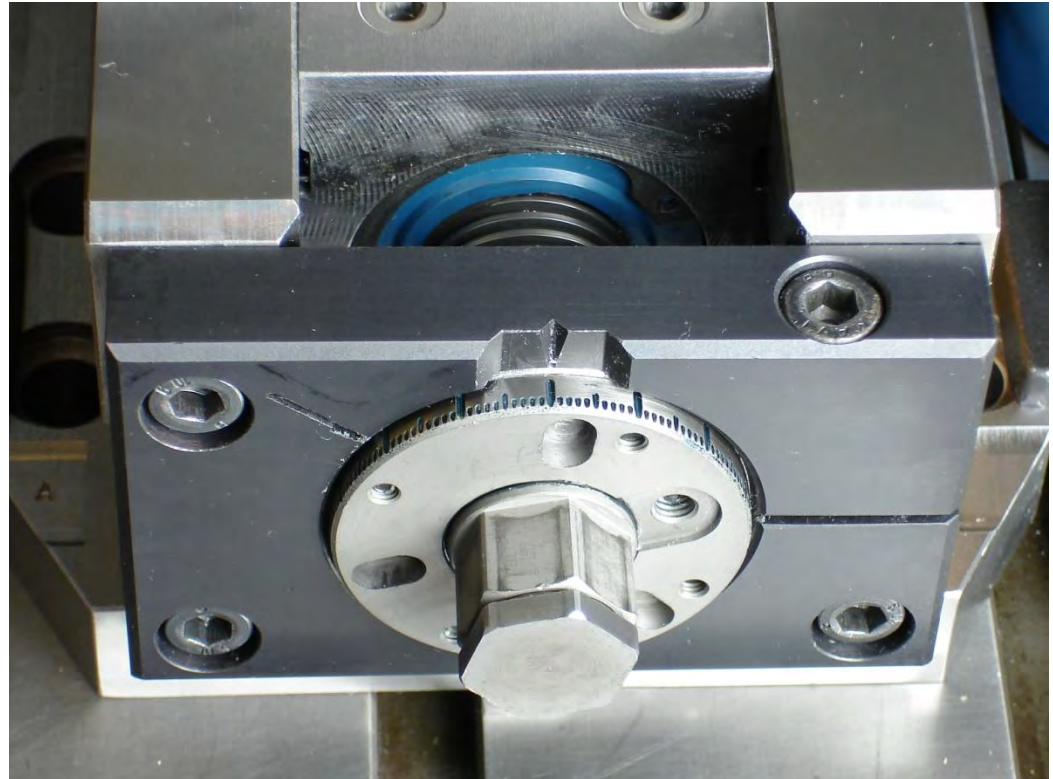
Only for personal use

The center position of the workpiece is identical with the positioning hole in the base.

the center can be
adjusted with the
adjustment wheel after
untightening the
clamping screw

10 tick marks = 0,1 mm

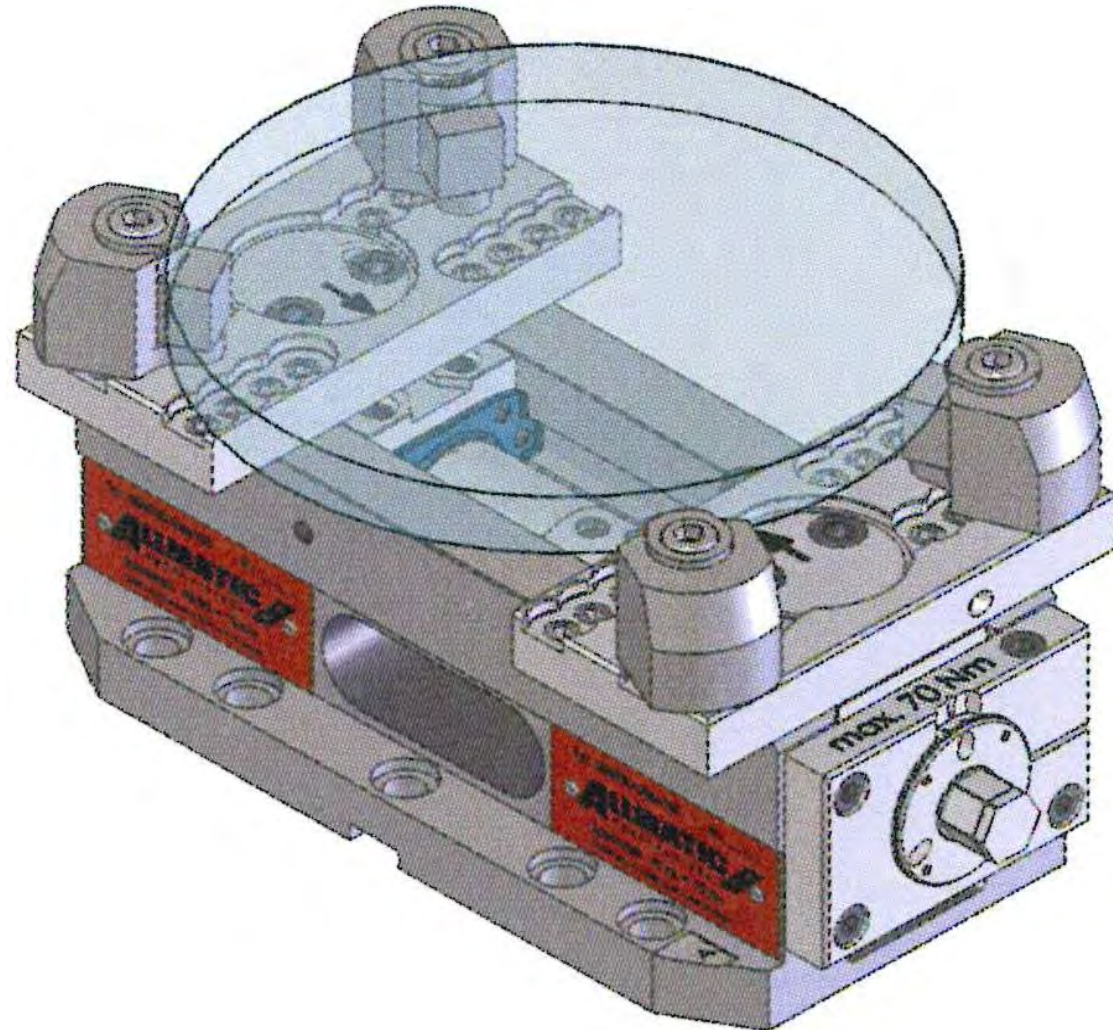
base setting (factory):
exact in the center



CENTRO- grip jaws



suitable jaws are available
for many applications.
Normally all are in stock
Clamping range up to 256
mm is possible.



CENTRO - gripp

scope of supply:

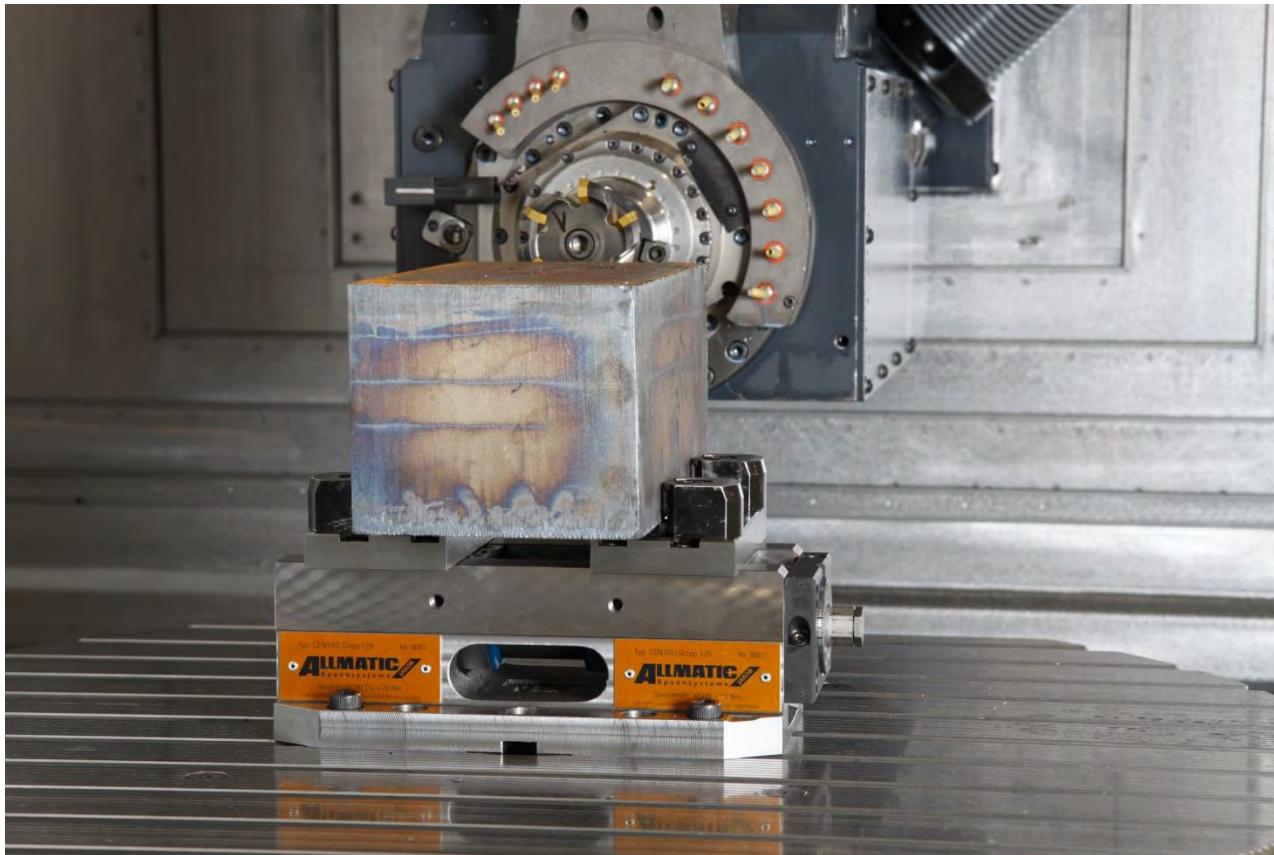
- CENTRO- gripp 125
(without jaws)
- allen key Gr. 6
- allen key Gr. 8
- 12-point socket SW 20 ½"
- 2 ring spanner SW 20
- 6 fitting screws



CENTRO - grip



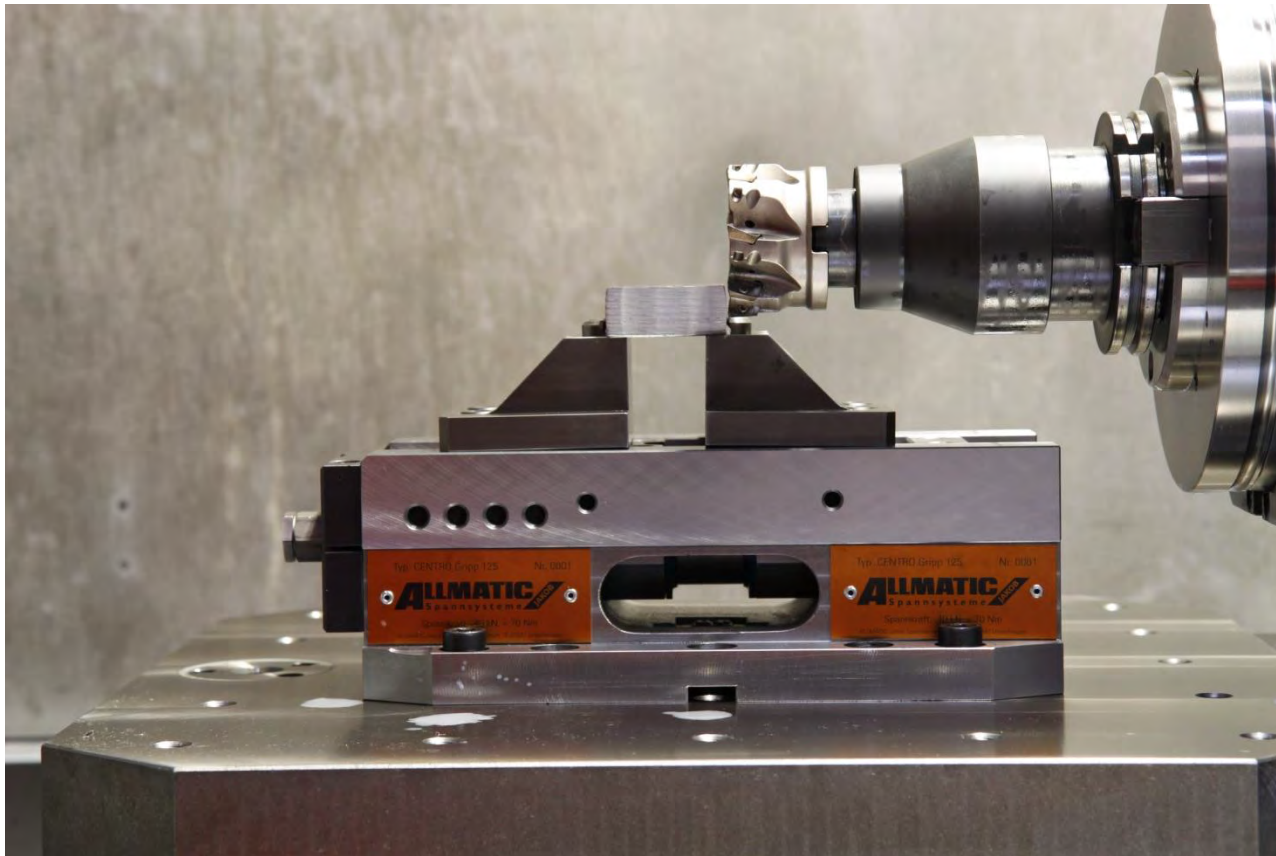
application:



CENTRO - grip

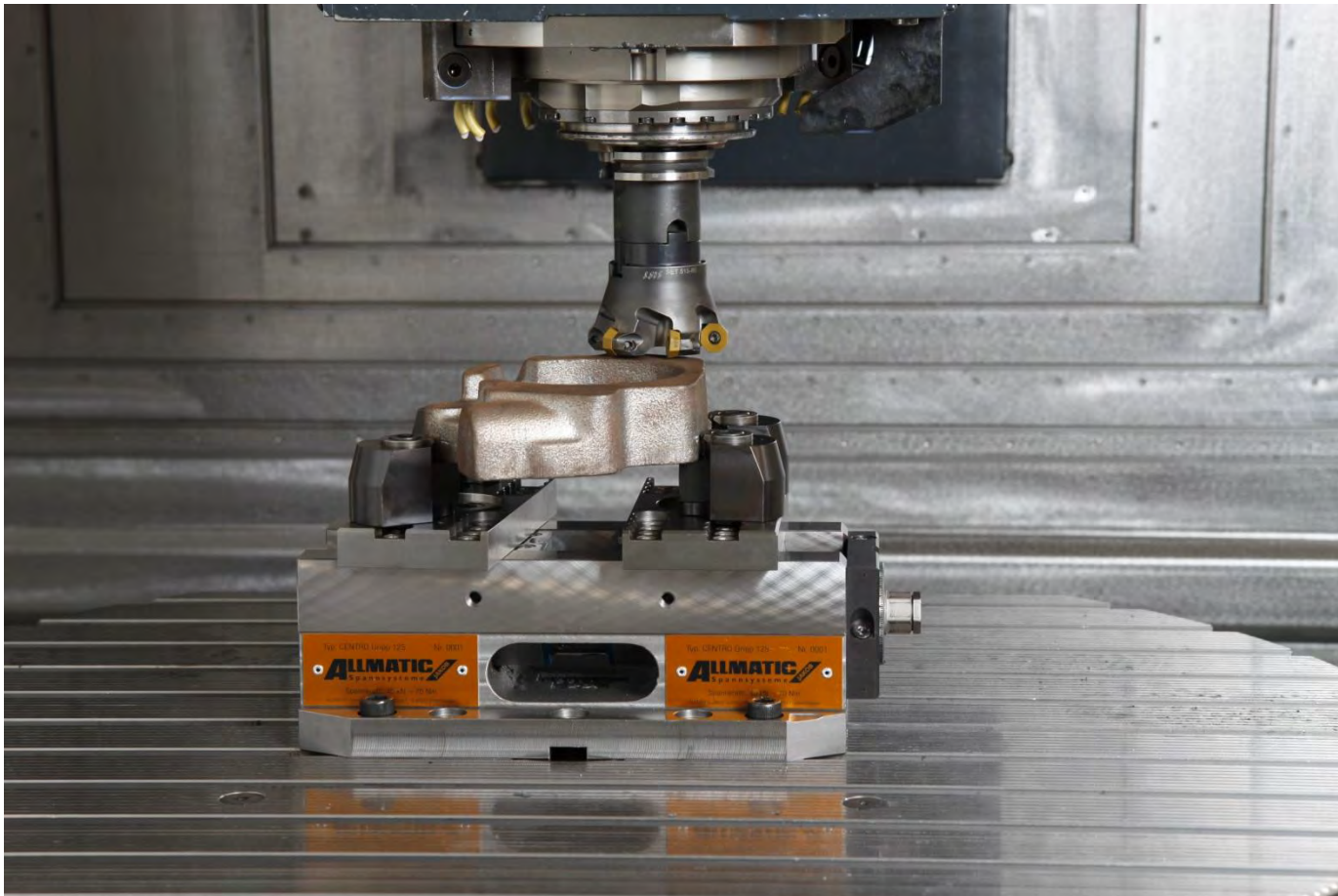


application:



CENTRO - grip

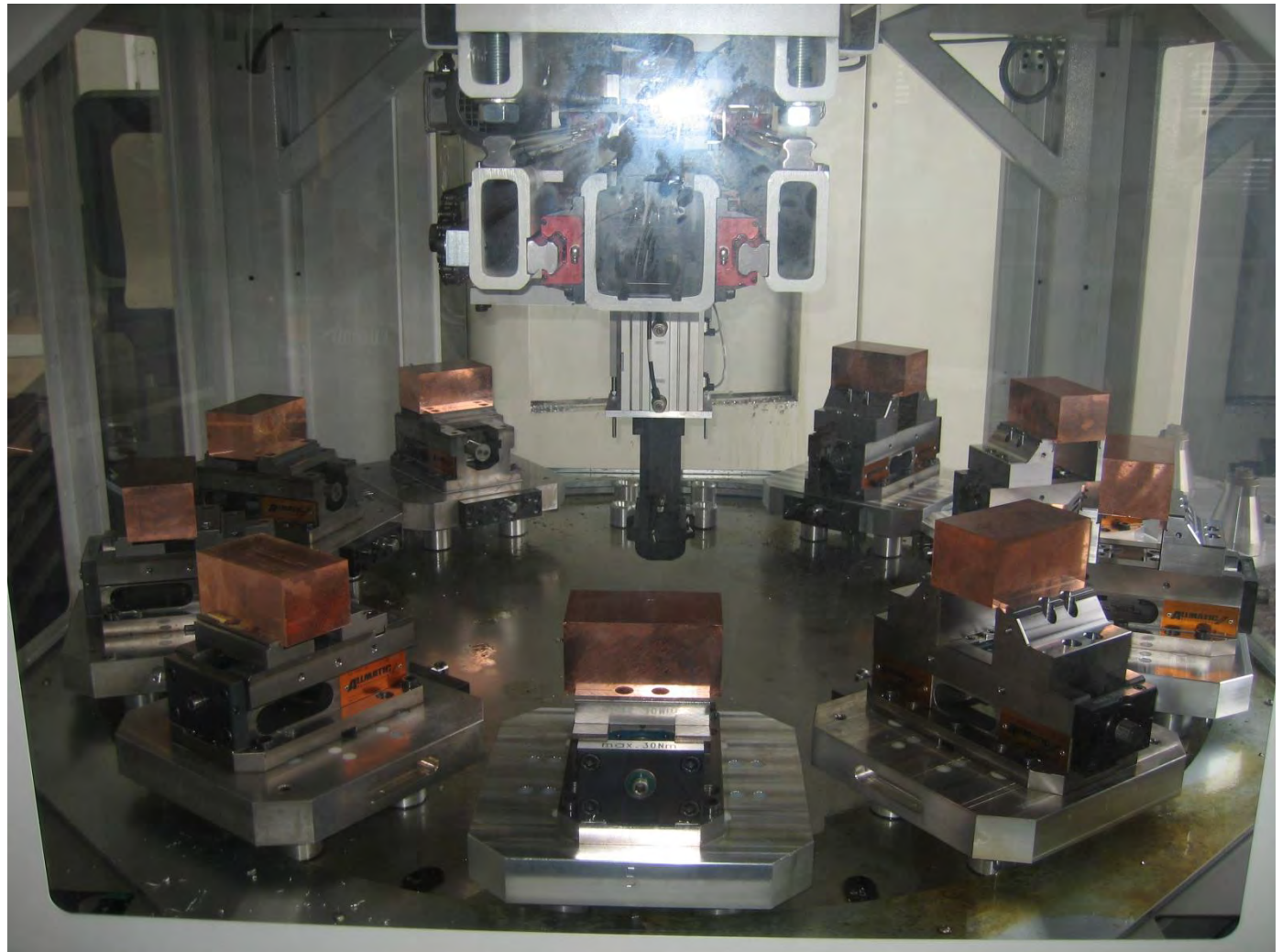
application:



CENTRO - grip

ALLMATIC
Spannsysteme **JAKOB**

application:



Advantage/disadvantage

T-Rex / Centrogrip

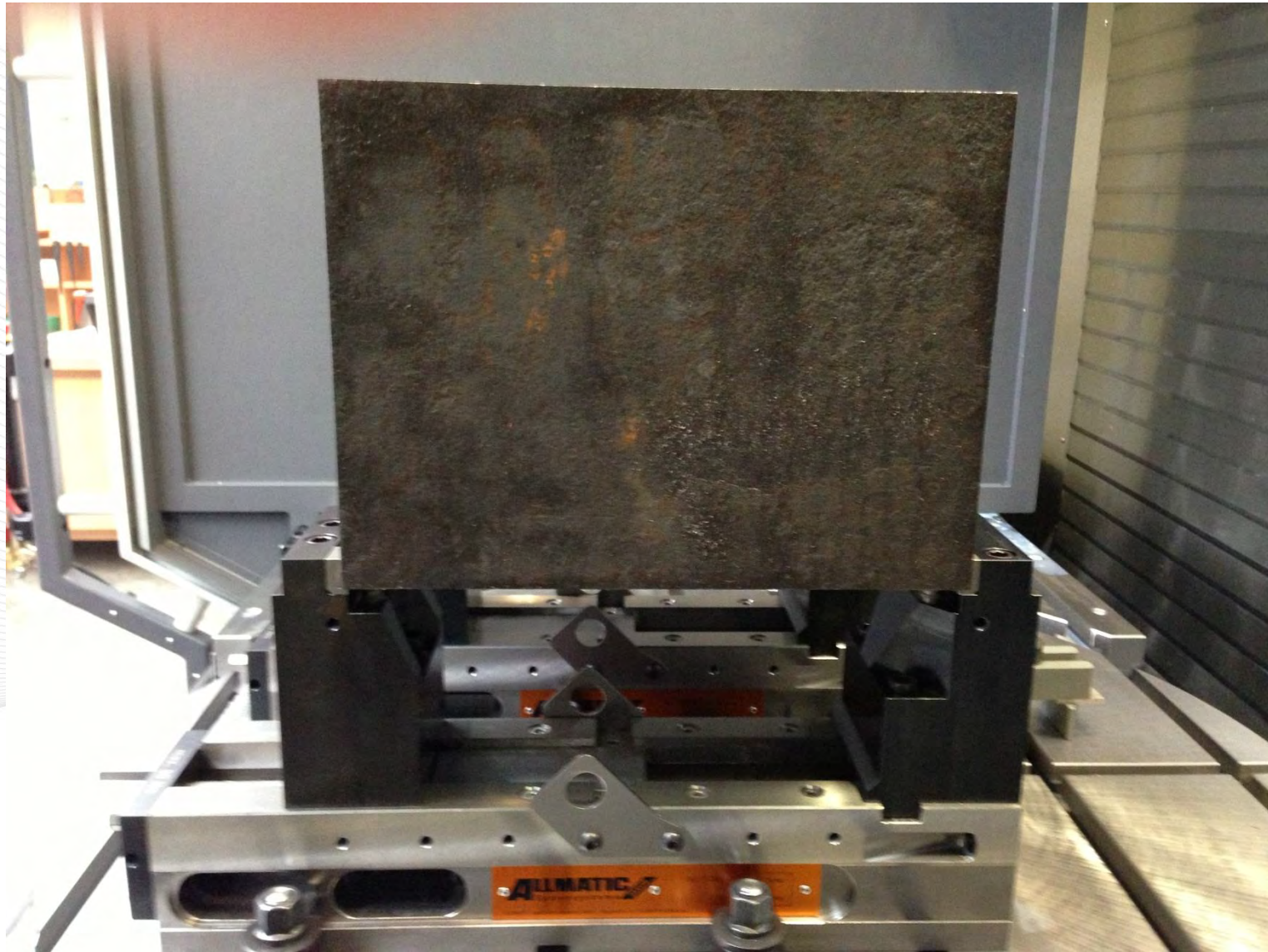


- clamp always to the fixed jaw = everytime the same 0 - point
- workpiece is always in contact to the fixed jaw. High stability and **no** movement = 'twisting' of the workpiece during machining
- limited clamping accuracy of the workpiece caused by irregular lifting of the jaws (mainly in the 2 operation)



- workpiece is always in the center (tolerance + / - 0,01 mm)
- workpiece is clamped floating, therefore sensitive to vibrations and 'twisting' during machining
- excellent parallelism of the workpiece; nearly identical lifting of the jaws

New generation Titan 2



Griptecnologie and new generation

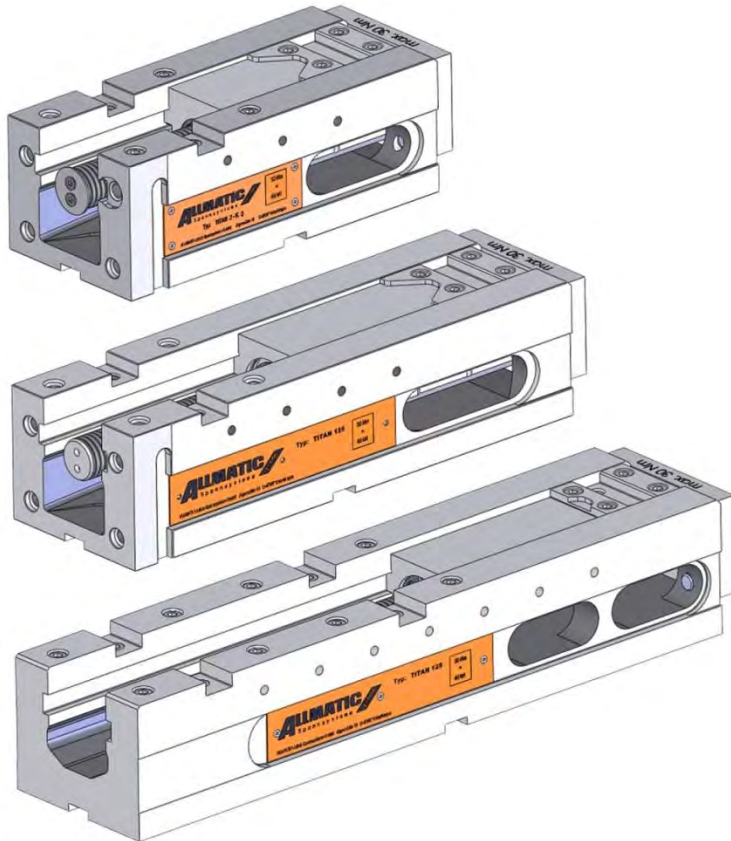


market situation:

- machine tool:
the trend to 5 – axis machine tools is constantly increasing
- operator:
universal clamping device; clamping of rough and premilled workpieces
- clamping device:
requirements increase (flexibility, accuracy.....)

Griptechnologie and new generation

- nearly 70 % of all Allmatic- vices are size 125 mm
- new vice available in 3 lengths



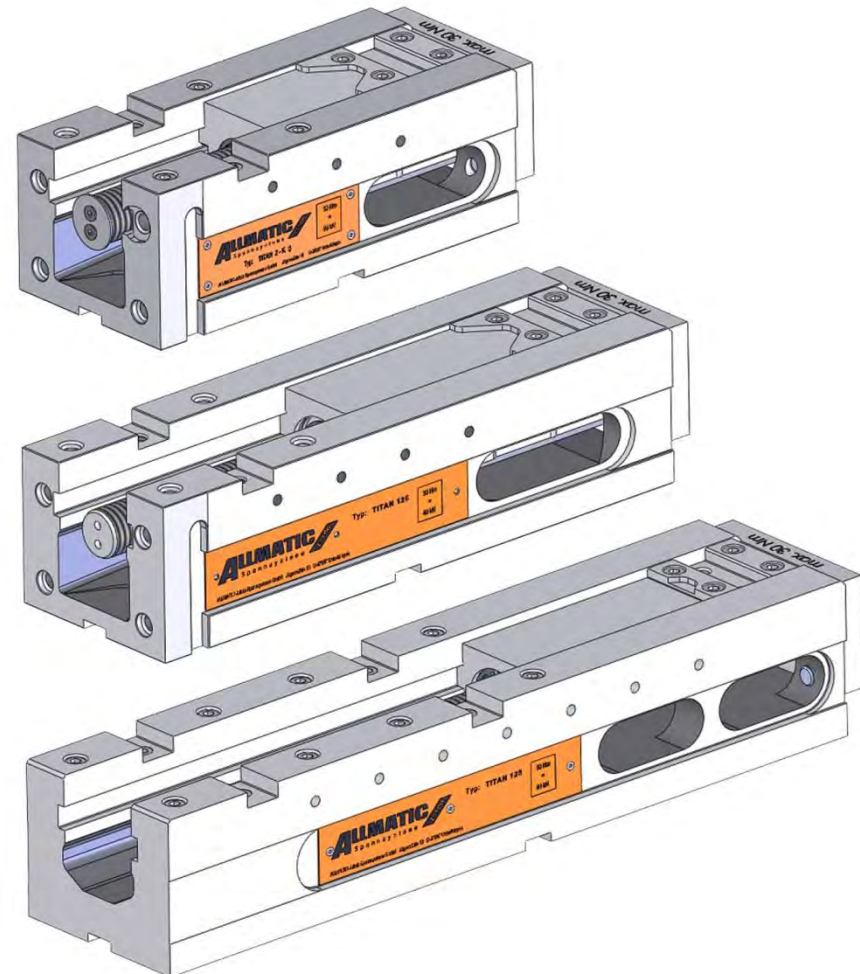
- Titan 2 K – für 5- side milling
- Titan 2 M – universal vice
- Titan 2 L – for big workpieces

Griptechnologie and new generation

Titan 2 K and 2 M are equipped as standard to fit with a vice extension; at Titan 2 L on request possible (reworking of the base)



Gressel Grepos 5 X
extension 100 mm und
250 mm



Universal vice Titan 2

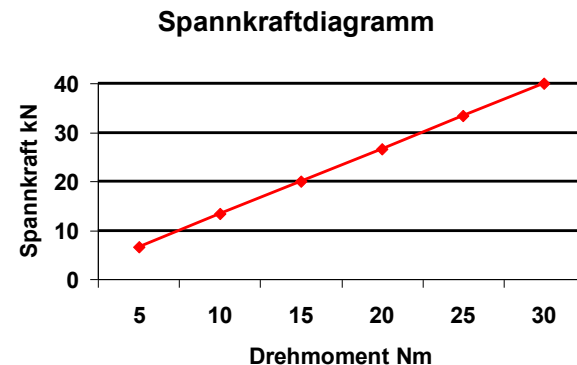
operation:

- with adjustable torque wrench (6 – 30 Nm)
- rotation angle to get the maximum clamping pressure is less than 270°

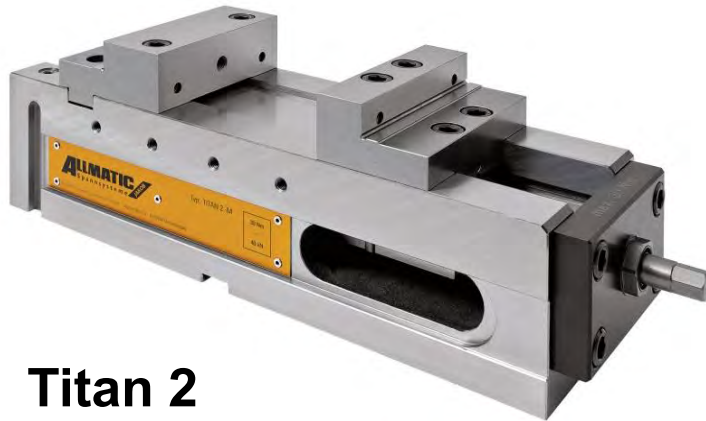


Clamping pressure:

- maximum clamping pressure approx. 40 kN (torque 30 Nm)



Universal vice Titan 2

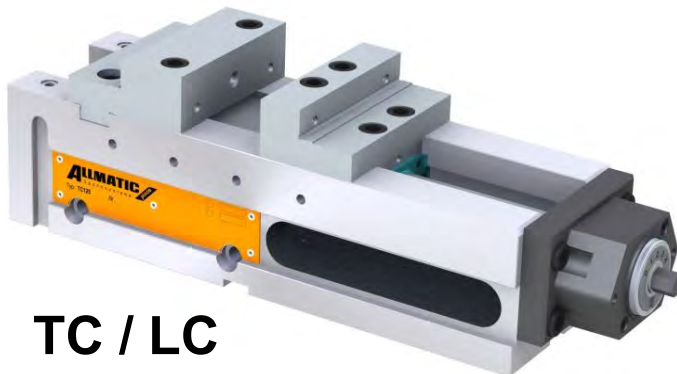


Titan 2

conventional clamping

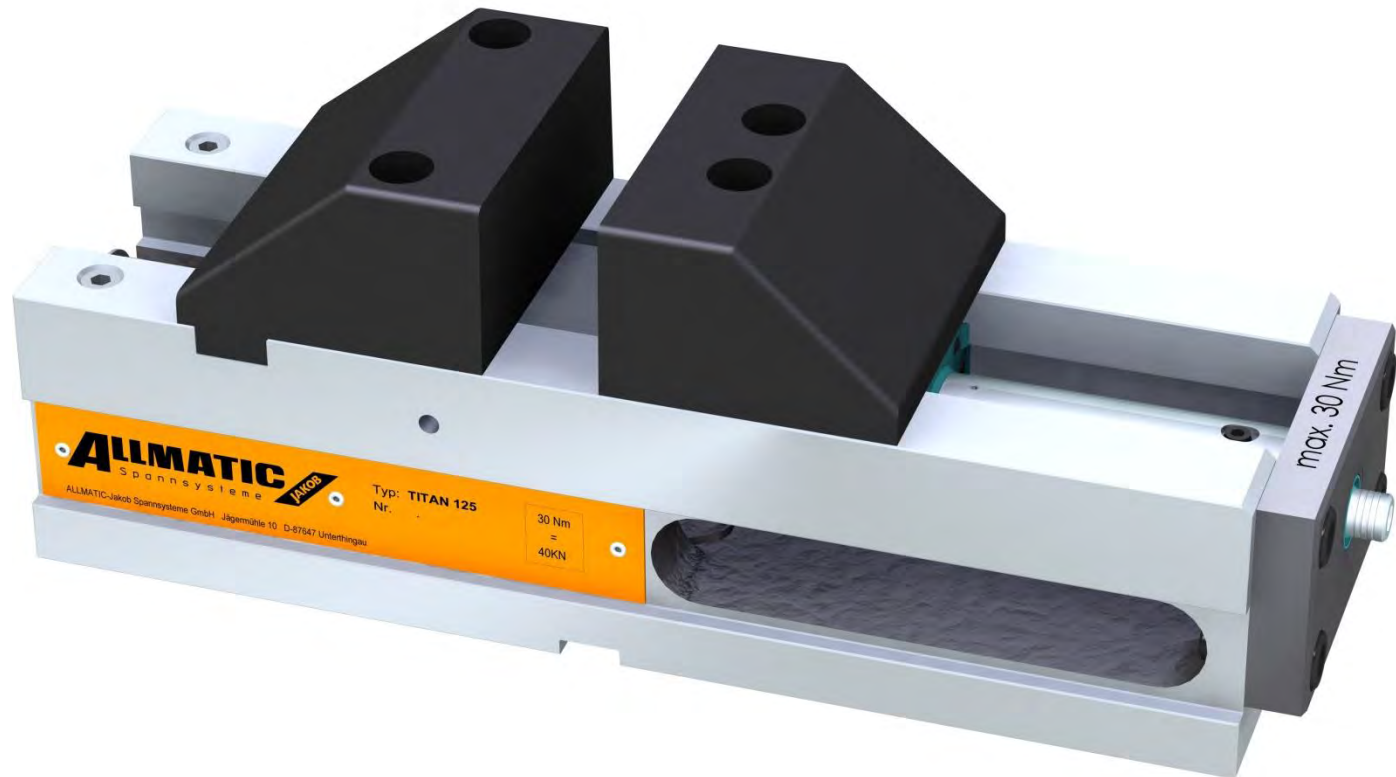


grip clamping



TC / LC

Conventional clamping of workpieces



Grip clamping

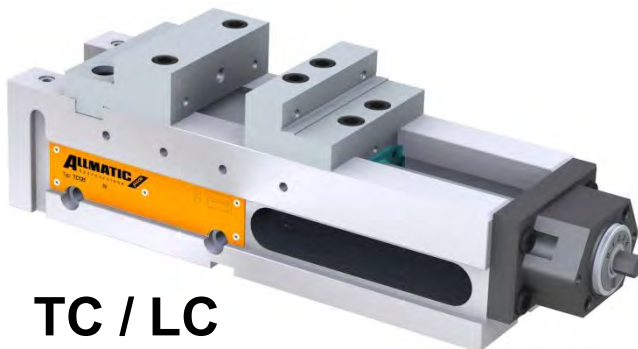


Griptechnologie and new vice generation

All jaws of the single vices – not DUO – built since year 1998 are exchangeable and does fit to the new generation



Titan 1



TC / LC



Titan 2

Mechanical power intensifier Titan 2 K, M, L



- pure mechanical
- power stroke 3,8 mm
- maintenance free

Griptecnologie and new vice generation



note: the power stroke at TC/LC is approx. 1,0 mm, other manufacturers do have sometimes less than 1 mm

What is the reason, that Allmatic had developed a complete new high pressure spindel ?

➡ Solely because of clamping rough workpieces

Using the rough workpiece clamping function the clamping safety essential depends from the contact areas between the teeth of the grip-studs and the workpiece. Deeper marks = clamping safety is better.

Griptechnologie and new vice generation

Clamping result:



Titan 2

Grepos 5X, TC/LC



Clamping pressure:
Titan 2: ca. 40 kN
Grepos: ca. 20 kN

Competition grip- vices



- power stroke 3,8 mm
- torque max. 30 Nm

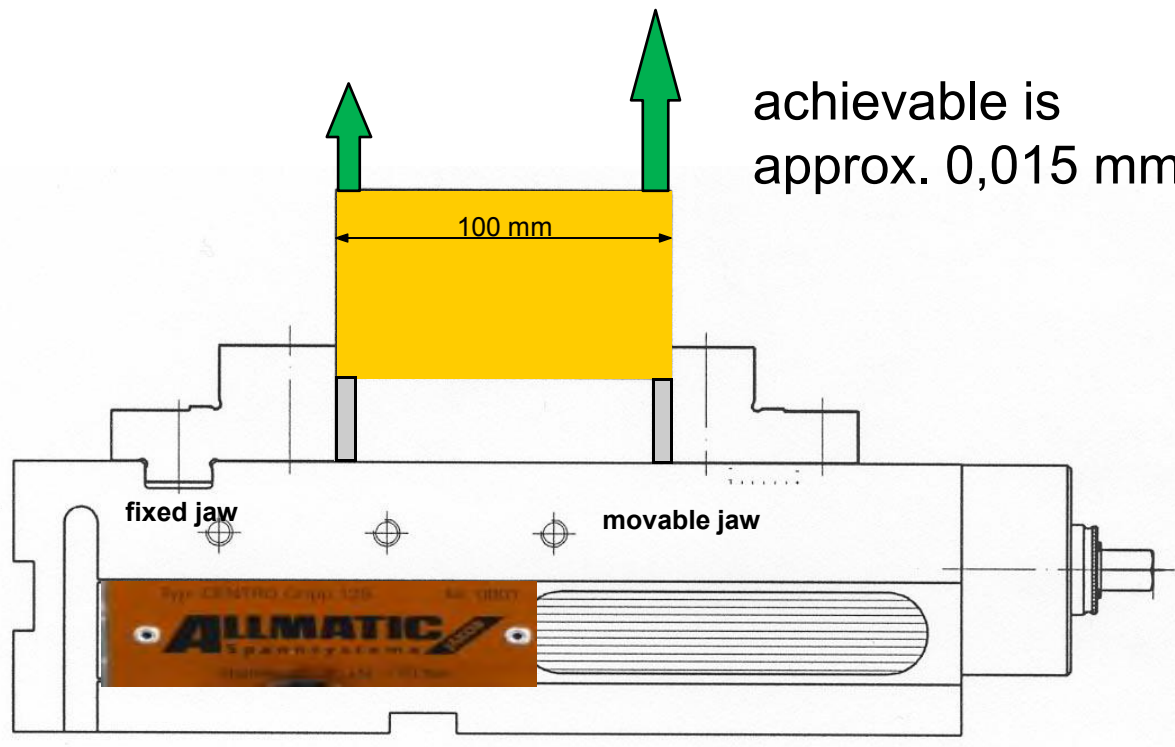
Pictures from Gressel system
are removed copyright reason

- power stroke approx. 0,8 mm
- Torque approx. 55 - 60 Nm

Griptechnologie and new vice generation

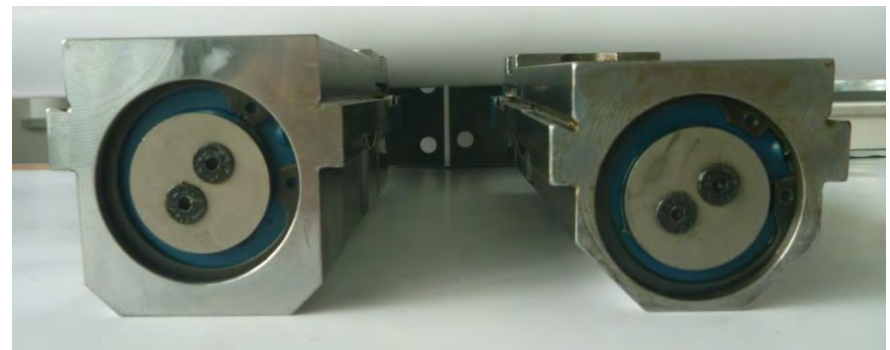
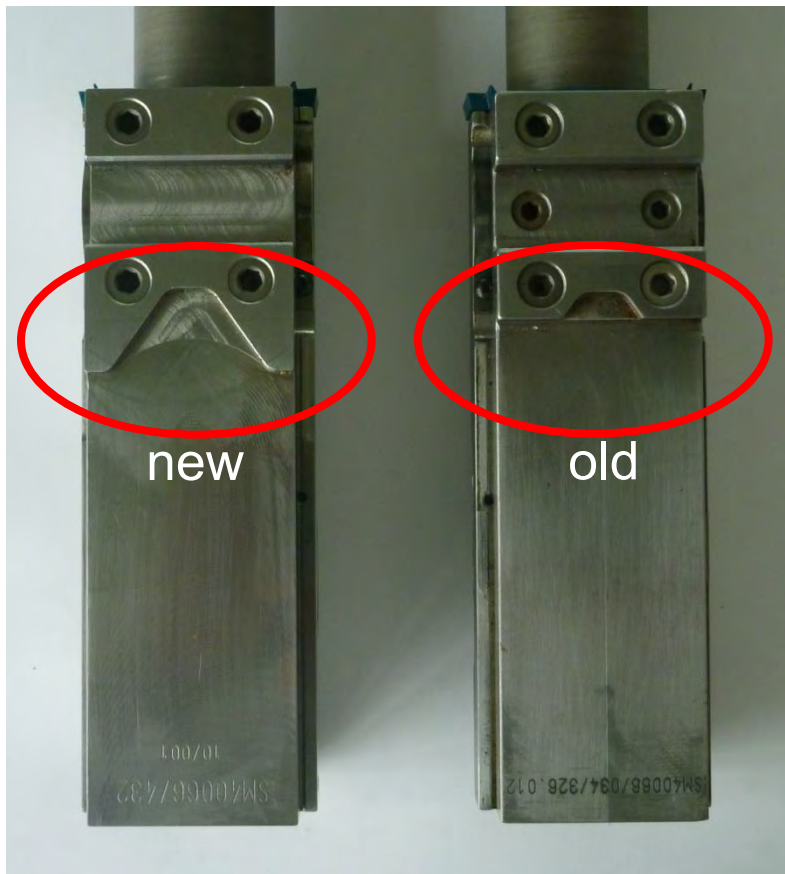
Clamping accuracy:

Operators accept normally a parallelism of 0,02 mm/ 100 mm (at maximum clamping pressure, workpiece sits on parallels)



Griptechnologie and new vice generation

better accuracy with new spindle nut and improved base



new

old

important for service:

new spindle nuts does **not** fit into
base of 'old' TC/LC/Titan 1vices

Griptechnologie and new vice generation



important = fault in catalogue !!!

clic – jaws does not anymore fit to Titan 2 K, M, L,

(will fit in near future again – we are working on it)

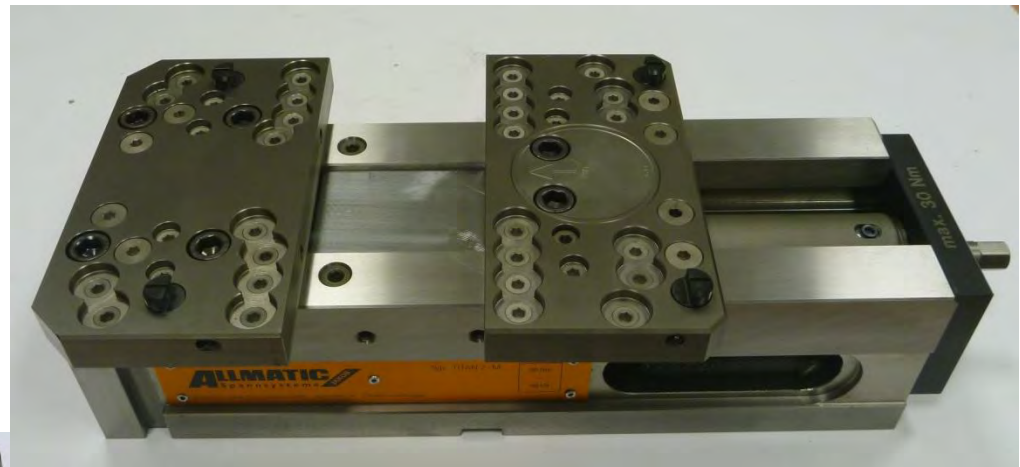


Griptechnologie and new vice generation



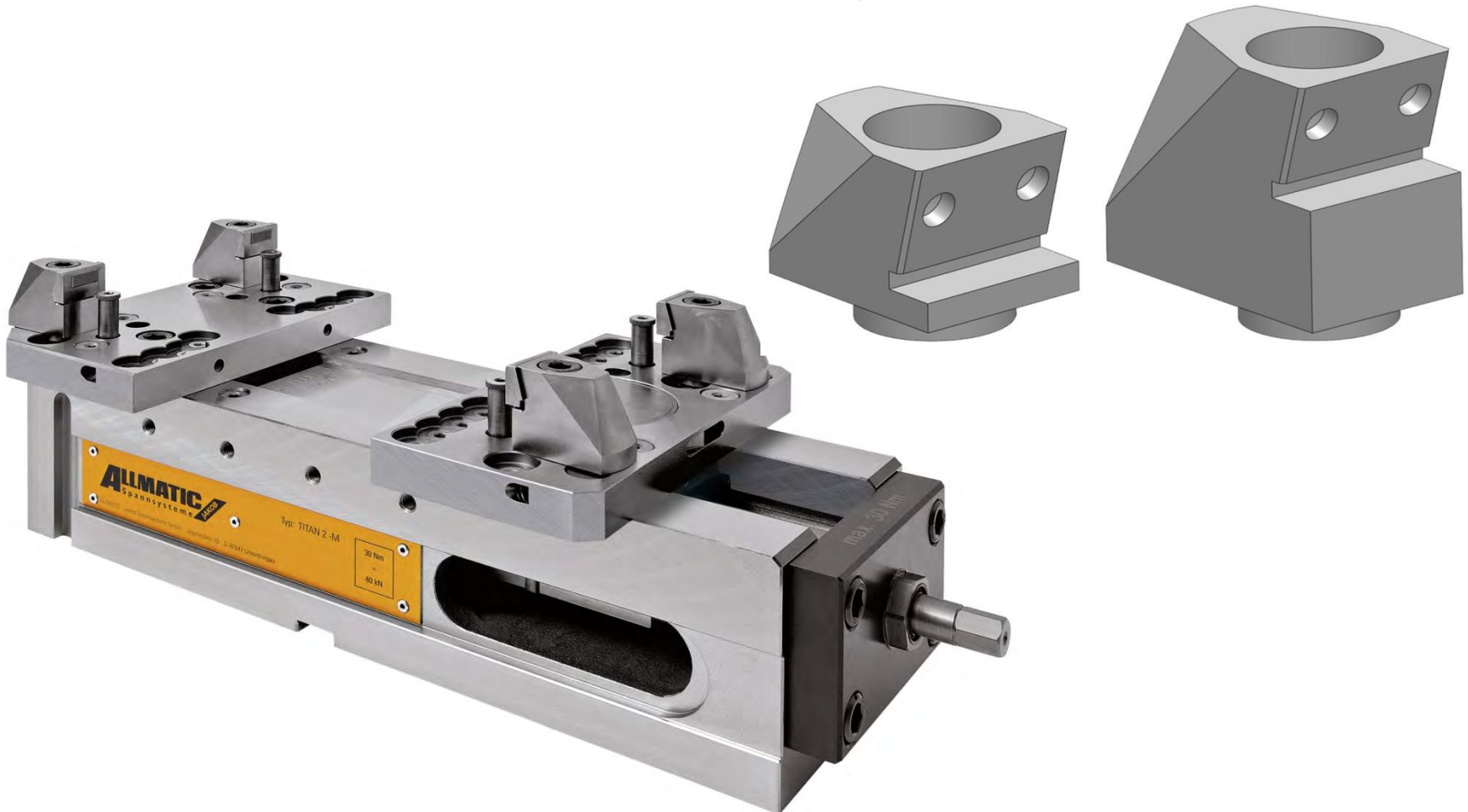
Grip – jaws new generation

all grip – studs and
universal grip- set remain in
our range of products



Griptechnologie and new vice generation

New: pull down elements available in 2 heights



Griptechnologie and new vice generation

function pull down elements

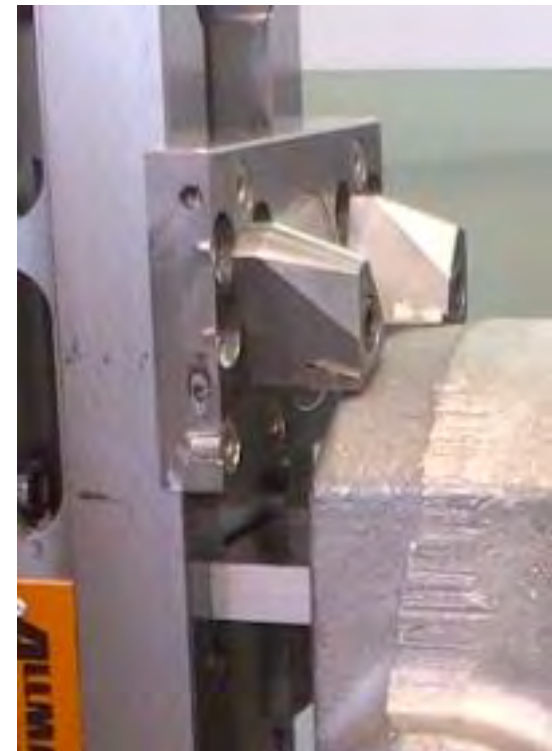
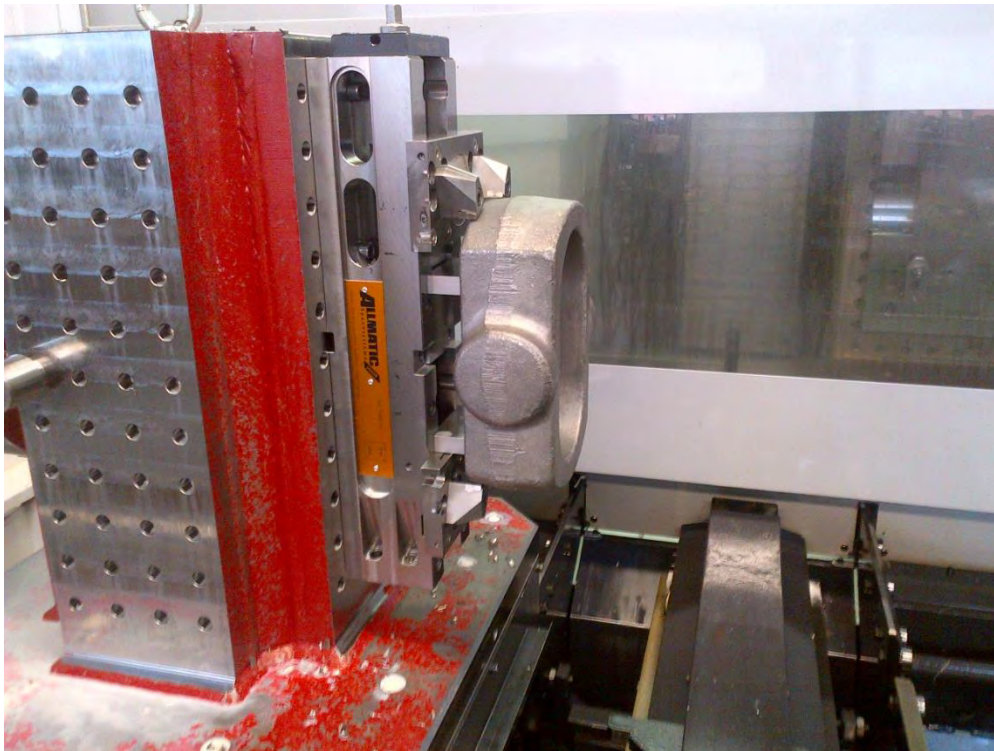
changeable grip inserts – different versions – are clicked in front of the adapter and are held with 2 magnetic pins. By the wedge the workpieces will be pulled downwards to the supporting surface of the base or to ground support pins. Minimum clamping depth: 8 mm



Griptechnologie and new vice generation

Function pull down element - advantage:

Workpiece sits nearly parallel to the machine table and is clamped secure mostly without causing vibrations during machining – independant of clamping rough material or premilled parallel workpieces.



Griptechnologie and new vice generation

ground support pins (screwed into the support jaws) give the contact to the supporting surface of the base. A mounted rubber thread sleeve in the support pins eliminates the lifting of the workpieces.

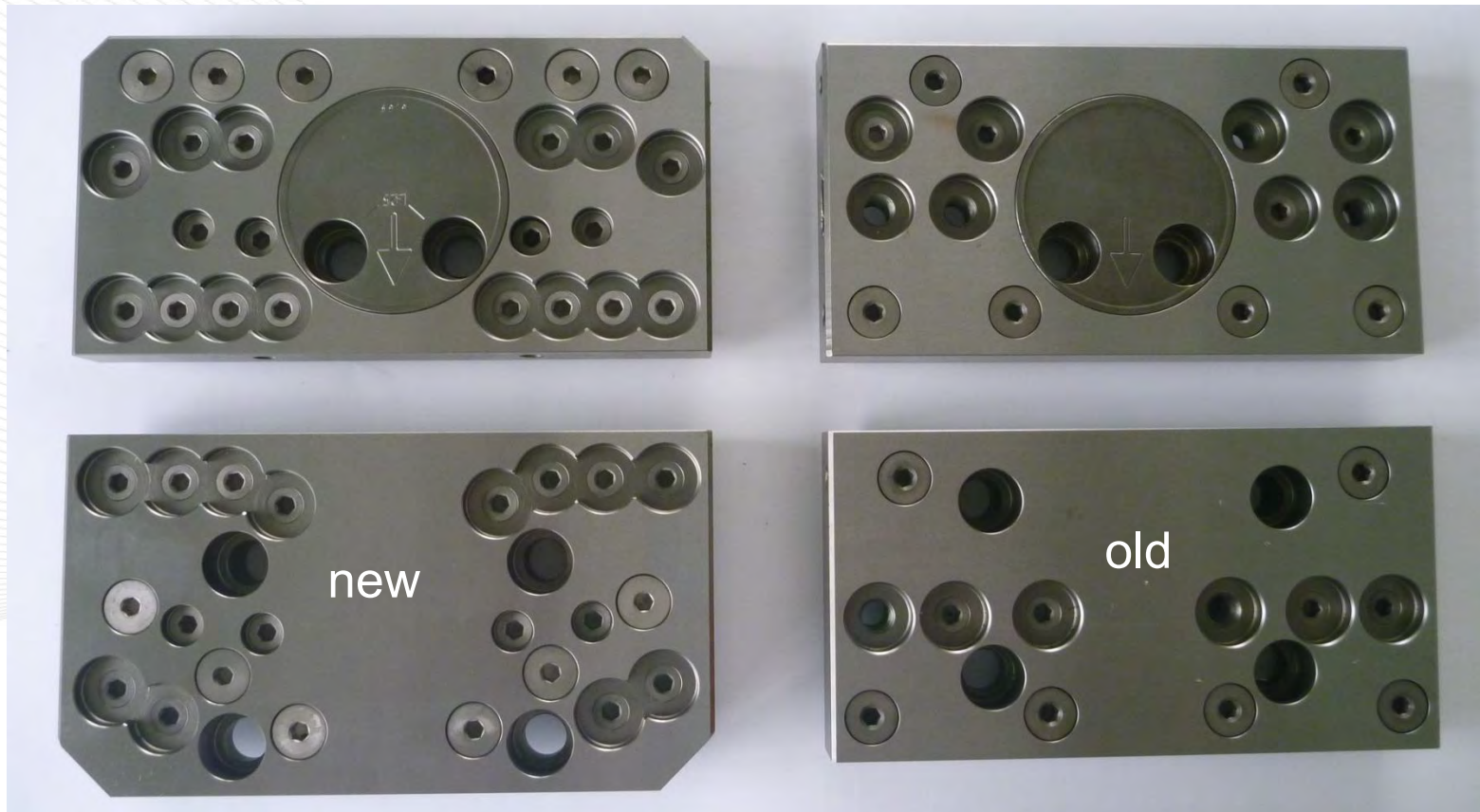
5 different heights: 23 mm , 29 mm, 34 mm, 43 mm , 48 mm



rubber sleeve

Griptechnologie and new vice generation

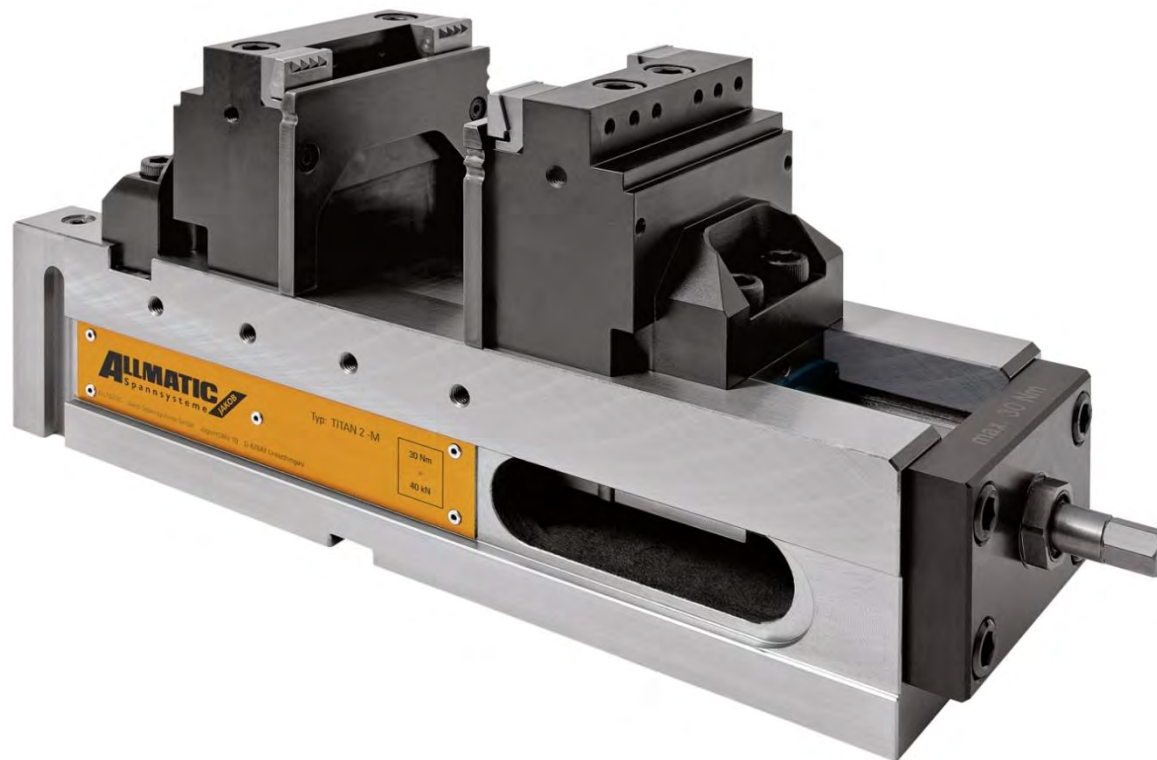
note: support jaws old version (Titan 1) can only be used in combination with the pull down elements with restrictions (changed/additional holes)



Griptechnologie and new vice generation

application to 5 – axis machine tools

5- axis jaws can be assembled on all Titan 2 vices



Griptechnologie and new vice generation

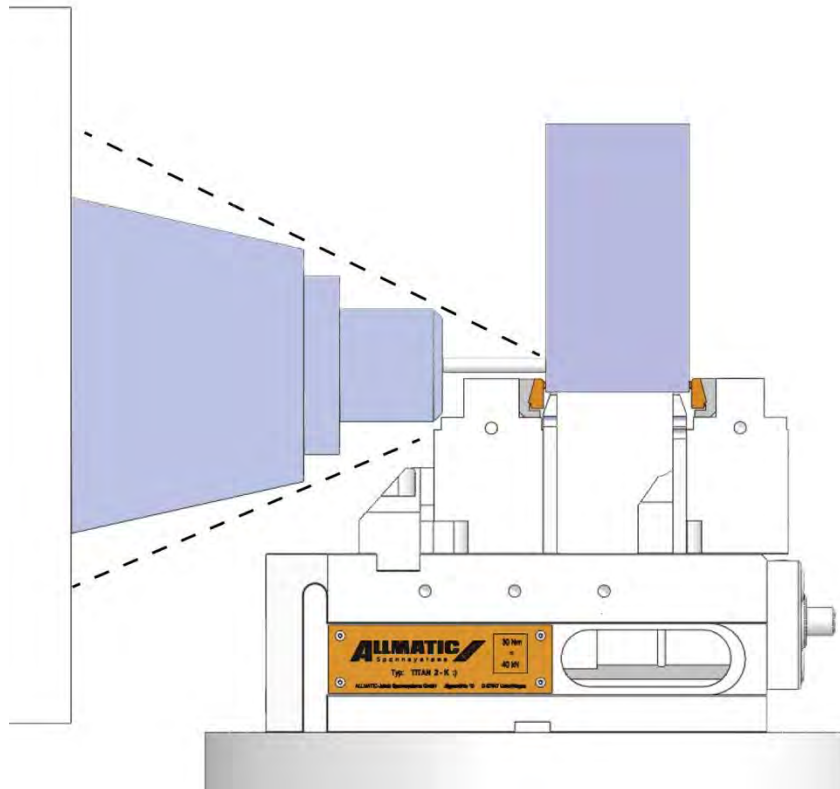
high jaws:



high jaws = big deflexion= loss of clamping pressure.
Titan 2 power intensifier has big reserve

Griptechnologie and new vice generation

The height of the jaws (97,5 mm) is selected in the following way, that the lifting of the jaws under pressure is as less as possible, but nevertheless a very good access to the workpiece is guaranteed. (short tools).



compromise:

- access
- stability
- holding force
- vibration

Griptechnologie and new vice generation



application to 5 – axis machine tools

additional console (height 100 mm) is available for Titan 2 K und M



Griptecnologie and new vice generation

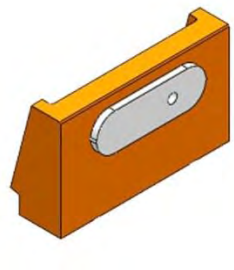
4 wedge adapter are fitted to the high jaws bolted each with one screw; dependig of the workpieces – position more inside or outside. Clicked grip wedge elements clamp and pull down the workpiece to the supports. Accuracy of 0,02 mm ist achievable. Supports available in height 70 mm, 85 mm, 90 mm.



- 4 teeth grip
- microgrip
- flat (diamond coated pads)

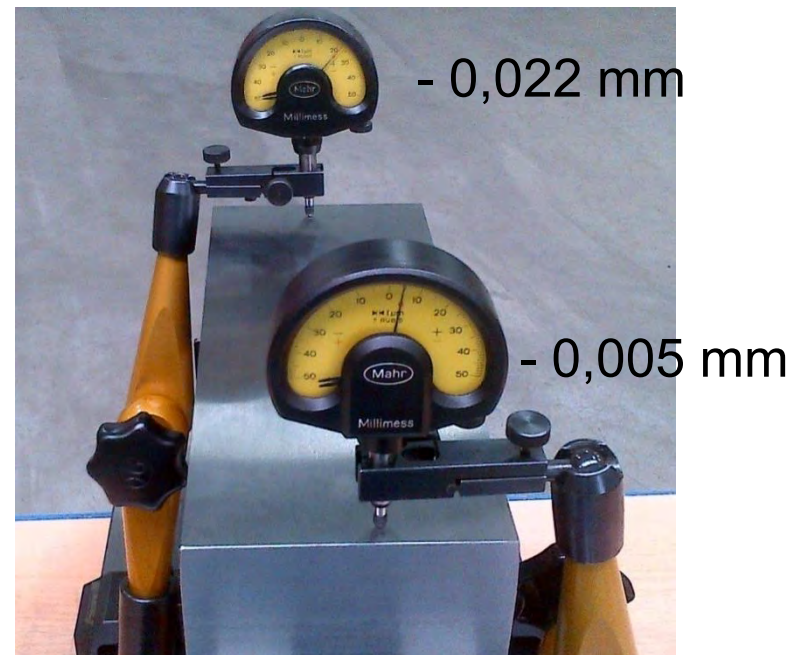
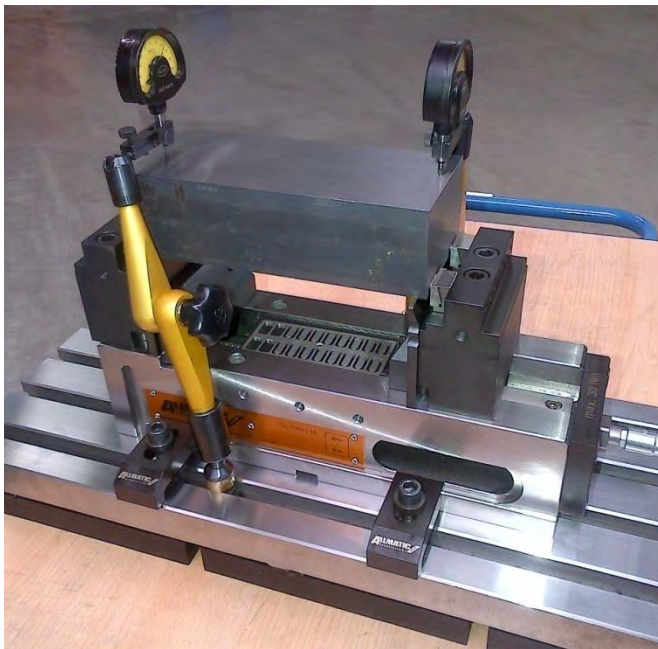
Griptechnologie and new vice generation

to clamp premilled workpieces we use diamond coated aluminum pads = designed as a wearing part. This works without a visible mark on the clamping area.



Griptechnologie and new vice generation

wedge elements pull the workpiece downwards



Griptechnologie and new vice generation



Complete set with selected items – packed in a stable case – is
available

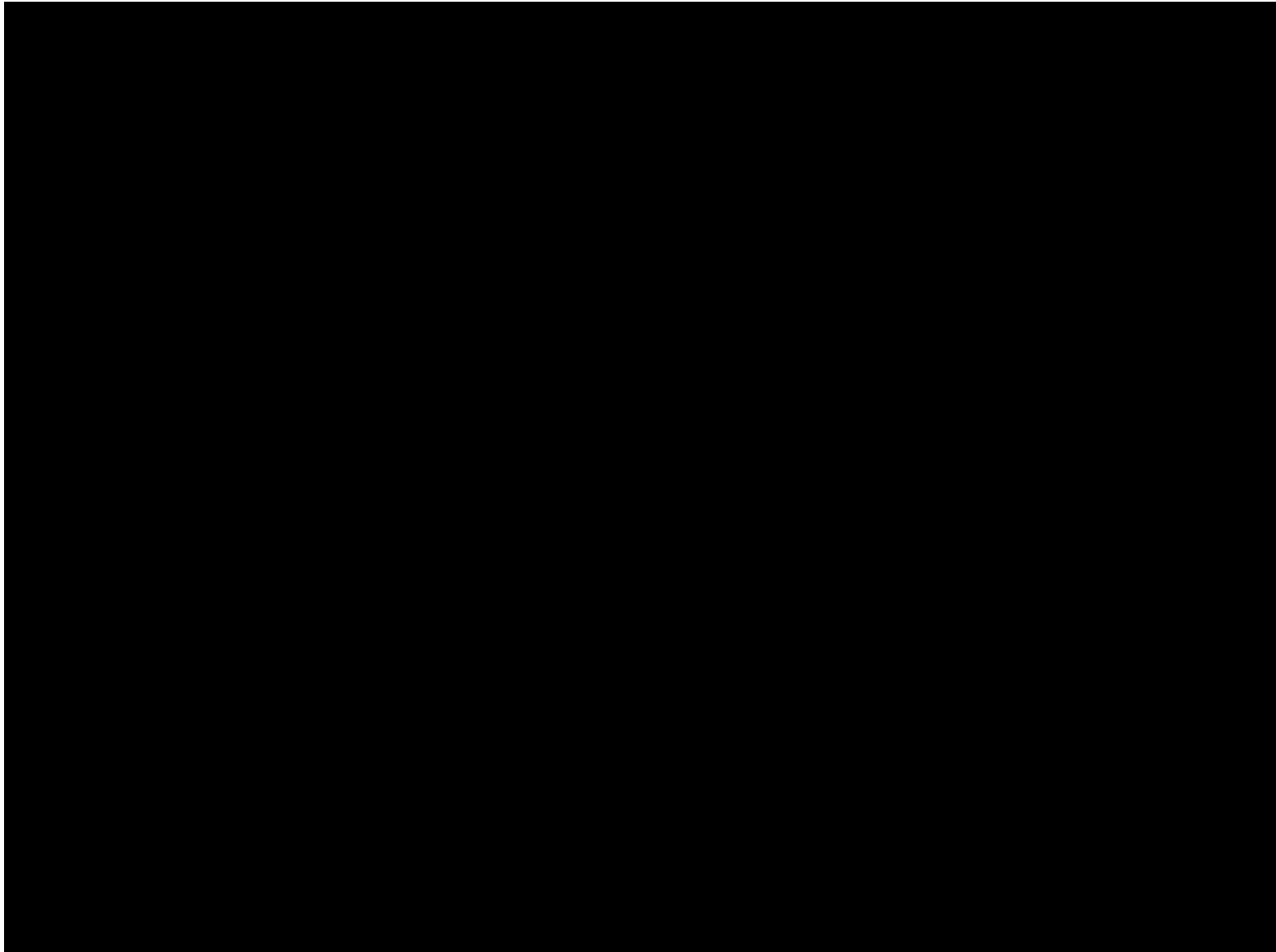


Griptecnologie and new vice generation

If pull down is not necessary a reversible gripper strip is available. Each strip is fitted with 2 screws to the high 5 – sided jaw (4 pcs. are necessary to clamp 1 workpiece).
Step 3 x 3 mm or 5 x 3 mm (height x width). Suitable **only** for workpieces with a rough surface (accuracy)



Example of use



5 – axis vice



Titan 2 K, BB 125 mm,
height 197,5 mm

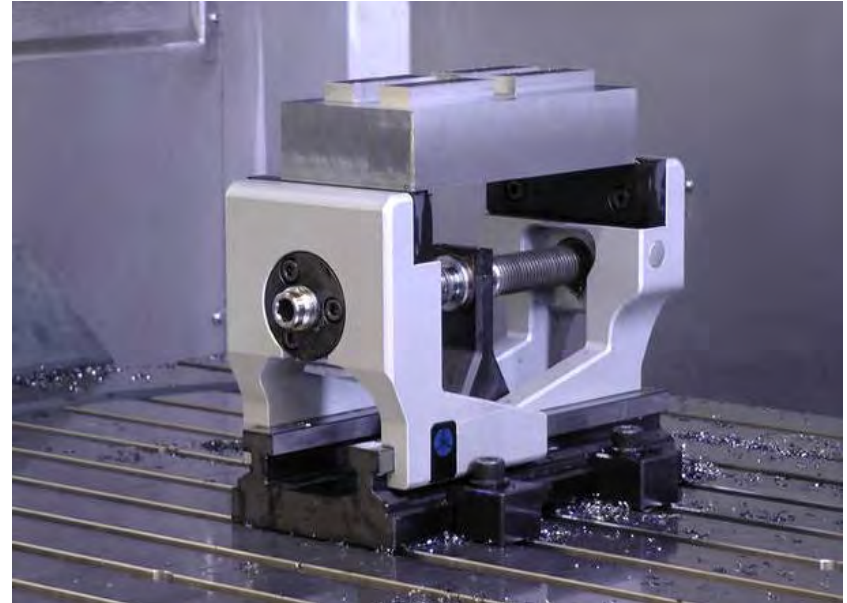


Kipp Zentrischspanner BB 90 und 125 mm,
height 170 mm

5 – axis vice



Titan 2 K, BB 125 mm,
height 197,5 mm



Röhm Zentralspanner RZM, BB125 mm,
height 196,5 mm

5 – axis vice



Titan 2 K, BB 125 mm,
height 197,5 mm

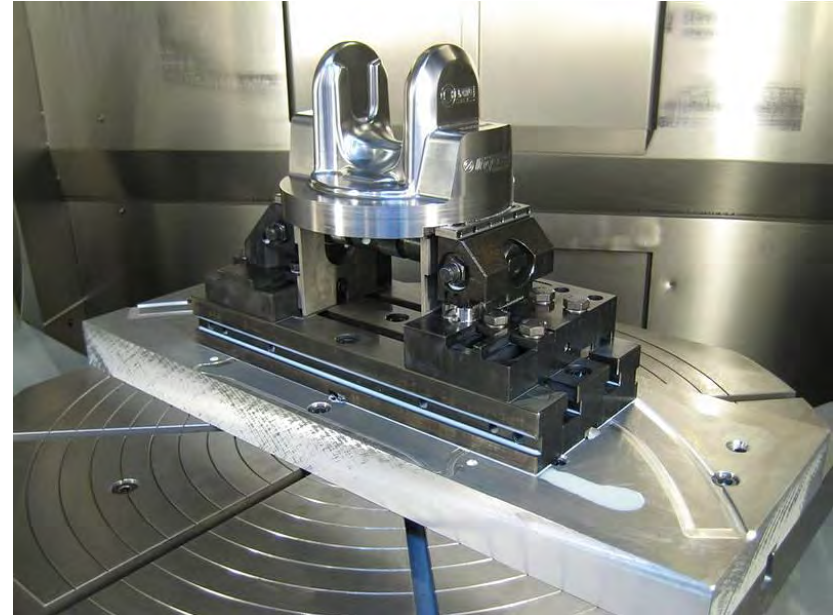


Gressel Grepos 5 X, BB125 mm,
height 214 mm

5 – axis vice



Titan 2 K, BB 125 mm,
height 197,5 mm



Schenke 5 AX100, BB 100 mm,
height 175 mm, variabel

Example of use



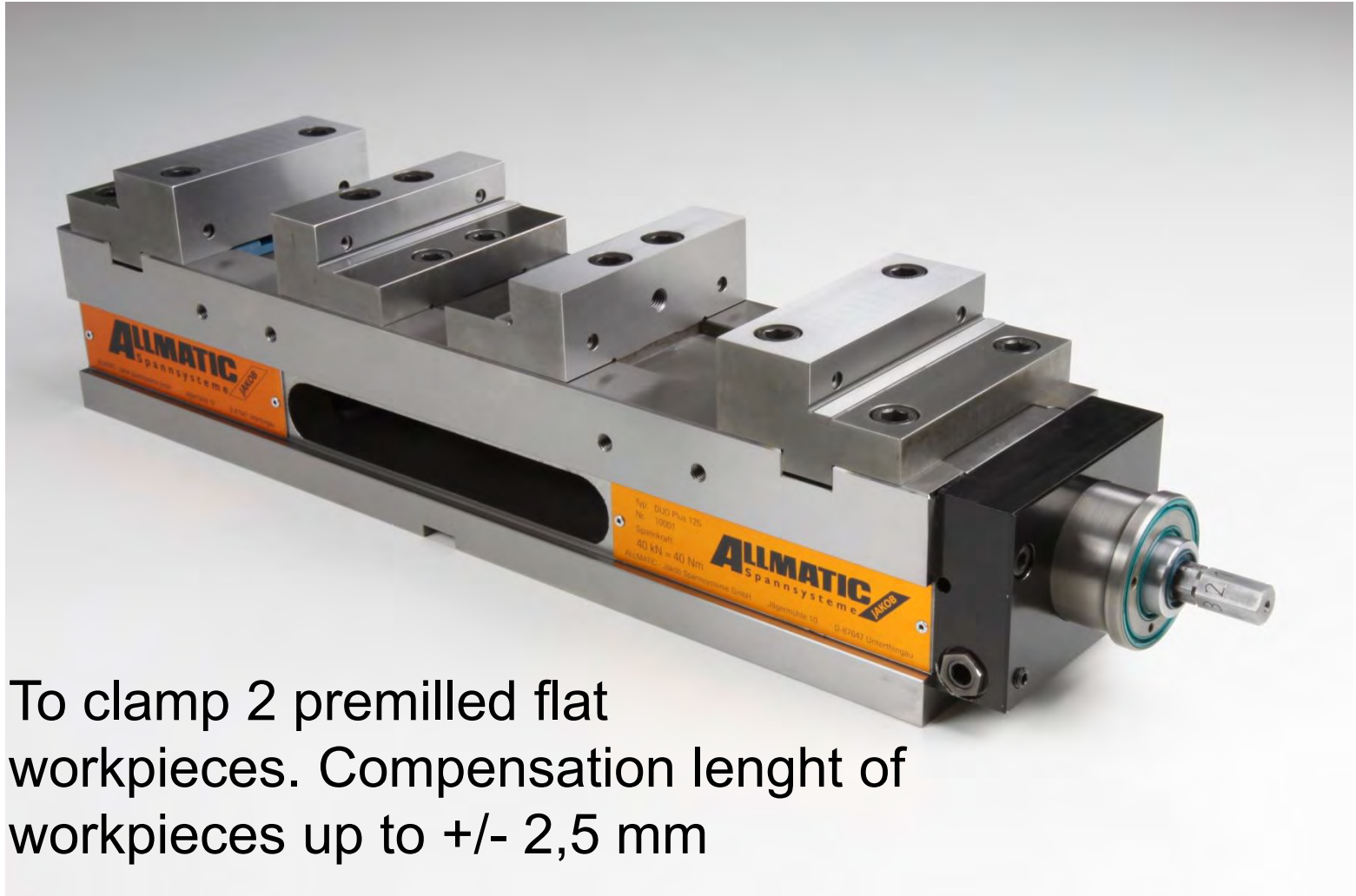
DUO Plus



Double vice to
clamp 2 workpieces



DUO Plus



DUO Plus

ALLMATIC
Spannsysteme **JAKOB**



Suitable to clamp 2 workpieces with rough surfaces
and grip inserts

DUO Plus



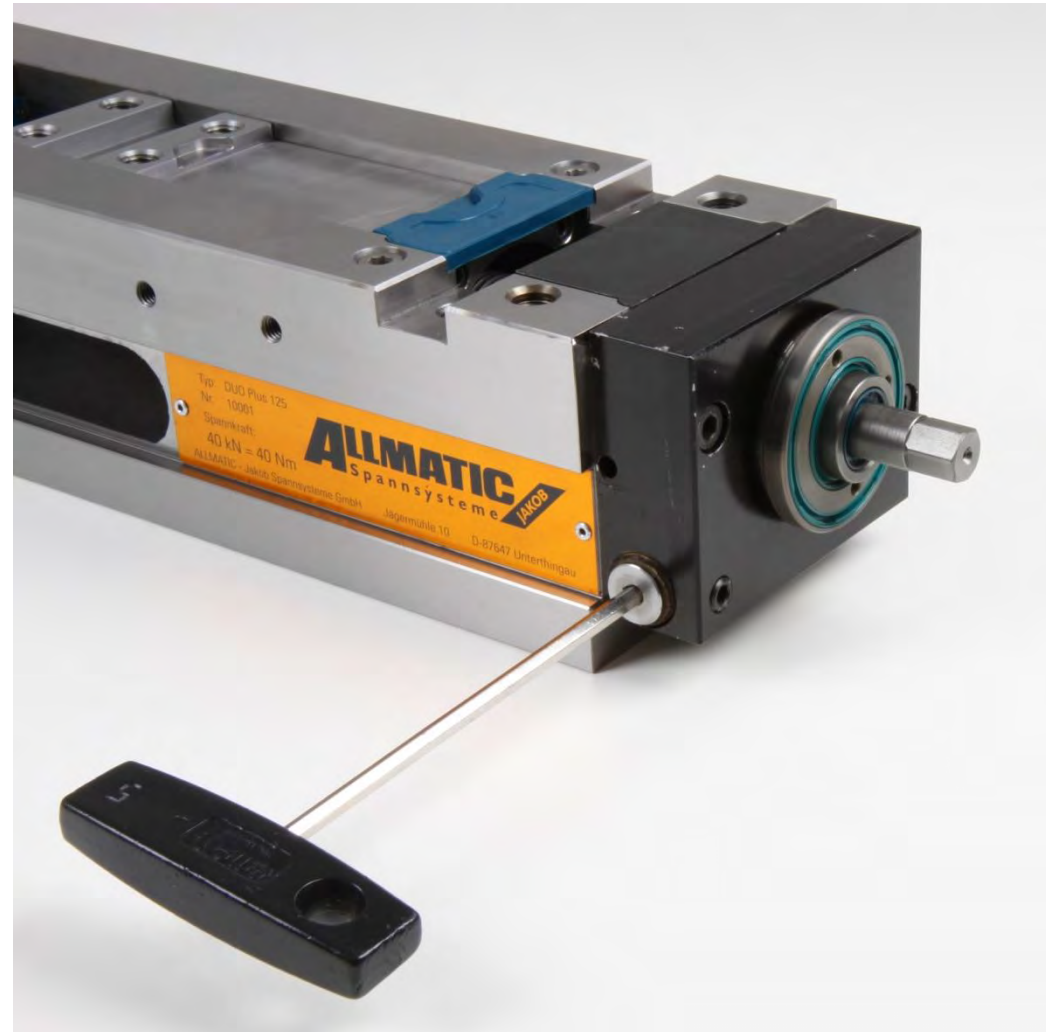
Or to clamp different workpieces:

1 workpiece = rough surface (1 –st op)

1 workpiece = flat premilled surface (2 –nd op)

DUO Plus

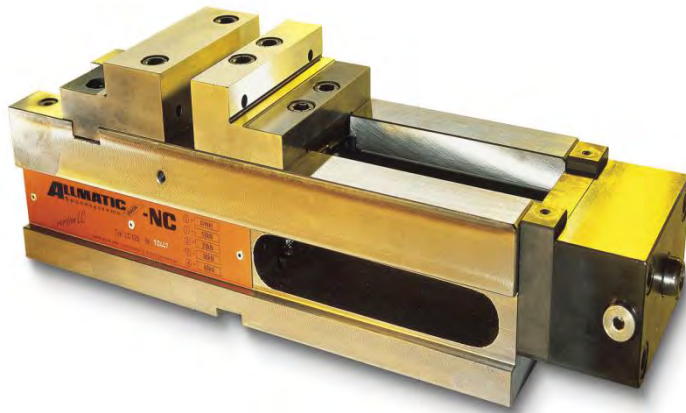
Clamping of workpieces with different length is possible:
Rotating the small adjusting spindle (max. approx. 270 degrees) the high pressure spindle moves forward or backward up to 25 mm. Workpieces up to a difference of 50 mm can be clamped absolutely secure.



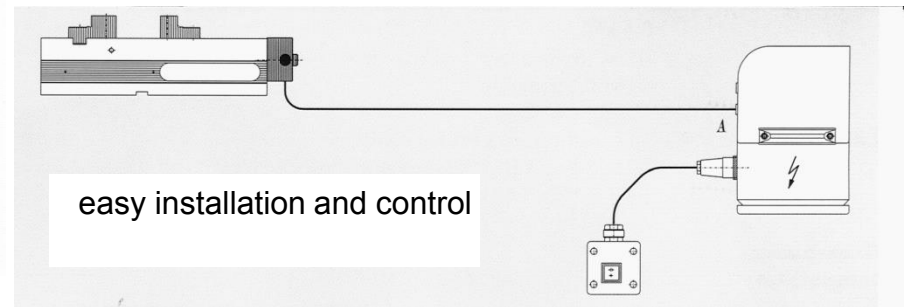
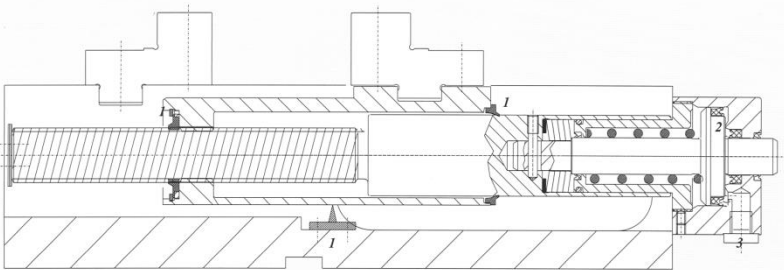
DUO Plus example of use



Hydraulic high pressure vice



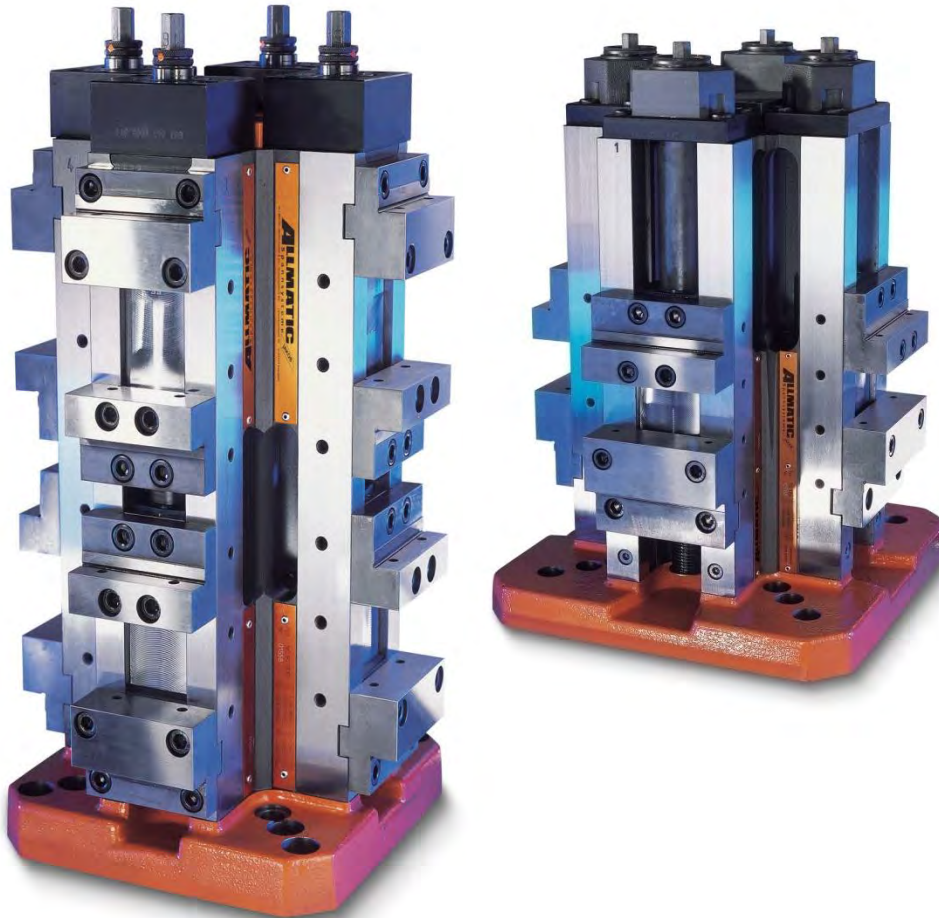
- base is LC- vice
- hydraulic stroke 4,5 mm
- clamping pressure regulation via hydraulic pressure
- Single acting hydraulic piston with additional package of belleville spring washers



example of use



Allmatic set-ups: monobloc



preselectable pressure setting

possibility to fit an angular drive

inductiv hardened supporting surface

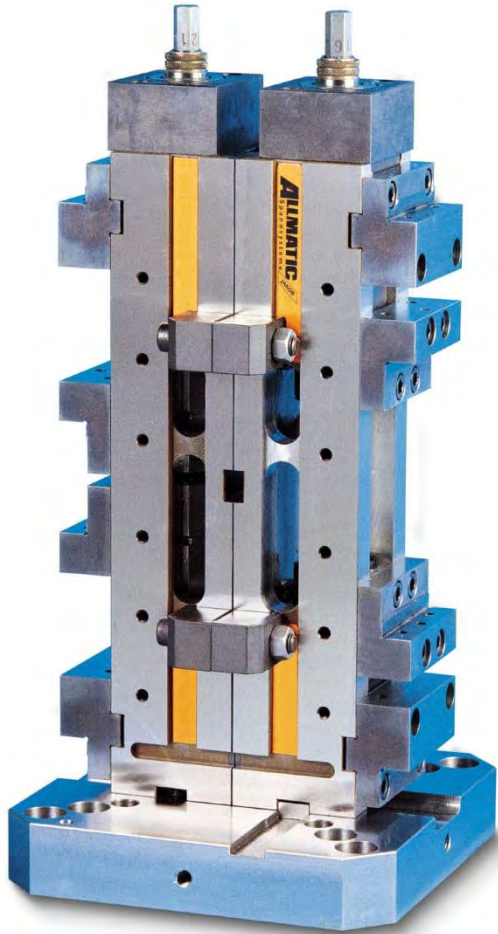
4 maintenance free, totally sealed spindles

base made from 1 bloc, gas nitrated and all around ground

Standard step jaws

Base plate: adapted to machine table, pallet, workpiece

Allmatic set-ups: DUO- Aufbau



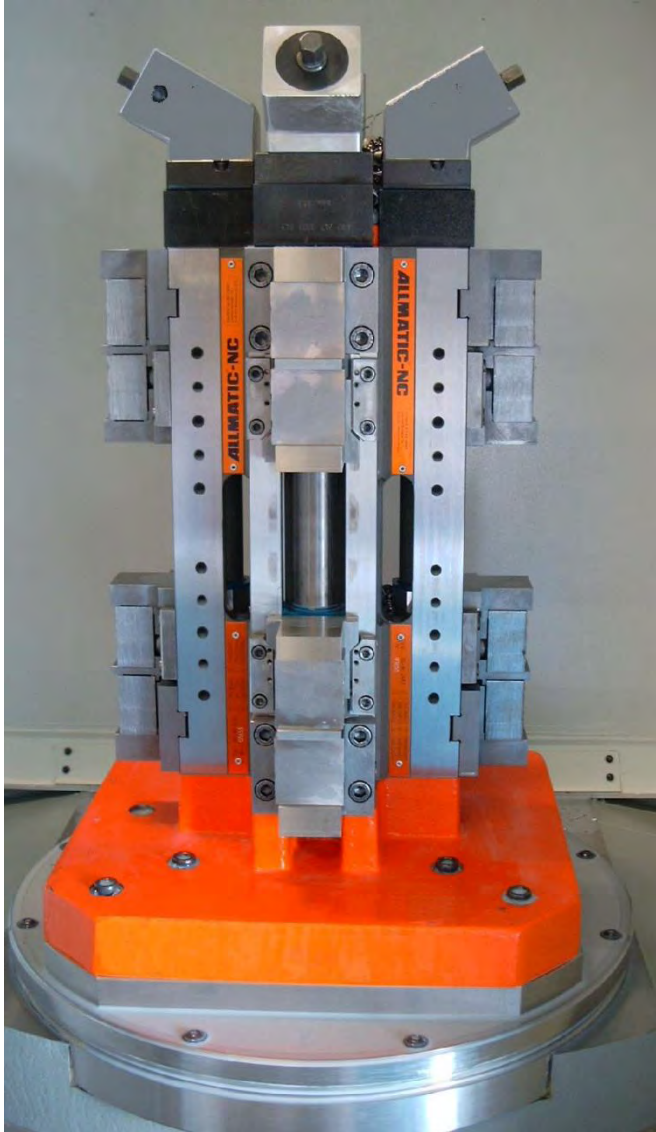
set-ups are basically built with standard vices or light modified vices

Set-up is possible with single or double vices

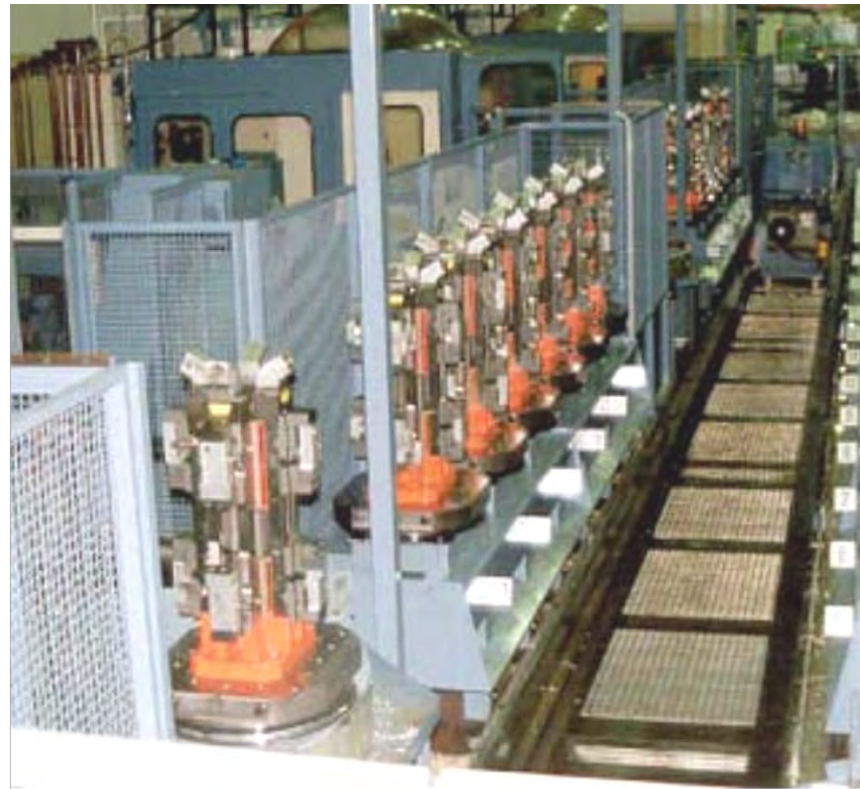
Configuration can be:

- 2 vices back to back
- 2 x 2 vices back to back
- 4 vices star formation
- 3 vices formation 120 degree

Example of use



Multiple clamping system for flexible manufacturing cell.
36 pallets with each 16 clamped workpieces



Example of use



Example of use



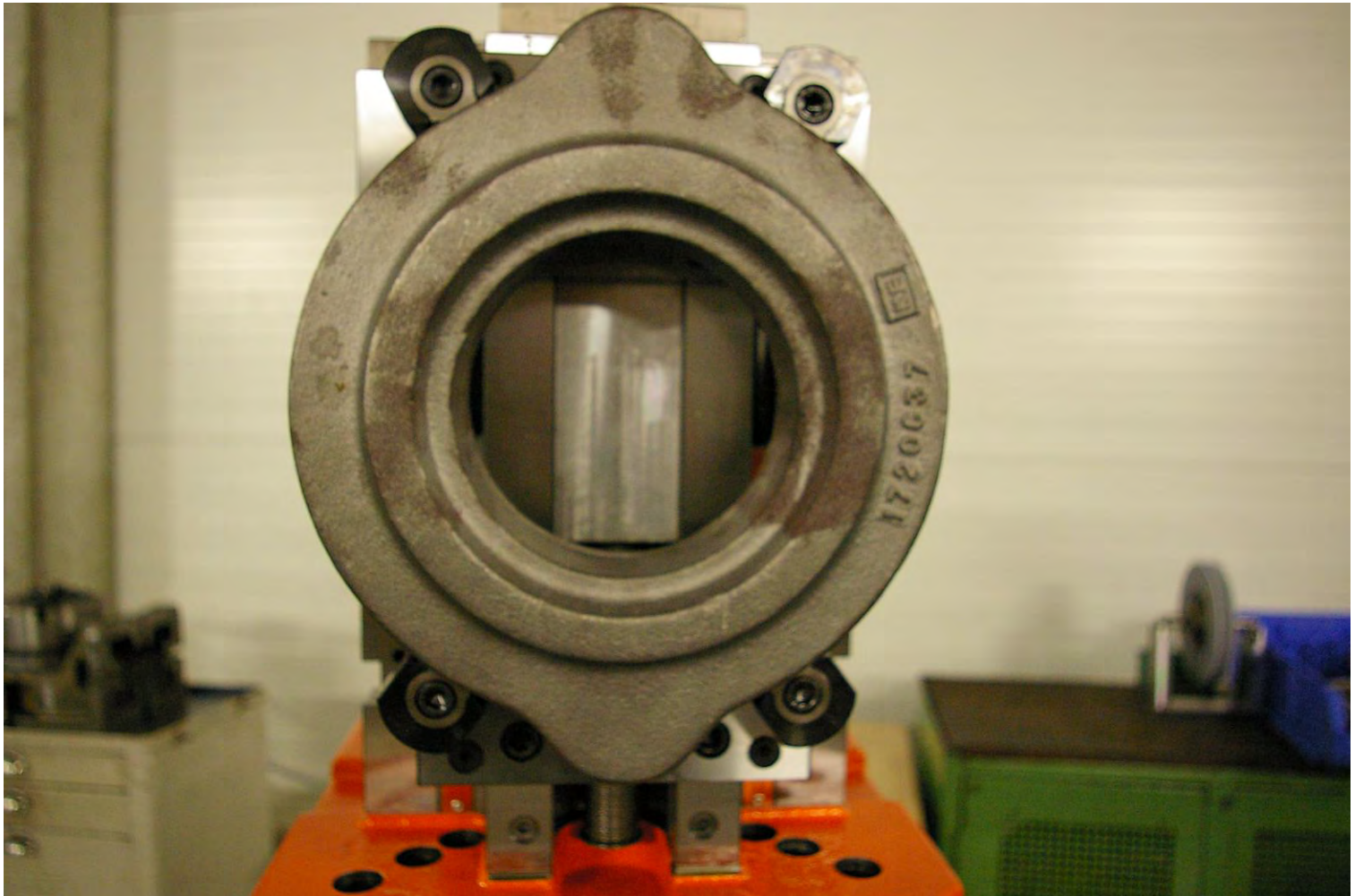
Example of use



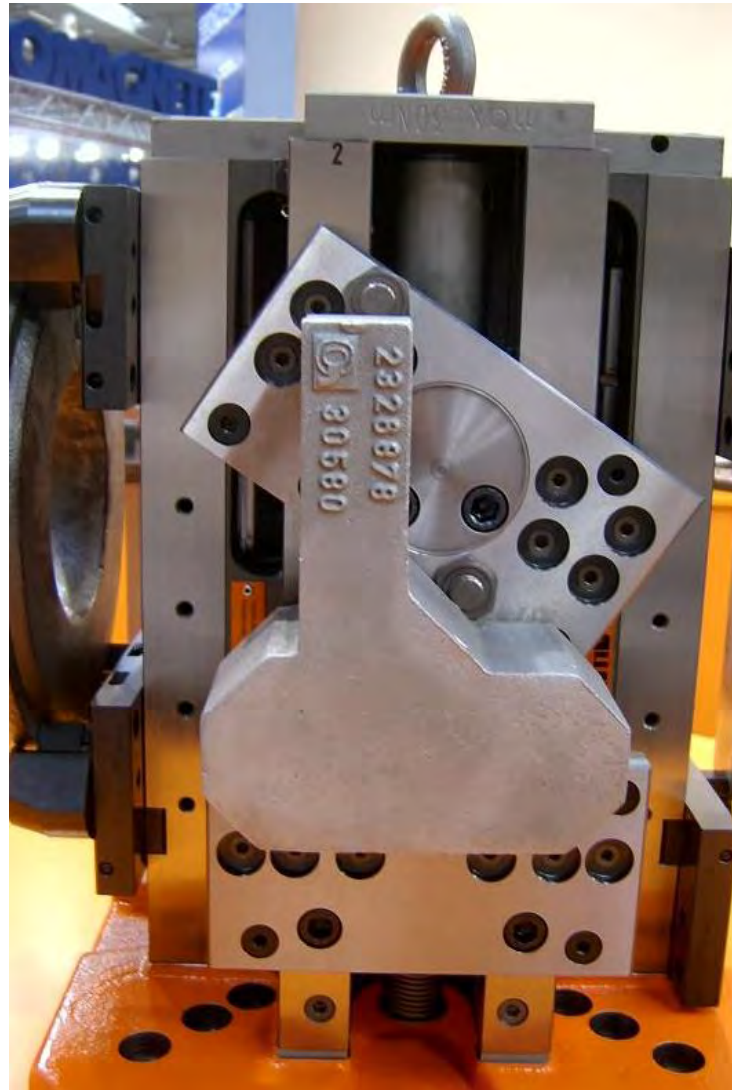
Example of use



Example of use



Example of use



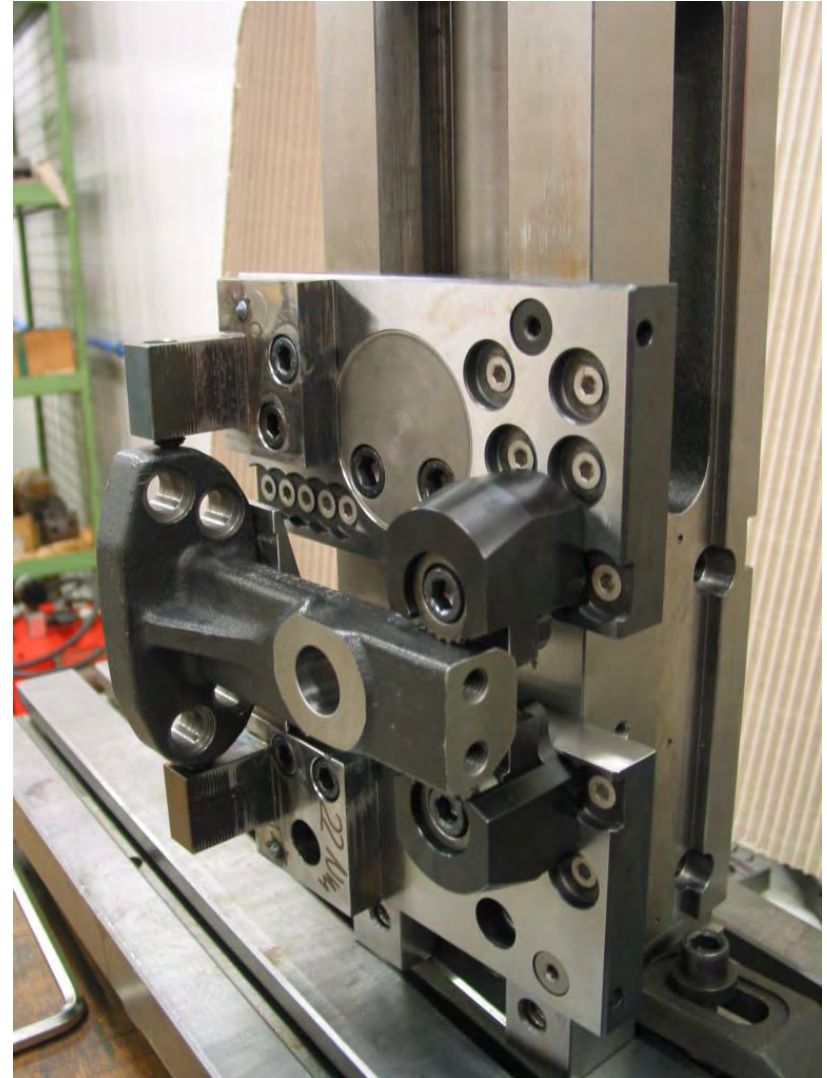
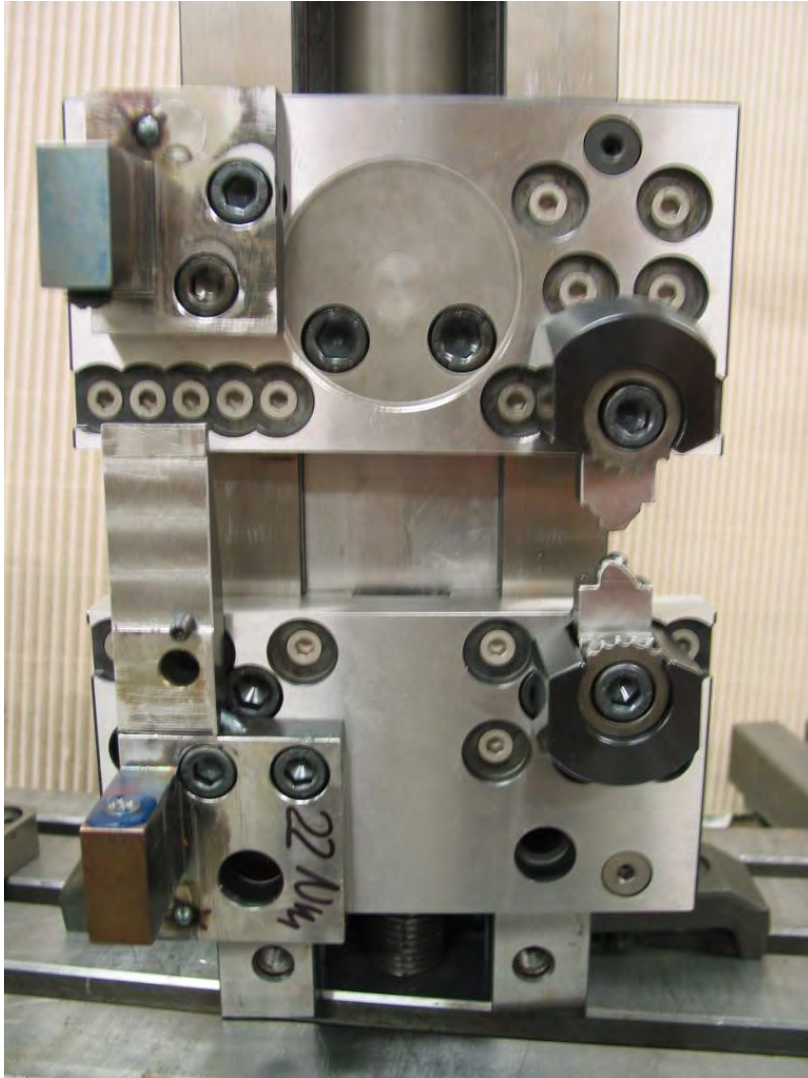
Example of use



Example of use



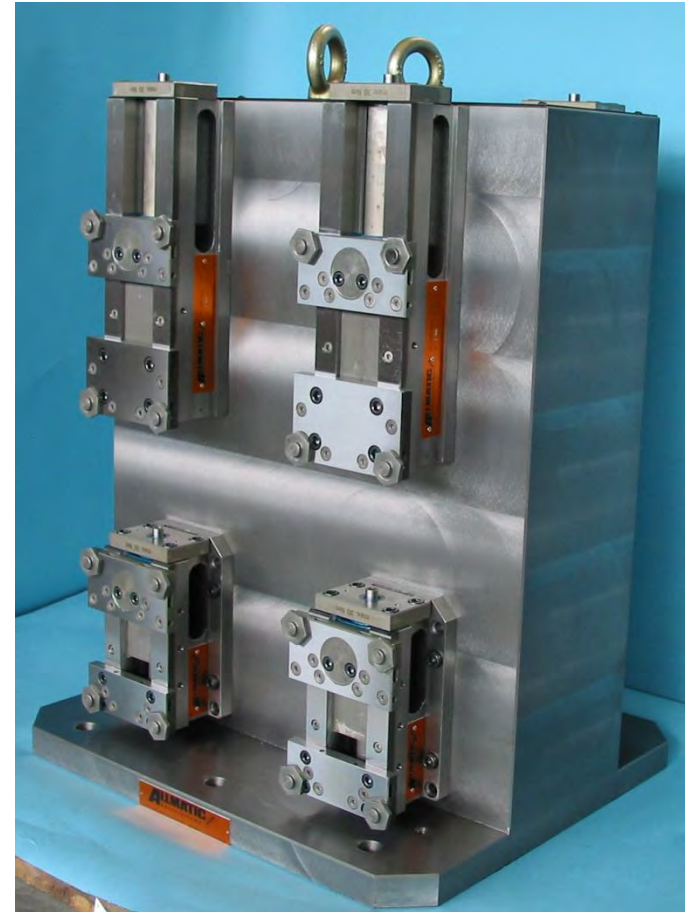
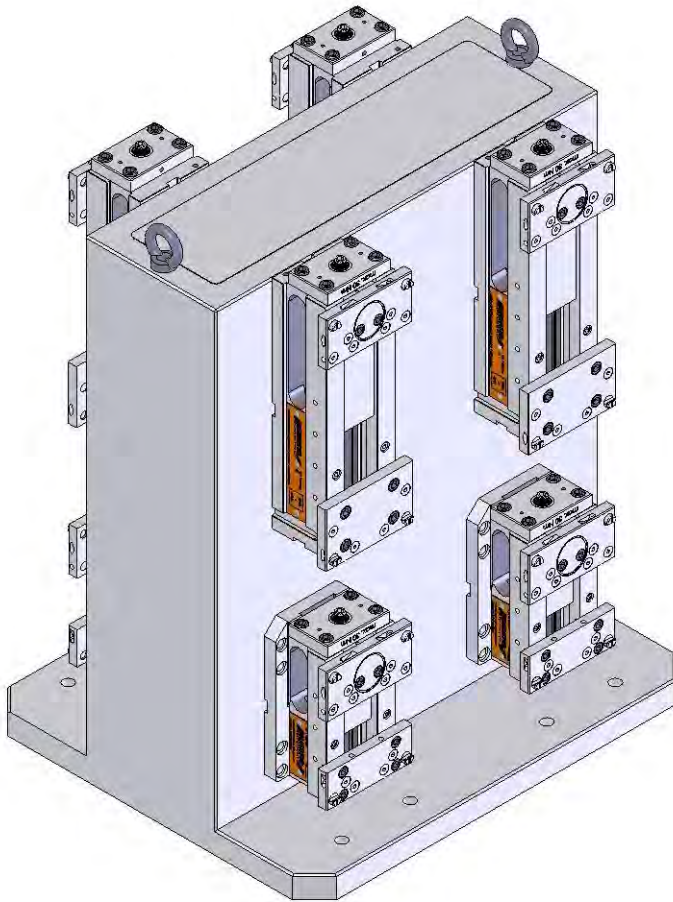
Example of use



Example of use



Specials



,the most exclusive bottle
opener of the world‘



Thank you for your
interest and
Good luck

