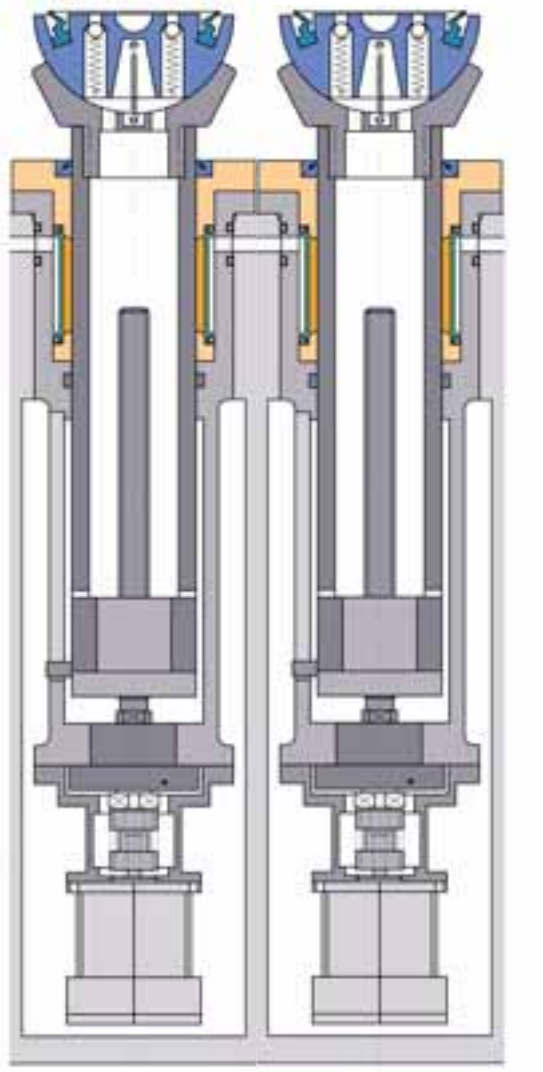
KOSTYRKA

FLEXIBLE TOOLING
UNIVERSAL HOLDING FIXTURES

ABSTRACT

Active and Passive Universal Holding Fixtures (UHF)



Active Jack Post

ACTIVE UHF

The figure to the left shows a self-contained, active jack post unit. It represents a technically superior solution for strokes up to 750 mm. High precision ground screw shafts and preloaded ball screws, together with high resolution stepping motors guarantee outstanding positioning accuracy to ±.005 mm (±.0002 in.)

For high axial stresses all jack supports are fitted with efficient mechanical brakes (clamping sleeves) allowing extraordinary vertical and horizontal loads. When utilizing the clamping effect the stepping motors may be disconnected from their power supply to save electricity and to avoid unnecessary heat generating.

Each jack post is individually adjustable and programmable by its own controller to conform to part shape. Stroke length is determined by the parts' lowest and highest fixturing point.

Service or replacement of any jack post is done from the top side of the UHF top plate. The clamping device, shaft, ball screw and motor can be extracted by simply removing four (4) socket head cap screws.

Jack posts with strokes extending 150 mm differ in their design from the example shown to the left, however they work on the same principle.

PASSIVE UHF

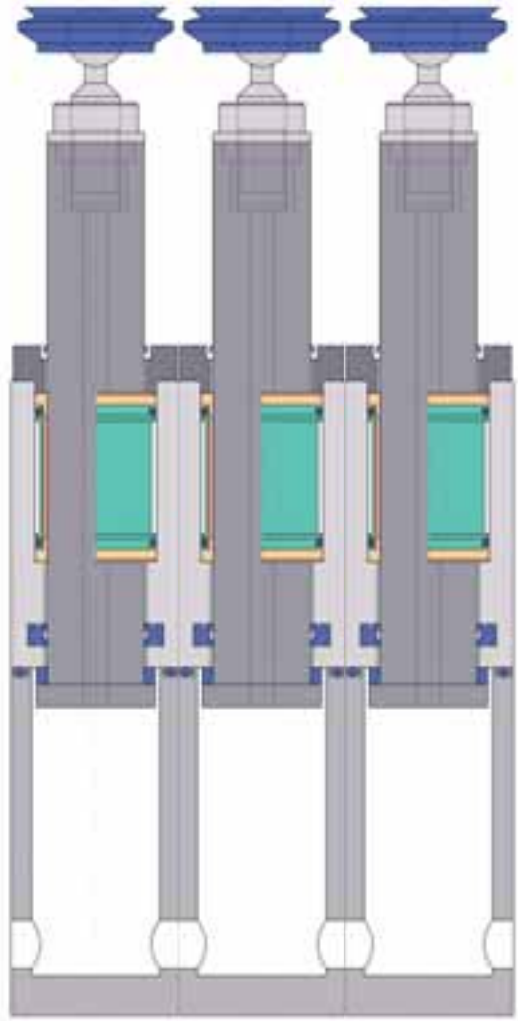
Passive jack posts, as shown to the right, consist of actuators only - capable of extending, retracting and clamping. These jack posts are positioned through external means, such as a robotic gantry or the machining center itself. The gantry system then sets the jack post to the correct heights.

NOTE: The passive UHF system leaves total position responsibility up to the CNC controller!

The setting process: With rod - clamping sleeves released all jack posts will be pushed to their outward position by use of compressed air. Then, low oil pressure will be built up around all sleeves simultaneously generating a clamping force just great enough to hold all jack posts in place.

Now all units will be precisely positioned by the milling head or robotic gantry. Setup accuracy and speed are dependent on the machine tool or robot.

The hydraulic clamping pressure will then be maximized to insure secure clamping. Once clamped, the jack post's axial and radial stiffness has become extraordinary, allowing immense loading of the system. KOSTYRKA jack posts can withstand up to several thousand pounds vertical weight with only (nearly immeasurable) elastic compression deflection of the jack post shaft.



Passive Jack Post

Universal Holding Fixtures - Significant Advantages

Recent polls of Universal Holding Fixture systems users cited significant advantages of (active and passive) UHF systems over conventional (hard tooling) methods. These large composite structures that hold a part to it's designed contour are created for each detail. They are larger than the parts they hold, are extremely heavy and block facility space. The part changeover time is very high and the use of riggers and a crane crew is traditionally required. Additional storage and handling equipment is also necessary.

KOSTYRKA GMBH from Stuttgart, Germany, is involved in research, development and production of sophisticated methods and fixtures to position, secure and clamp many types of workpieces, both large and small. In 1969 the company began manufacturing and distribution of a previously unknown clamping device: The Tension- or Clamping-Sleeve. Within a short time this unit became a versatile element with great benefits to modern workholding equipment.

Clamping Sleeve -

these clamping elements are able to transmit great forces, to open and to close with milliseconds and to be program-controlled. They are available with internal diameters from 8 to 1200 mm.

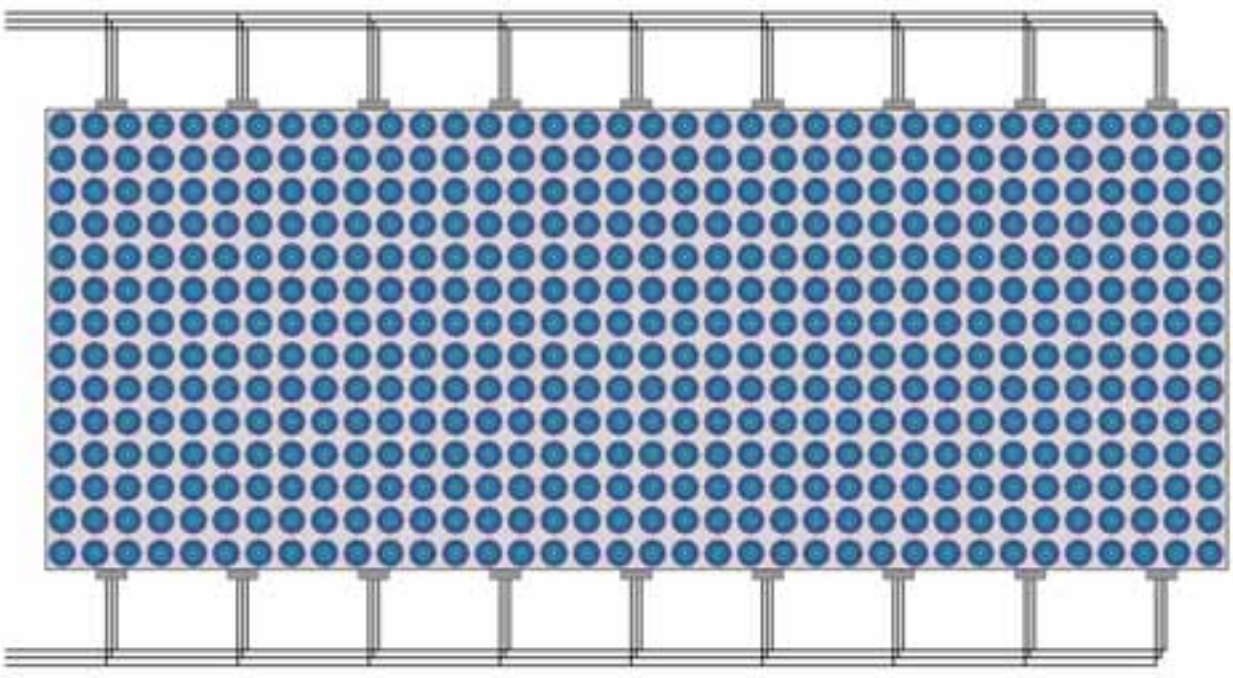
Very soon the aircraft-, aerospace and defense-industry took the advantage of the KOSTYRKA™ Clamping Sleeve for supporting and workholding applications, including for clamping jack posts in Universal Holding Fixtures.

The combination of up-to-date technical components and classically proven mechanical clamping systems enabled the development of the unique KOSTYRKA Universal Holding Fixtures. The KOSTYRKA - UHF is the basic component of one of the most versatile holding systems in use in the world today. In either of it's forms (active or passive) it provides manufacturing, assembly and inspection solutions with a level of flexibility and economy which could not be achieved before. Skins, nacelles, panels, doors, spars, stringers etc. are securely held for cutting, trimming, drilling, scanning, riveting, assembly and inspection purposes.

KOSTYRKA UHF systems use up to several hundred computer controlled variable height shafts to rigidly hold curved and shaped panels, large, contoured and/or variable geometry parts and structures (See figure below, "Bed Of Nails"). After implementing this flexible fixturing, recurring and non-recurring tooling costs become minimized because of dramatical reduction in setup time. There will be a considerable increase in part accuracy and quality, as well as diminution in material inventories and inspection requirements.

Features:

- Jack support actuators with positioning accuracy of ± 0,005 mm,
- Quick programming for rapid response to part shape or production changes,
- Modular structure of jack posts permits customized configurations,
- Utmost optimized service by plug-off-plug-in technology,
- Extremely dense configuration of passive and active jack posts down to 60 mm center line distance,
- No heat from permanently "living" systems,
- Extremely high permissible vertical loads,
- Capsulated design, impervious to dirt, dust, chips, swarf, abrasives and coolant fluids.



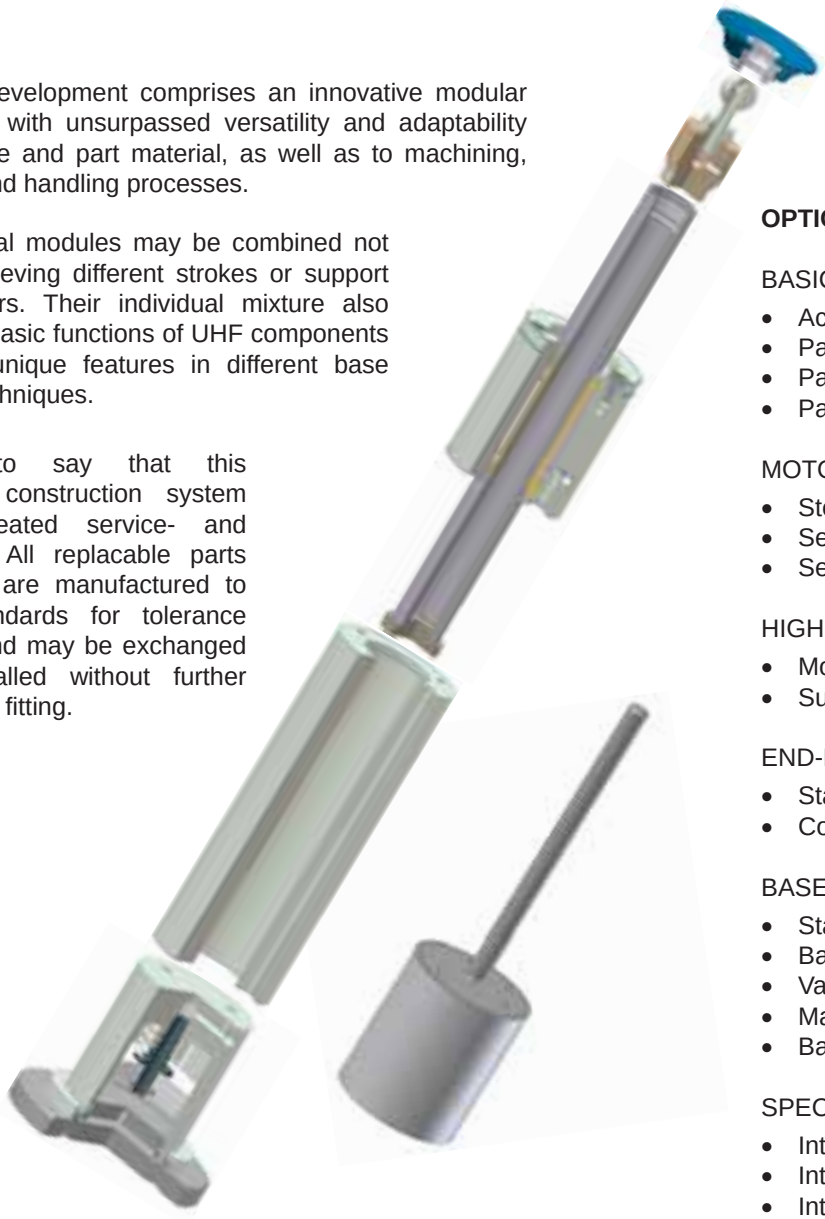
„Bed Of Nails"

Customized Universal Holding Fixtures

The latest development comprises an innovative modular UHF-system with unsurpassed versatility and adaptability to part shape and part material, as well as to machining, inspection and handling processes.

The individual modules may be combined not only for achieving different strokes or support rod diameters. Their individual mixture also determines basic functions of UHF components and offers unique features in different base mounting techniques.

Needless to say that this exceptional construction system allows unbeated service- and repairability. All replacable parts or modules are manufactured to definite standards for tolerance and finish and may be exchanged or field-installed without further machining or fitting.



OPTIONAL VARIETIES:

BASIC FUNCTIONS:

- Active System
- Passive System, neutral
- Passive System, air advance
- Passive System, spring advance

MOTOR + POSITIONING:

- Stepping Motor
- Servo Motor with/without resolver
- Separate Positioning Control

HIGH LOAD UHF:

- Motor with Gearbox and/or Brake
- Support Rod with Clamping Sleeve

END-EFFECTOR:

- Standard End-Effector
- Compensating End-Effector

BASE MOUNT:

- Standard Base Plate
- Base Plate with Connectors
- Vacuum Hold
- Magnetic Hold
- Bayonet Catch

SPECIALS:

- Integrated Booster
- Intergrated Pressurizer
- Internal/external Vacusystem

We would like to help you

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