



## Equipment of machinery for contract manufacturing

<b>Milling Technology:</b>	<b>CNC micro milling and micro drilling High-precision milling in <math>\mu</math>-range Standard milling (24/7 processing)</b>
<b>EDM Technology:</b>	<b>Wire EDM EDM die sinking Hole drilling EDM and precision drilling</b>
<b>Grinding and Lapping Technology:</b>	<b>Surface grinding Jig grinding One-disc-lapping</b>
<b>Laser Technology:</b>	<b>Laser marking and micro-labels</b>
<b>Measurement Technology:</b>	<b>Tactile 3D-metrology Optical metrology of dimension and surface</b>

### KERN-competencies:

- ✘ Manufacturing of micro parts and micro structures
- ✘ High precision machining in  $\mu$ -range
- ✘ Automated serial manufacturing
- ✘ Hard milling
- ✘ Surface quality down to Ra 0.05
- ✘ Complete manufacturing with different processing technologies
- ✘ High-End metrology
- ✘ Design and manufacturing of sub-assemblies

### Processing the following materials:

- ✘ Variety of steel alloys for example stainless steels or tool steels in the hardened state
- ✘ Copper and copper materials such as brass, bronze, nickel silver, tungsten copper
- ✘ Aluminium and aluminium alloys
- ✘ Titanium and titanium alloys
- ✘ Tungsten carbide and heavy metals such as molybdenum, tungsten
- ✘ Nickel-based alloys such as Inconel, Hastelloy and Nitinol
- ✘ Special alloys such as Kovar, Invar
- ✘ Plastics, particular Vespel
- ✘ machinable ceramics such as Macor or boron nitrides
- ✘ Sintered ceramics such as zirconium oxide or aluminium oxide (hard ceramics)
- ✘ possibly precious metals such as gold, platinum and silver



## **Machines:**

### **Micro milling and micro machining:**



### **Centrally controlled robot cell for serial production:**

**2x KERN Evo 5-axis-CNC- micro machining center**

**and**



**2x KERN Micro 5- axis-CNC- micro machining center**

### **CNC micro milling:**



### **Micro milling and micro drilling with individual automation**

**8x KERN Evo 5-axes CNC micro machining center**  
travels: X 300, Y 280, Z 250  
spindle speed 50,000 rpm  
with System 3R 60-fold work piece changer,  
laser tool measurement and infrared touch probe

**2x KERN Evo 3-axes CNC micro machining center**  
travels: X 300, Y 280, Z 250,  
spindle speed 50,000 rpm  
with System 3R 10-fold work piece changer,  
laser tool measurement and infrared touch probe

### **High Precision machining centres:**



### **High precision milling, 5-axes simultaneous machining and options of jig grinding**

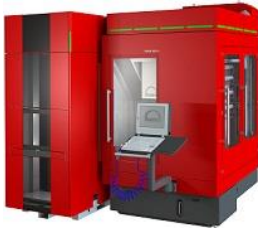
**1x KERN Triton 5-axes CNC -Nano high precision machining center**  
hydrostatic guide ways  
travels: X 500, Y 500, Z 400  
spindle speed 42 000 rpm  
with System 3R 10-fold work piece changer,  
laser tool measurement and infrared touch probe



- 1x** **KERN Micro 5-axes CNC high precision machining center**  
spindle speed 50 000 rpm  
HSK25 tool magazine with 99 positions,  
Integrated 30-fold workpiece changer



- 1x** **KERN Micro HD 5-axes CNC high precision machining center**  
hydrostatic guide ways, integrated linear motor drives  
travels: X 350, Y 220, Z 250  
spindle speed 42 000  $1/\text{min}$   
c-axis 360° endles, 200  $1/\text{min}$ ; b-axis 200°  
HSK40 tool magazine with 184 positions  
with Erowa Robot Compact 75-position pallet changer,  
laser- tool measurement and infrared touch probe



- 2x** **KERN Micro 5-axes CNC high precision machining center**  
travels: X 350, Y 220, Z 250  
spindle speed 42 000  $1/\text{min}$   
c-axis 360° endles, 200  $1/\text{min}$ ; b-axis 200°  
HSK40 tool magazine with 184 positions  
with Erowa Robot Compact 75-position pallet changer,  
laser- tool measurement and infraret touch probe

#### Laser marking:



- 1x** **TruMark Station 5000 with TruMark 3230**  
travels: X 300, Y 300, Z 500 with axis of rotation  
wave length 532nm, focus diameter 24 $\mu\text{m}$

## Wire EDM:



- 1x AGIE CHARMILLES Cut 3000 Twin-Wire**  
travels: X500, Y 350, Z 256  
thinnest wire  $\varnothing 0,03$ ; two-wire system for processing with standard wires and fine wires in one operation  
best surface quality of Ra0,05  
accuracy of contour  $\pm 0,0015$ , AGIE 3D touch system



- 1x AGIE CHARMILLES Vertex 3F**  
travels: X500, Y 350, Z 256  
thinnest wire  $\varnothing 0,03$   
best surface quality of Ra0,05  
accuracy of contour  $\pm 0,0015$ , AGIE 3D touch system



- 1x MITSUBISHI FA20S**  
travels: X 500, Y 350, Z 300; max cutting height 295  
with axis of rotation

## Sink EDM:



- 1x ZIMMER & KREIM GENIUS 850**  
travels: X 565, Y 400, Z 415  
16-fold electrode changer, system 3R clamping system,  
dynamic Z-axis and micro generator  
Fine plain generator for surface values Ra 0,2.

### Hole drilling EDM:



- 1x AGIE CNC Präzidril**  
hole drilling EDM from  $\varnothing 0,23$  up to  $\varnothing 3$   
depth up to 250mm, or 300 x  $\varnothing$

### One-disc-lapping:



- 1x STÄHLI LTS-RF-600 Lapping machine**  
outer  $\varnothing$  of lapping disc 610 mm  
3-ring system with dressing ring inner  $\varnothing 248$  mm  
disc of cast steel, spiral grooved allows an Rz-value of 0,67  
Based on the Bi-Composite disc an even finer surface finish can be reached, as basic for polishing metallic sealing surfaces.

### Flat and parallel grinding:



- 2x JUNG JF 520 flat grinding machine**  
grinding length 600mm, traversal 200 mm

### Sand Blasting:



- 1X HGH 6040-DUO sand blasting cabin**  
2-steps-sand-blasting-procedure  
Sharp-edged corundum (50-70 $\mu$ m corn size)  
Ball-corundum (30 $\mu$ m corn size)  
Two work-places of: 590 x 400 x 250 mm

### Measurement Technology:



- 1x ZEISS Prismo 3D-coordinate measuring machine**  
travels: X 900, Y 1200, Z 600  
VAST XT touch probe system  
automatic touch probe changer



- 1x ZEISS O-Inspect 3D -coordinate measuring machine**  
 travels: X 400, Y 400, Z 200  
 optical and tactile measurement  
 automatic touch probe changer  
 smallest touch probe  $\varnothing 0,3\text{mm}$   
 with topographic 3D-demonstration per white light sensor as well  
 able for transparent materials



- 1x ZEISS O-Inspect 3D -coordinate measuring machine**  
 travels: X 400, Y 400, Z 200  
 optical and tactile measurement  
 automatic touch probe changer  
 smallest touch probe  $\varnothing 0,3\text{mm}$



- 1x ZEISS F25 3D-coordinate measuring machine**  
 travels: X 100, Y 100, Z 100  
 touch probe  $\varnothing 0,3\text{mm}$  and  $\varnothing 0,12\text{mm}$   
 measurement accuracy  $0,25\mu\text{m}$



- 2x ZEISS Duramax 3D-coordinate measuring machine**  
 Travels: X 500, Y 500, Z 500



- 1X CONVOFIS DUO Vario surface measuring device**  
 High-precision measurement in the nanometer range  
 objectively tower  $50 \times 0,95$   
 measuring of Rz- und Ra- values up to 6 nm



- 1x Video measuring microscope MM01**  
 with automatic edge detection  
 measurement area: X 200, Y 100, Z 100



- 1x MITUTOYO QUICK VISION 3D-CNC-optical measurement machine**  
travels: X 200, Y 200, Z 150
- 1x Dr. Schneider WM2BV measurement projector**  
data processing in 2D (dxf, dwg), travels: X 250, Y 140, Z 200
- 1x ZEISS TSK SURFCOM 130A surface measuring instrument**  
surface quality according to Ra, Rz, Rmax
- 2x ZEISS ZKM 01-250D optical 2D-coordinate measuring unit**  
travels: X 250, Y 125
- 5x Heidenhain height measuring instrument with macro video**  
measurement area : Z 12.5 -25mm , accuracy of 1 micron
- 5x ZEISS stereo microscopes**  
magnification 8-32 fold
- 1x MITUTOYO Mess-Profilprojektor**  
magnification 100-20-100fach

**We have more than 1500 units of measuring and test equipment which are regularly checked and calibrated.**