HARDY

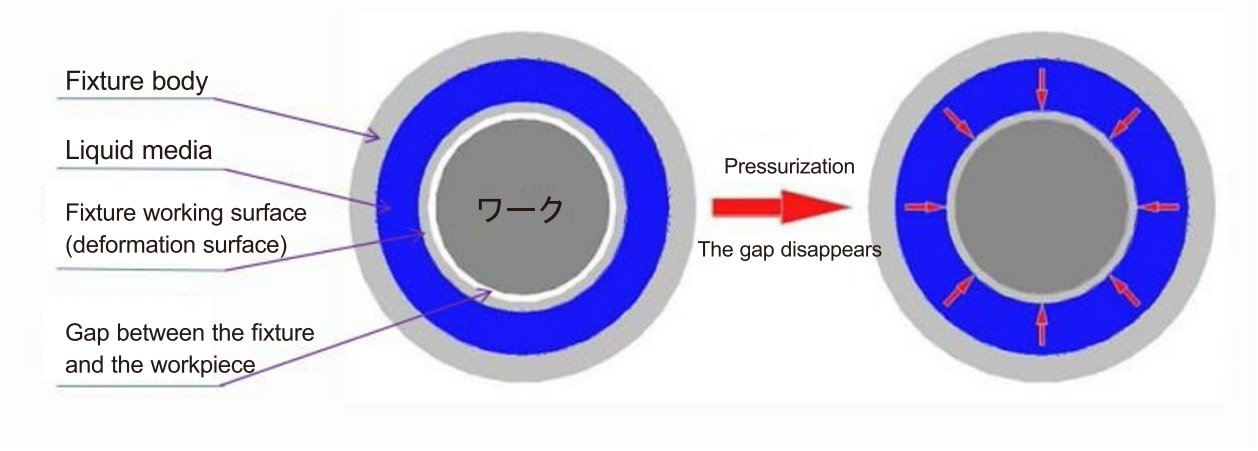
High Precision Liquid Expansion Fixture

Advantages: The measured circle runout accuracy is within 0.001mm. The repeatability of positionin g is within 0.002mm;
Turning and grinding of thin-walled parts.
Gear processing (hobbing, grinding, shaping, shaving, turning, cloth teeth); Internal and external cylindrical grinding and honing processing.
Clamping of workpieces in inspection equipment, such as tooth shape detection , dynam ic balancing, etc..
Quick change system.

Principle of Liquid Expansion

According to the law of hydrostatics —- "Pascal's law": after any point in an incompressible stationary fluid is subjected to an external force that increases the pressure of the pressure, this pressure increase is transmitted instantaneously to all points of the stationary fluid.

The liquid expansion fixture adopts static pressure expansion technology, after pressurizing the liquid in the fixture, the hydraulic medium generates pressure under the action of the pressurization mechanism, forcing the deformation element of the fixture to uniformly produce elastic deformation along the 360° circumferential direction, so as to realize the expansion of the workpiece positioning hole/shaft. The expansion fixture enables both workpiece positioning and torque transfer. The clamping is extremely reliable and safe, and can be achieved by selecting a reducer sleeve to respond to the requirements of flexible production. Flexible adjustment and fast clamping reduce the changeover time, greatly improve production efficiency and equipment utilization rate, and reduce production costs. The liquid expansion fixture can give full play to the performance of the machine tool, improve the processing accuracy of the workpiece, and maintain the consistency of the product.

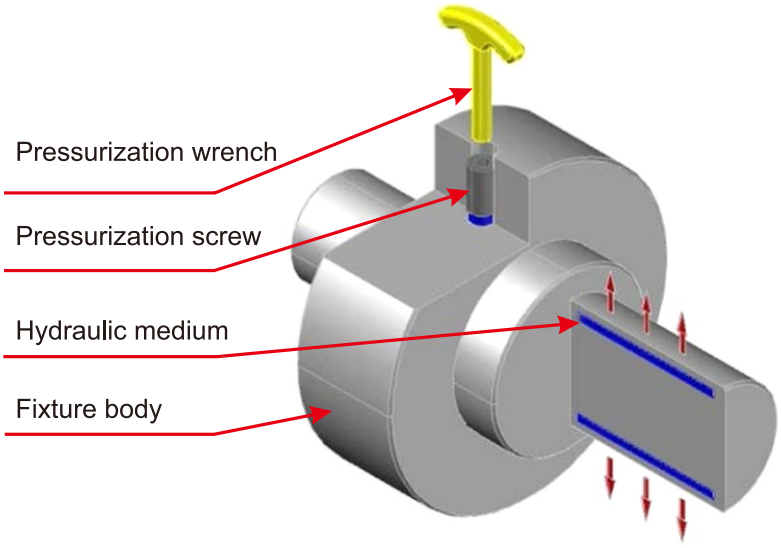


Features of the Liquid Expansion Fixture

- The inside of the fixture is filled with liquid medium.
- The hydraulic system inside the fixture is independent and does not communicate with the outside world.
- The fixture can be clamped manually, or it can be automatically clamped with the machine tool.
- The working surface of the fixture is elastic deformation and has a long service life.
- The fixture performs a circular 360° seamless gripping of the workpiece, and the surface contact occurs between the workpiece.
- The clamping force is generated by the hydraulic pressure, the force is uniform and the pressure is stable.
- When the workpiece is clamped, the clamping force is large, the design pressure can reach 100MPa, the clamping force can be adjusted, the deformation is small, and the processing accuracy is high.
- The repeatability of the fixture is < 0.002mm, and the consistency of the product is good.
- The speed of clamping the workpiece and disassembling the workpiece is fast, and the work efficiency is high.
- The fixture is tailored according to the equipment and workpiece, and has strong adaptability.
- The maximum expansion of the fixture is 0.3% of the clamping diameter.
- The minimum diameter of the fixture is 8 mm, which can maintain high accuracy and rigidity at the same time.
- It can be used with variable diameter circlips, spline circlips and other accessories to realize the processing of workpieces of various sizes and specifications.
- The liquid expansion fixture can realize the rapid replacement of workpieces and fixtures.

The way the fixture clamps the workpiece

Clamping method 1: External Expansion - Expanding the inner diameter of the workpiece



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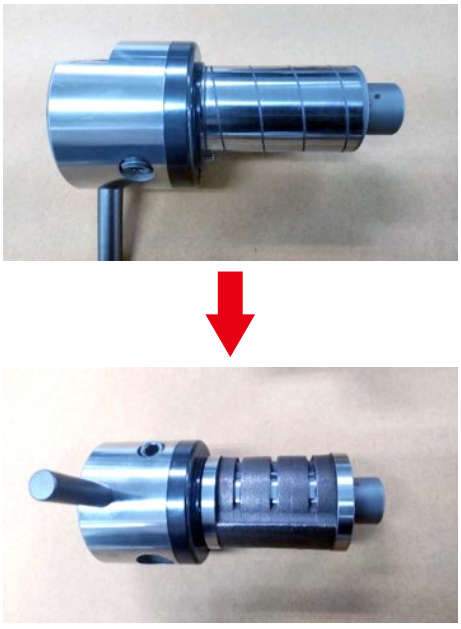
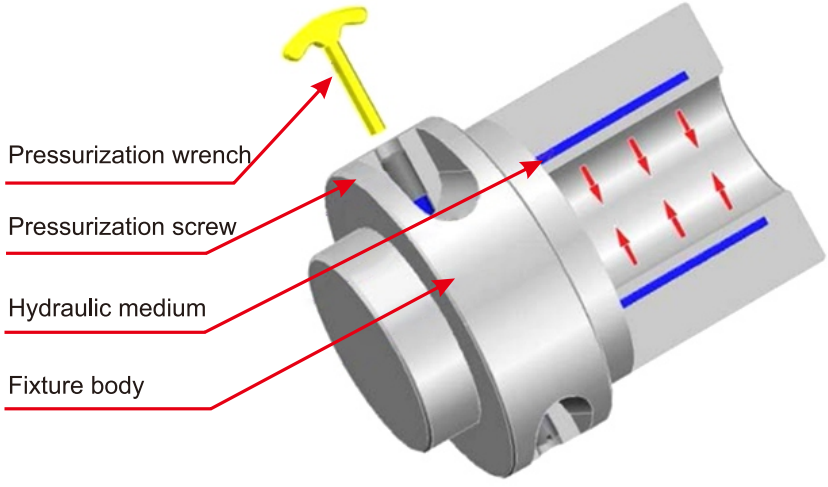


Clamping mothod 2: Internal oxpansion - clamping the outer diameter of tho workpiece



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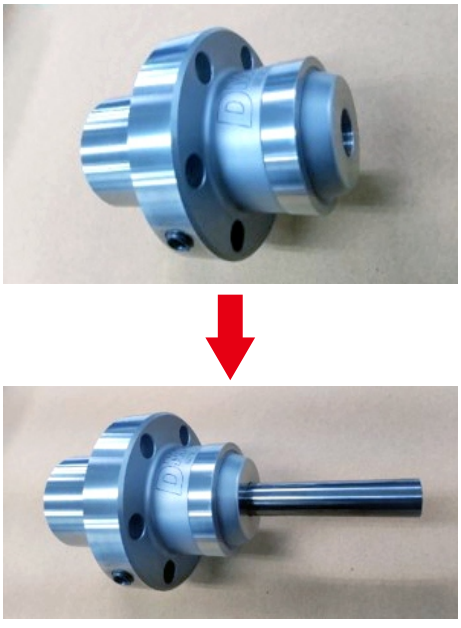
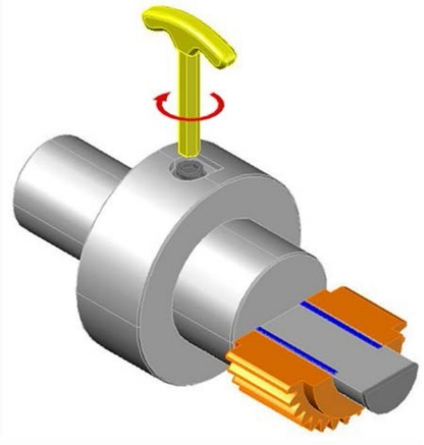
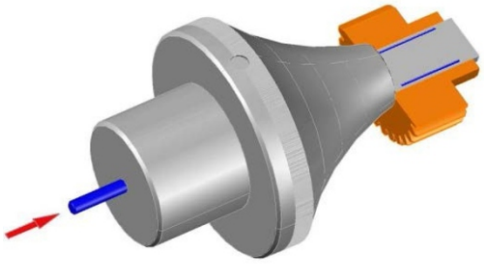


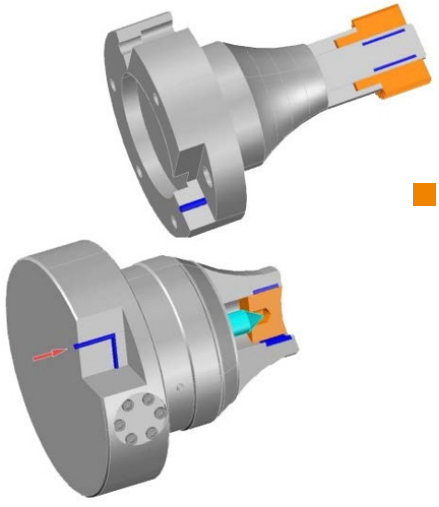
Pressurization Method



- **Pressurization Method 1:**
  Manual pressurization:
  Using a torque wrench.
  Tighten/loosen the pressurized screws.



- **Pressurization Method 2:**
  Automatic pressurization:
  Pusher/tie rod pressurization.
  The piston rod on the fixture is matched to the pusher on the machine.

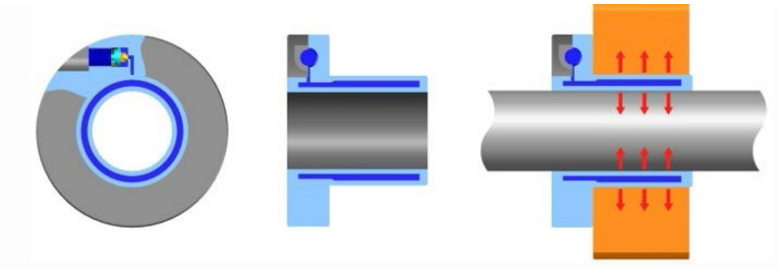


- **Pressurization Method 3:**
  Automatic pressurization:
  The machine is supplied with oil.
  Built-in pressurized piston.

Application Scenario Introduction and Physical Photos

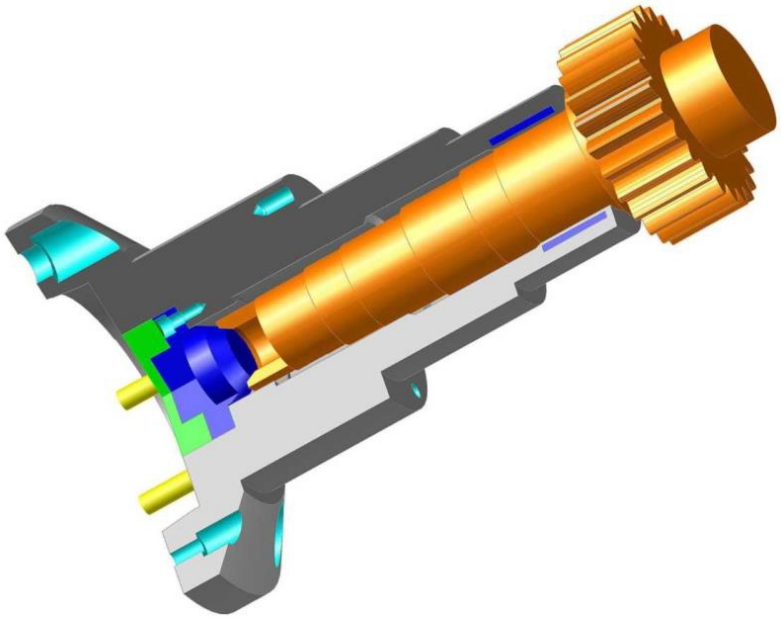
Applications:

- Turning and grinding of thin-walled parts.
- Gear processing (hobbing, grinding, shaping, shaving, turning, cloth teeth).
- Internal and external cylindrical grinding and honing processing.
- Clamping of workpieces in testing equipment, such as tooth shape detection, dynamic balancing, etc..
- Quick change system.



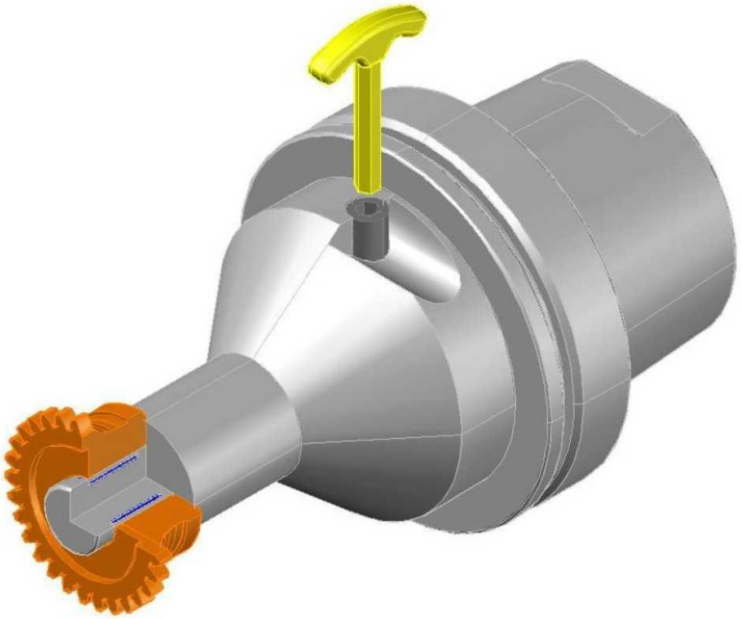
- **Name: Liquid expansion coupling (also known as expansion coupling sleeve)**
- **Features:** Control the expansion and retraction of the expansion sleeve by tightening and loosening the screws. The built-in independent hydraulic system can make the expansion sleeve expand evenly inward and outward at the same time, and while the outer diameter automatically rises and centers, the inner diameter also holds the shaft and supports the outer hole. It can achieve high-precision positioning and strong torque transmission at the same time.
- **It has the following features:**
  1. Quick and easy installation.
  2. Accurate positioning.
  3. One-sided radial runout within 3pm.
  4. The size of the expansion sleeve is small, saving axial space, and there are more possibilities for radial fit.
  5. Easy to disassemble.
  6. Reusable.
  7. There is no damage or scratch on the surface of the part and the position where the fixture is in contact.
  8. The fixture and the part are in surface contact, the clamping force is large, and the clamping force is inward and outward, and the clamping force is evenly distributed along the internal and external contact surfaces.

Application Scenario Introduction and Physical Photos



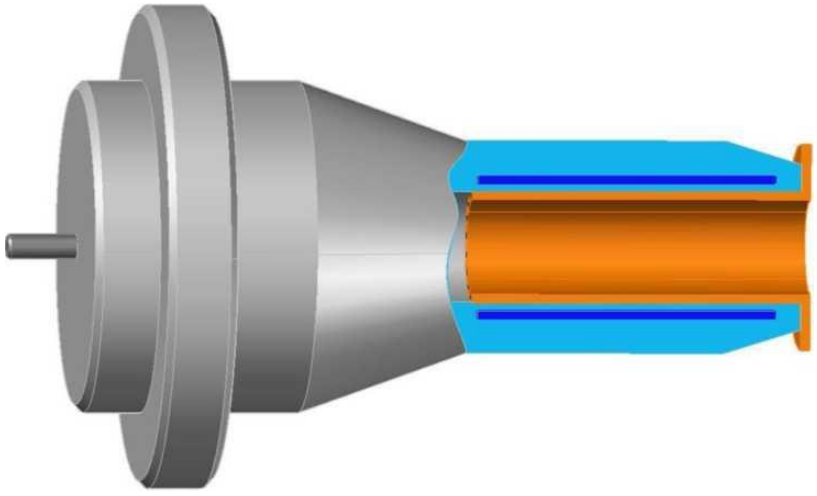
- **Applicable Equipment:** Honing equipment
  Clamping Method: automatic clamping

- **Applicable Equipment:** gear grinding machine
  Clamping Method: manual clamping

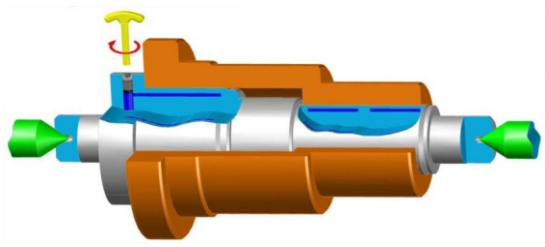


Application Scenario Introduction and Physical Photos

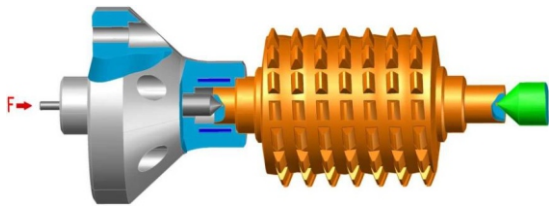
- **Applicable Equipment:** turning machine tools.
- **Clamping Method:** automatic clamping.
- **Applications:** Suitable for fine turning of inner holes of thin-walled parts. There is surface contact between the fixture and the workpiece. After clamping, the defor mation of the workpiece is small, the roundness is high, the coaxiality is high, and the consistency of the processed product is good. This type of fixture can also be used on high-precision grinding machines for internal hole grinding.



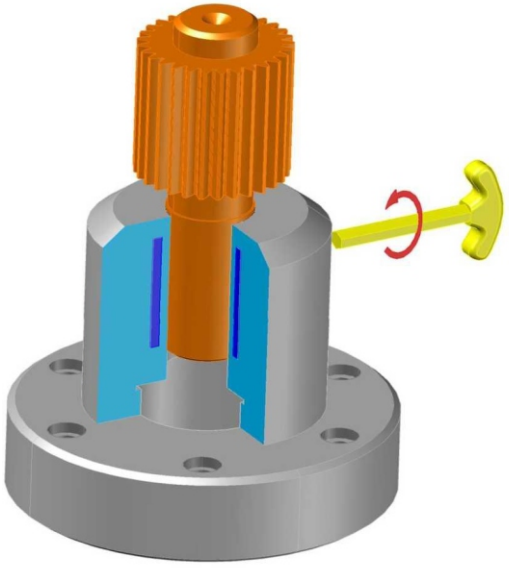
- **Applicable Equipment:** cylindrical grinding machine.
- **Clamping Method:** manual clamping.
- **Applications:** Clamping of step holes.



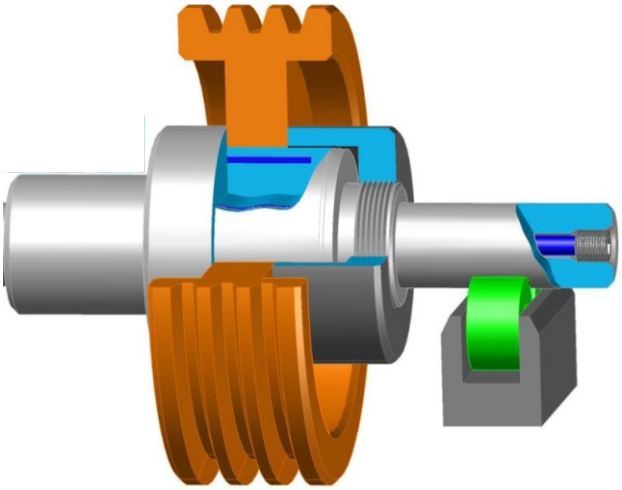
- **Applicable Equipment:** gear grinding machine tool.
- **Clamping Method:** automatic clamping.
- **Applications:** Tool making, sharpening and clamping.



Application Scenario Introduction and Physical Photos

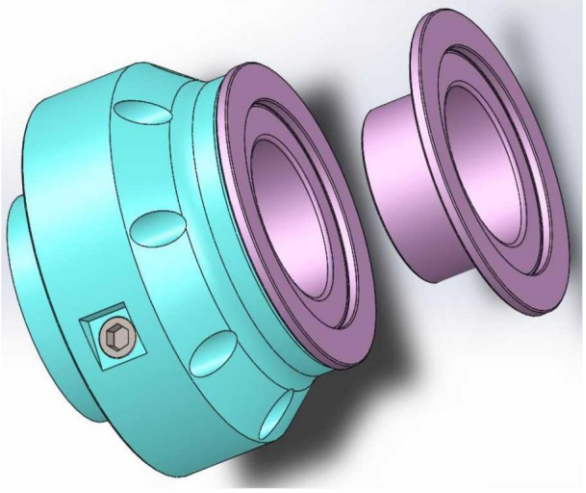


- **Applicable Equipment:** gea r detection equipment.
- **Clamping Method:** manual clamping.

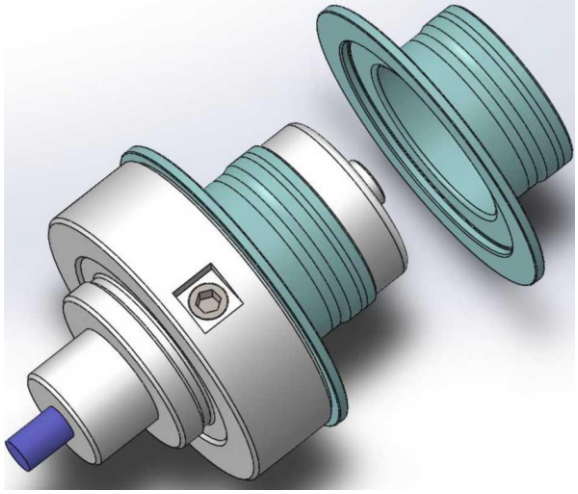


- **Applicable Equipment:** dynamic balancing equipment.
- **Clamping Method:** manual clamping.
- **Features:** The fixture has been dynamically balanced.

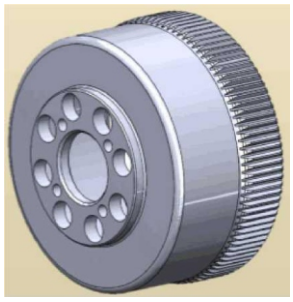
- **Applicable Equipment:** turning machine tools.
- **Clamping Method:** manual clamping.
- **Features:** Suitable for fine turning of thin wall parts inner hole and end face.

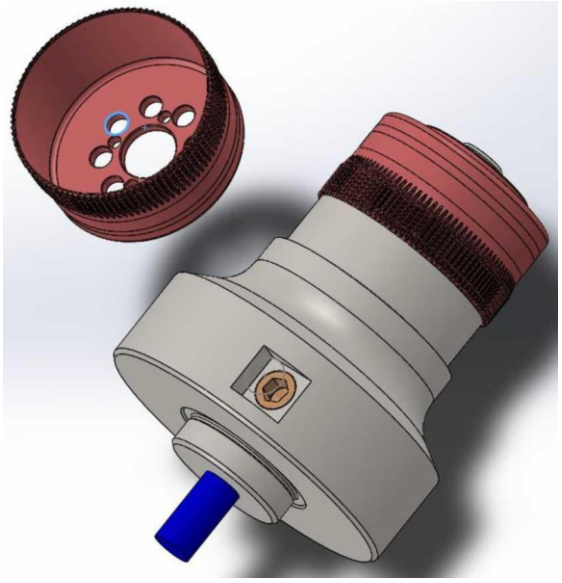


- **Applicable Equipment:** turning machine tools.
- **Clamping Method:** automatic clamping.
- **Features:** Suitable for fine turning of thin-walled parts outer circle and end face.



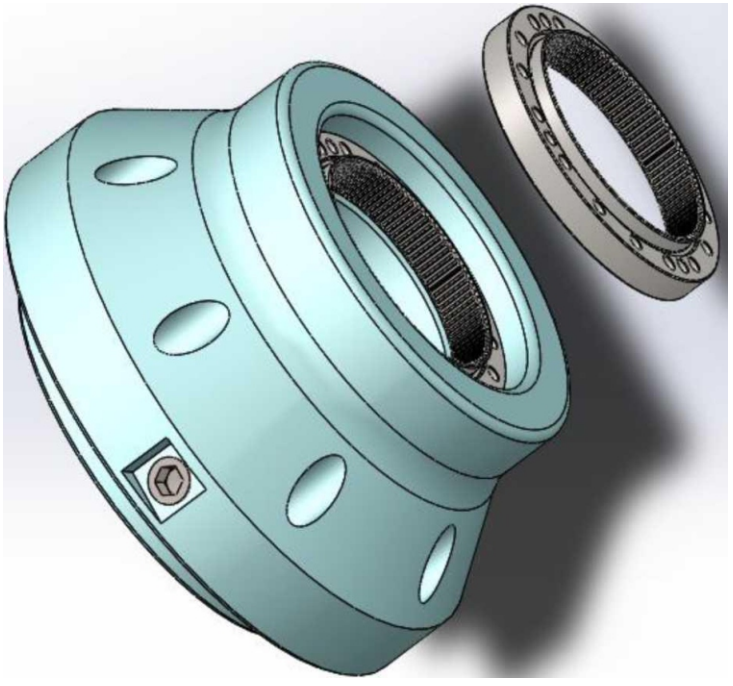
Application Scenario Introduction and Physical Photos





- **Applicable Equipment:** gear hobbing machine.
- **Clamping Method:** automatic clamping.
- **Features:** Suitable for hobbing of small module gears.

- **Applicable Equipment:** gear turning machine, gear shaping machine.
- **Clamping Method:** manual clamping.
- **Features:** Positioning and clamping the workpiece by holding the outer circle of the workpiece.



Application Scenario Introduction and Physical Photos

Grinding fixture

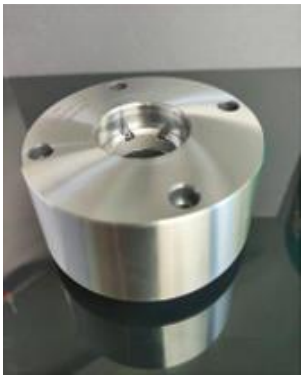
Grinding fixture

Hobbing fixture

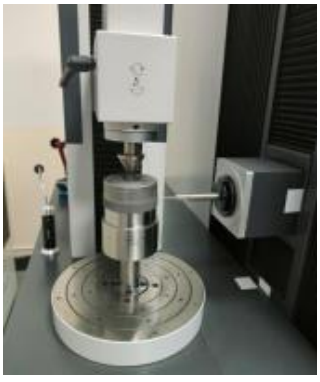
Hobbing fixture

Grinding machine fixture

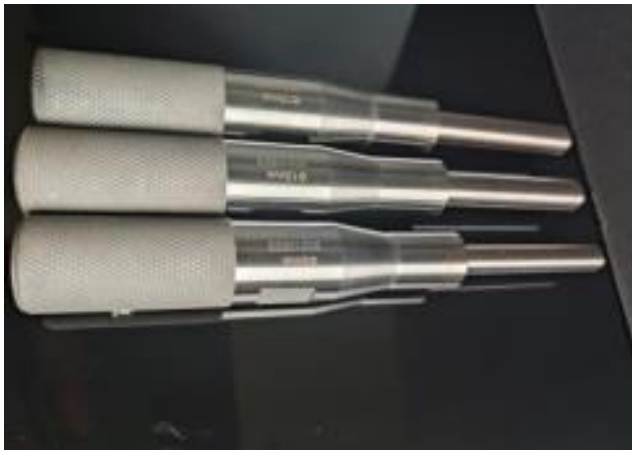
Grinding machine fixture



Tooth fixture



Fixture for testing

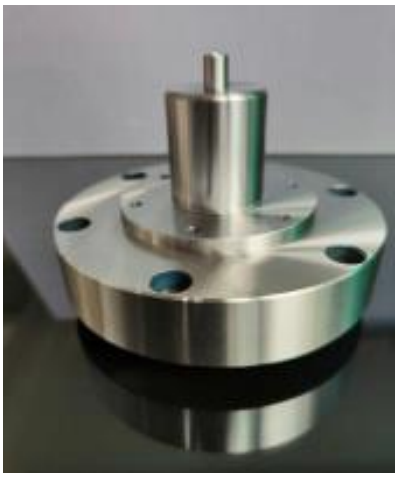


Grinding machine fixture

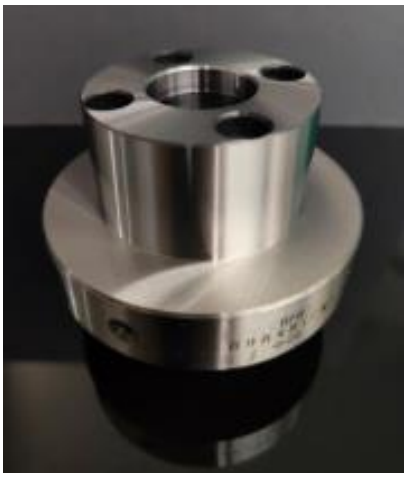
Grinding machine fixture

Application Scenario Introduction and Physical Photos

Lathe fixture (brace bore)



Lathe fixture (brace bore)



Liquid expansion coupling

Parts produced using
liquid expansion fixtures

Liquid expansion coupling

Lathe fixture (holding outer circle)

Manufacturer:

DMW DE MA WEI Guangzhou DE MA WEI Industrial Equipment Manufacture Co.,Ltd
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