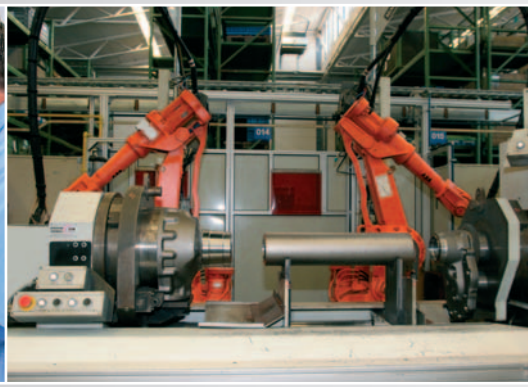
ROEMHELD

System solutions for production engineering



Solutions | for | productivity

ROEMHELD

Increase in productivity –

by modern clamping and positioning systems

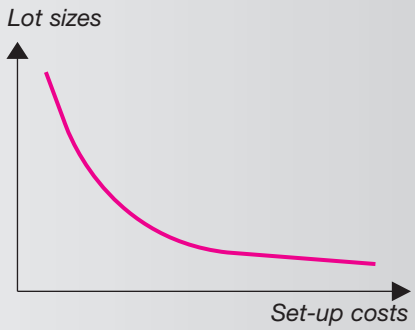
The efficiency of manufacturing processes on machine tools depends more and more on the clamping and positioning technique of the workpiece. Whereas machining times are exhausted up to fractions of a second, clamping and positioning processes amount to lost production.

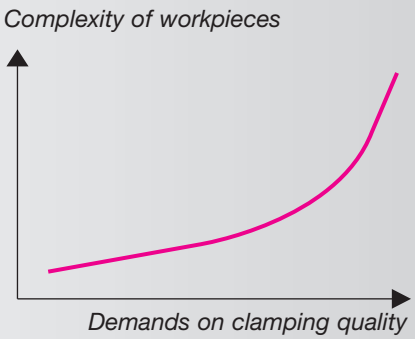
Always shorter product life cycles require shorter delivery times, smaller batch sizes and a grown variety of variants. Frequent changes of clamping means and clamping fixtures increase the proportion of set-up times with regard to the manufacturing time.

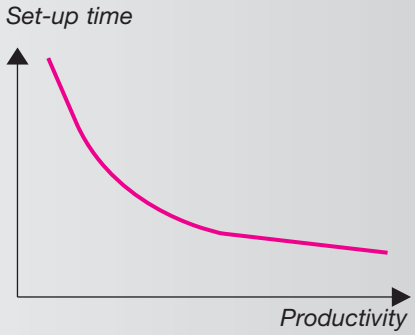
The development of smaller and more filigree fragile components increases the direct influence of the clamping quality on the workpiece precision and the ratio of rejects. Clamping with minimum deformation and optimised force flow are more and more important so that by increase of clamping quality, even in case of set-up concepts parallel to the primary processing time, the economical manufacturing results are considerably improved.

To ensure the base of the commercial success - the manufacturing process - also the clamping and positioning technique has to be optimised to the maximum.

Our clamping, fixture and positioning systems implement concepts, which meet today's and future requirements and guarantee a sustainable increase in productivity.







Single source supply

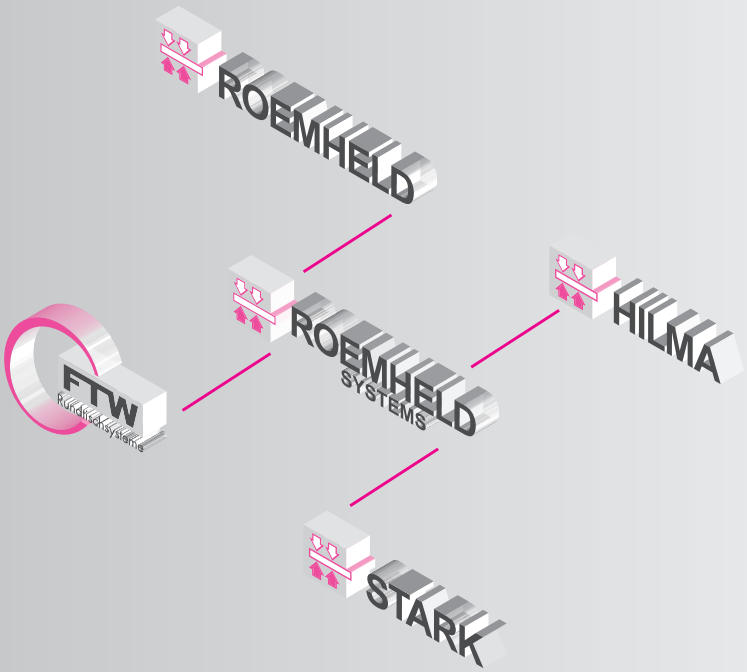
**From the idea, to engineering,
to start up and maintenance**

If it is the matter of planning of clamping systems for a new machine tool or of optimising and transition to flexible of already existing clamping processes, we give you our advice and support. Founded on your demands we develop for you ideas and support you in engineering , start up and maintenance.

For this purpose an extended analysis of your planned or existing clamping and set-up processes as well as an intensive examination of your manufacturing and automation processes are the basis.

In close cooperation with you we establish concepts for solutions and make risk analyses as well as efficiency assessments with detailed cost estimation. For smooth and efficient project handling we prepare all required planning records and specify global and detailled system specifications. We attend to you in the purchasing stage, coordinate the start up in due time and work out specific maintenance plans.

Thereby innovative clamping, fixture and positioning systems are made, which can be technically realised and guarantee long term your manufacturing competitive edge.



Competences in the ROEMHELD Group

More than 40 years of international experience and professional competence

The development of user-oriented solutions for complex clamping tasks is from the beginning part of our self-image. In partnership with our customers at home and abroad we specify these solutions and realise them.

With the sound know-how of all experts in power workholding in the ROEMHELD Group - Hilma-Römheld GmbH and Stark Spannsysteme GmbH - as well as the manufacturer of rotary tables FTW GmbH, ROEMHELD Systems combines perhaps the most versatile professional competence available in the field of clamping and positioning technique.

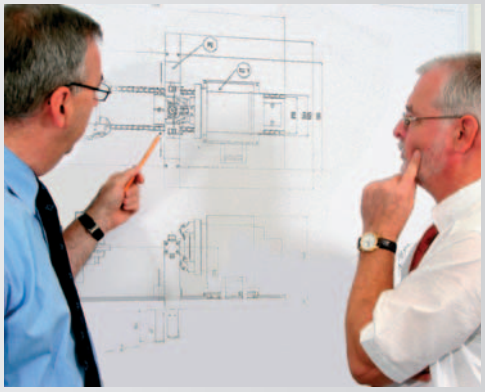
Expert know-how on call

Individual consultation and services

From the first consultation free of charge up to order-related services our activities for all tasks in clamping and positioning technique are adjusted to your requests and objectives.

If it is a matter of preparation of concepts or constructional sketches for partial or complete solutions or calculations of amortisations or detailled constructions:
You decide yourself of which services you make use.

Also splitting up of a task in several sub-projects is possible to get step by step to a solution ready for operation.



Approved and reliable solutions

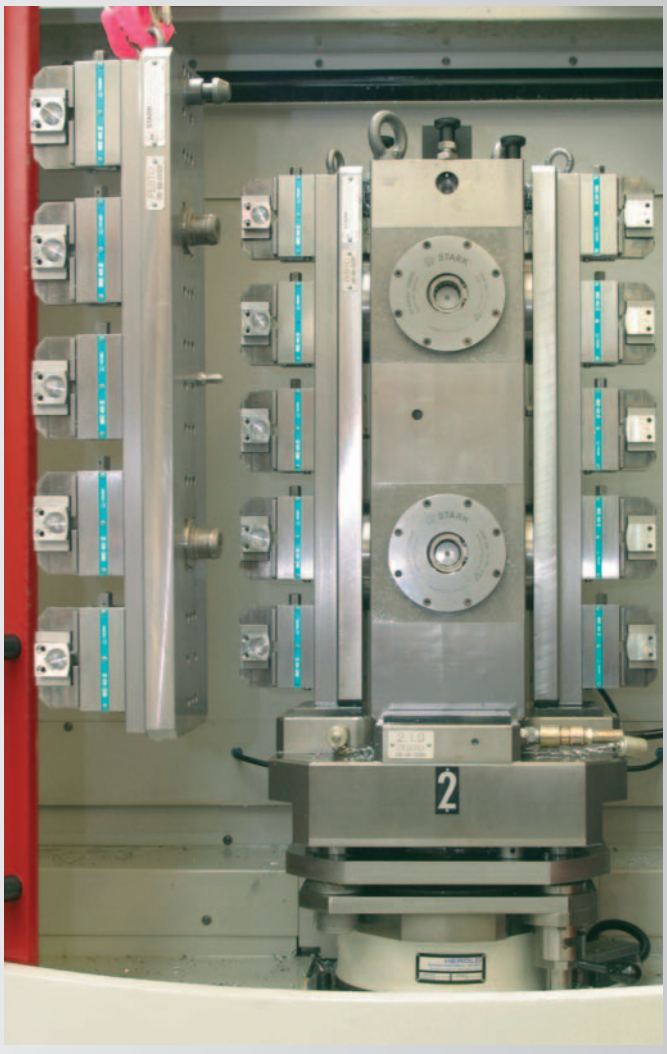
Clamping and fixture systems made of standard modules

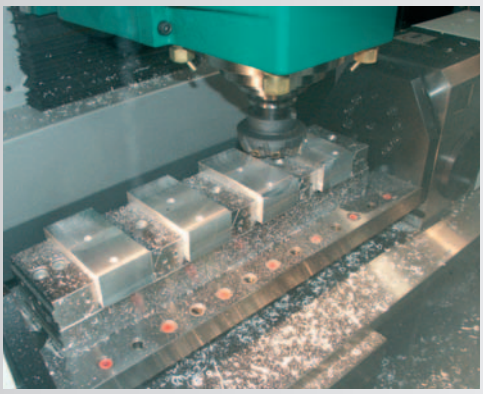
With the experience in realising versatile individual projects in the individual companies of the ROEMHELD Group we are now in the position to offer an unique, modular product range of clamping and fixture systems.

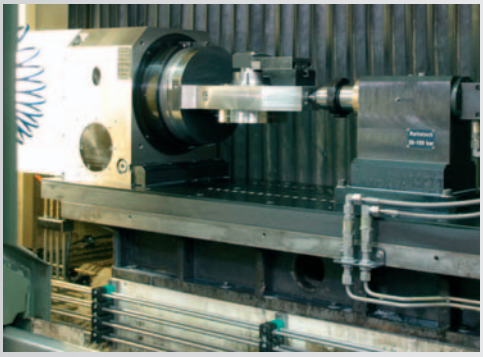
Depending on the machine tool there are the following clamping and fixutre systems:

- **Horizontal machining**
- **Vertical machining**
- **5-axis machining**

The use of approved and reliable standard modules is the key for optimised production and engineering costs and guarantees the realisation of individual system solutions without risks.







System solutions - directly from the manufacturer of power workholding

Customer-specific clamping and positioning systems

Our engineering know-how and the huge number of fully-developed clamping and positioning technologies in the ROEMHELD Group allows us to produce and to deliver customer-specific systems.

Whereas Roemheld covers the complete range of hydraulic clamping elements and clamping power units, Hilma-Römheld GmbH offers with standard fixtures and machine vices as well as Stark GmbH with zero-point mounting systems extensive, alternative and complementary clamping techniques. In positioning technique of workpieces on machine tools FTW GmbH with modern N/C rotary table and multi-axes swivel systems as well as Stark GmbH as pioneer in the range of zero-point mounting systems take up a technological key role.

If a customer-specific clamping and positioning system consists mainly of components and modules of the ROEMHELD Group, proved series products or modifications can be advantageously used. In case of delivery of individual workpiece fixtures we co-operate with recognized companies for fixture construction.

Due to design and production of the relevant components within the ROEMHELD Group we have access to extended know-how and well-proven production engineering, which together with our engineering know-how guarantees a fully-developed and reliable function of the complete system.

ROEMHELD Systems as contractor for the complete system undertakes beside the complete engineering and project coordination also the management of the complete purchase. Persons to contact for the customer with regard to all questions are only the project engineers of ROEMHELD Systems.

System solutions for complexe clamping and positioning tasks directly from the manufacturer of power workholding guarantee advantages in the realisation of the project and its purchase.

Modular clamping and fixture systems

Horizontal machining, vertical machining, 5-axis machining

Due to the systematic analysis of numerous projects in the companies of the ROEMHELD Group ROEMHELD Systems has developed modular clamping and fixture systems. The modules can be combined due to suitable interfaces and cover thereby a large range of applications in the metal-cutting manufacturing industry.

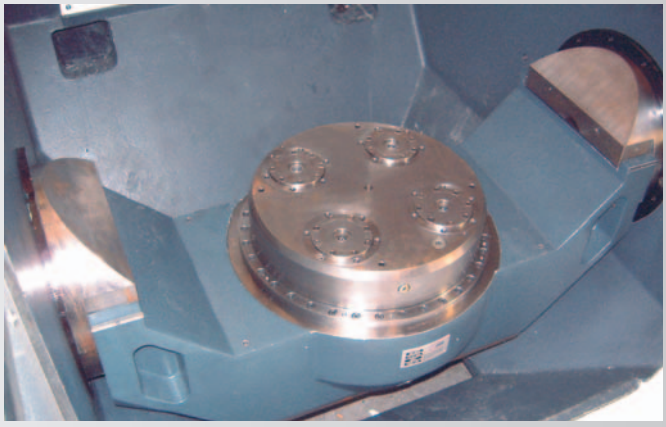
The basis of modular clamping and fixture systems is power workholding, which allows clamping within seconds and due to repetitive and adjustable clamping force the required conditions are ensured.

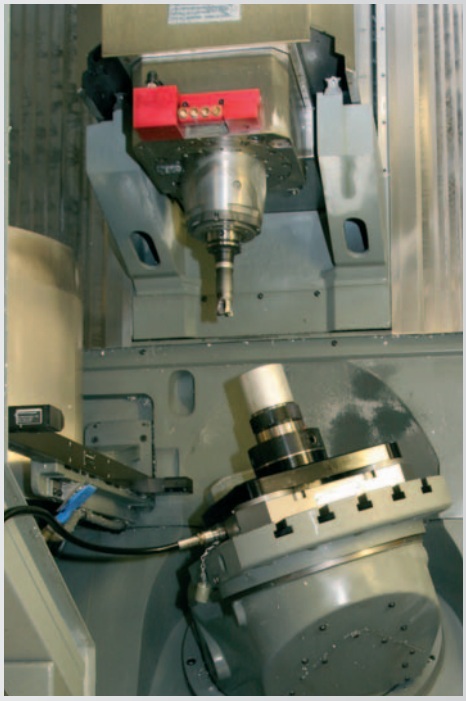
Compared with hydraulic special fixtures, which normally have a large part of the hydraulic control technique on the workpiece fixture, for modular systems a central standard hydraulic control is used, which is mounted onto the basic body.

The workpiece-specific characteristics of the fixture is obtained by simple machining of the workpiece supports by the customer or the use of adapted fixtures.

Due to the constructive design, rigidity and accessibility are higher than for modular fixture systems and many special constructions. Together with the good cushioning characteristics of the basic body made of grey cast iron higher cutting performances and a better surface quality are obtained with reduced tool wear. Force-flow optimised clamping elements reduce deformation of the workpiece by the clamping process and improve thereby the precision of the workpiece.

Compared with modular fixture systems the design is easier and more flexible. Less components guarantee simple handling. The elements can be freely positioned and are not bound to an existing grid.



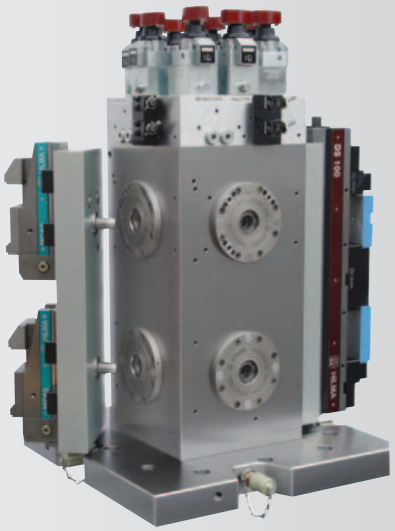


Horizontal machining

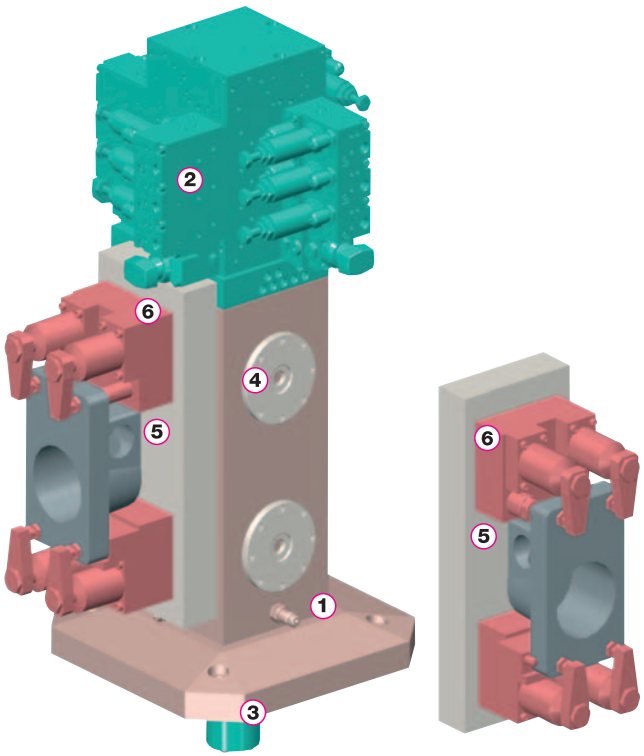
Modular clamping and fixture systems

Hydraulic and pneumatic supply is effected at the bottom of the basic body through a connecting element. The hydraulic control, which effects all required functions as sequence controls, pressure intensification and pressure reduction, is mounted at the top of the basic body.

Coupling of the fixture to the basic body is made by connecting elements with integrated hydraulic couplings.
The hydraulic clamping fixture with the clamping elements is mounted on a fixture plate, in which all supply lines through drilled channels are integrated.



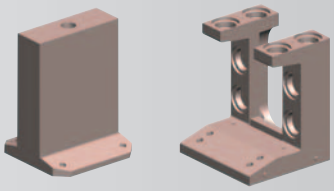
Modular design



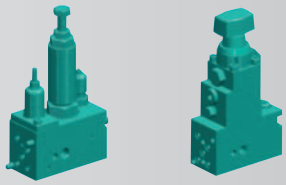
① Basic body
② Hydraulic control
③ Hydraulic-pneumatic connecting element
④ Connecting elements with hydraulic couplings
⑤ Fixture plate
⑥ Clamping and fixture elements

Examples of modules

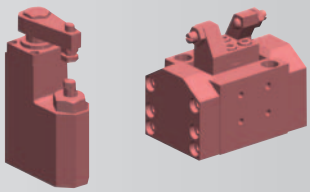
Basic body
- Clamping towers
- Double angle
- Clamping frame



Hydraulic control
- Pressure reducing valves
- Sequence valves
- Hydraulic connecting and distributor blocks
- Directional control valves
- Valve combinations
- Intensifier



Clamping elements and systems
- Swing clamps with integrated work supports
- Position flexible clamping elements
- Fixture clamps
- Clamping claws
- Hydraulic machine vices
- Zero point mounting systems



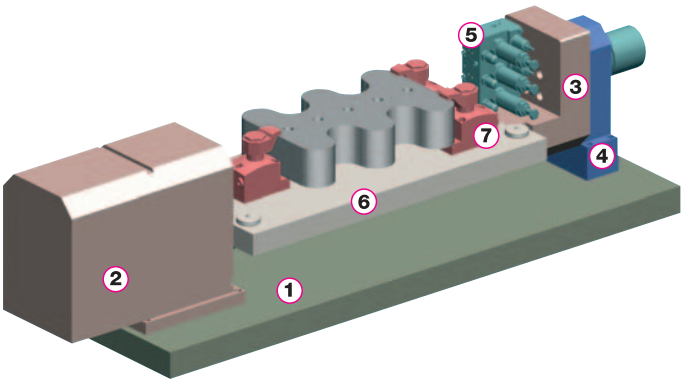
Vertical machining

Modular clamping and fixture systems

An indexing device for the swivel movement of the clamping bridge is mounted on an indexing device.
At the trunnion bearing there is a rotary valve coupling for hydraulic and pneumatic supply. The hydraulic control for the hydraulic fixture with the clamping elements is mounted to the support face of the trunnion bearing.

Coupling of the fixture to the clamping bridge is made through connecting elements with integrated hydraulic couplings. The hydraulic clamping elements are mounted on a fixture plate, in which all supply lines through drilled channels are integrated.

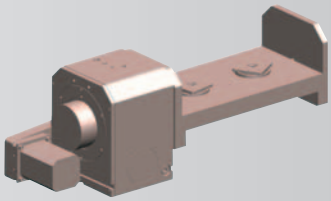
Modular design



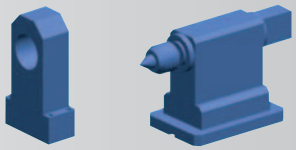
1. Base plate
2. Indexing device
3. Support face
4. Trunnion bearing with rotary valve coupling
5. Hydraulic control
6. Fixture plate
7. Clamping and fixture elements

Examples of modules

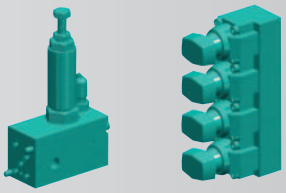
Indexing devices and rotary tables
- N/C indexing devices
- N/C indexing devices (with and without Torque-drives)
- Rotary tables with additional planets



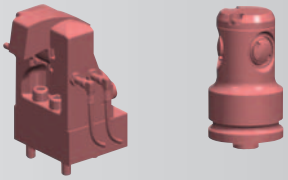
Trunnion bearing
- rotating
- with hydraulic locking
- with synchronous drive
- tailstock



Hydraulic control
Corresponding to the modules for horizontal machining



Clamping elements and systems
Corresponding to the modules for horizontal machining



5-axis machining

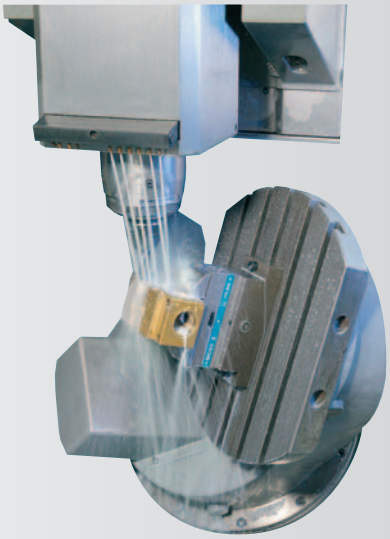
Modular clamping and fixture systems

For 5-axis machining clamping systems with one fixing side are used, which allow maximum accessibility of the tools and the machine spindle from the remaining 5 sides.

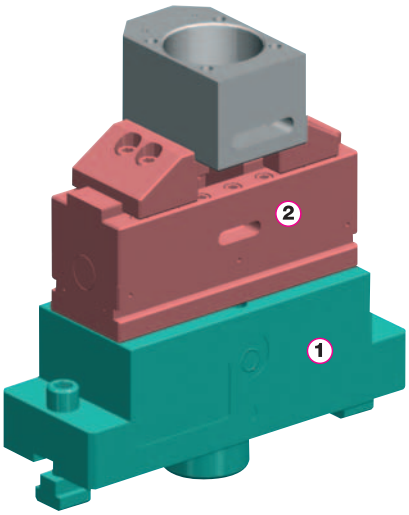
As a base mechanical or hydraulic quick-clamping equipments, for example zero-point mounting systems are used, which allow a quick and precise change of the clamping fixture.

As clamping fixtures mechanical or hydraulic machine vices, radial chucks or special fixtures, which are especially adapted to 5-axis machining, are used.

Oil supply to hydraulic clamping fixtures is made through hydraulic coupling elements directly through the basic body.



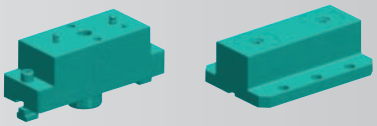
Modular design



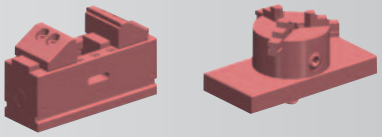
① Base/Quick-clamping feature
② Clamping and fixture elements

Examples of modules

Quick-clamping feature
- Quick-clamping block
- Zero point mounting system



Clamping fixture
- Machine vice
- Chuck
- Special fixture



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Project example: Daimler Chrysler AG, Gaggenau

Clamping and turning system

Application : welding fixture

On the machine bed in welded construction two stationary supports are mounted for support of the axis shaft. Each stationary support is equipped with two electrical N/C drives for height and length adjustment. At the side of the drive there is a N/C indexing device, on its face plate the relevant clamping fixture for the bodies is fixed with a zero-point mounting system. For adaptation to the different axis lengths the N/C indexing device is positioned with a N/C linear slide unit. At the driveless side of the trunnion bearing the clamping fixtures for the bodies at the side of the gear are fixed on a 4 x 90° rotary table with a four-sided clamping tower and fixed with a zero-point mounting system and indexed as required.

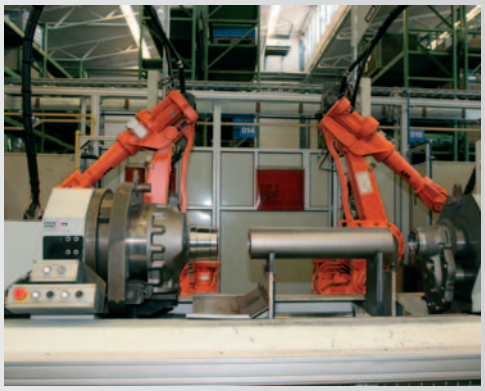
Both clamping fixtures for the bodies are hydraulically operated. Oil supply is made by the separately mounted hydraulic power unit with hydraulic control through rotary valve coupling and the face plate with hydraulic coupling to the clamping fixtures for the bodies.

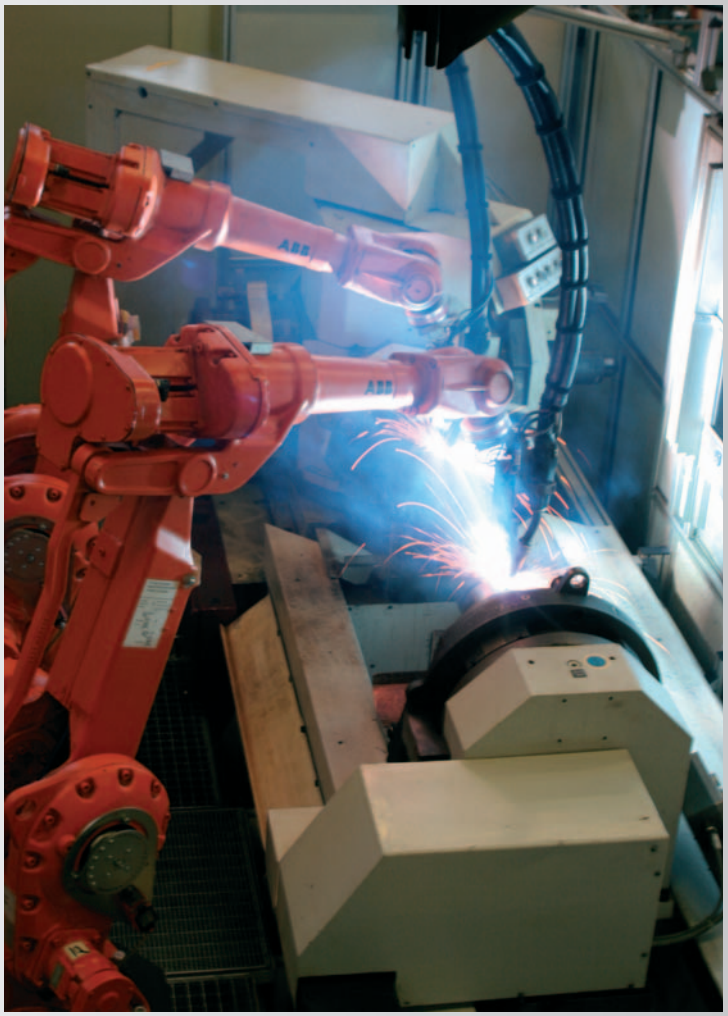
After clamping of the bodies and insertion of the axis shaft the automatic positioning process will be effected and the welding process started. Both welding robots connect first the three individual components by setting of datum points in the pre-turned bevels between the bodies and the axis shaft. Then by exact matching of the rotation of the N/C indexing device and the pendulum movement of the welding jets of the robots an extraordinary uniform V-shaped welded joint will be obtained.

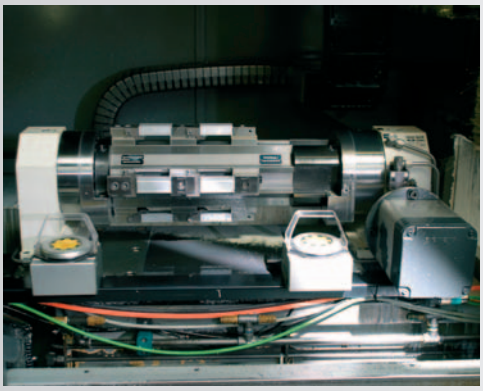
Customer's opinion

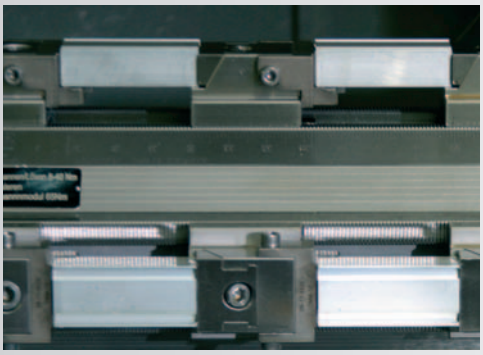
Design and production as well as installation and start-up were effected by the employees of ROEMHELD Systems with expert knowledge, strong commitment and absolute adherence to the delivery dates. The requirements with regard to precision and reliability were very high and have been met to our full satisfaction. The clamping and turning system runs very reliable in 2-shift operation in spite of high contamination and big influences in temperature.

Norbert Tschan, Project manager,
Daimler Chrysler AG, Gaggenau









Project example: Manufacturer of pneumatic elements

Rotary indexing unit with mechanical multiple clamping system

Application : fixture for machining centre

An N/C indexing device, which realises the required angular positions is mounted onto a base plate. The clamping bridge consists of two support faces with adapted support pieces and a mechanical 4-side multiple clamping system, on which up to 16 workpieces can be clamped at the same time. The side of the clamping bridge opposite to the indexing device is supported in a trunnion bearing, which can be clamped hydraulically in the working position.

By operating the two-hand control the N/C indexing device is rotated in steps of 90° for loading and unloading. The set-up process is effected parallel to the machining time, since two identical systems are installed on a machining centre with pendulum machining.

To be in the position to act flexibly in case of changed requirements, N/C indexing devices and trunnion bearing are equipped with rotary valve coupling and the support faces with hydraulic couplings. Retrofitting to a hydraulic clamping unit is possible without problems.

Customer's opinion

Due to the multiple-indexing bridge of ROEMHELD Systems the productivity of our manufacturing process has been considerably improved. We meet effectively the increased demands on the quality of the workpieces with smaller batch sizes but at the same time bigger total quantities by using this system.

We decided not only on ROEMHELD Systems, because we had a high opinion of the quality of Hilma-Römheld multiple clamping systems and the FTW N/C rotary tables, but especially because of the fact that we required a system ready to use including installation on the machine and start-up. The complete system is running since start-up trouble-free with constant precision in 3-shift operation.

Dipl. Ing. Kurt Birtel, production manager

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