



Accumulator Technology 30.000



Filter Technology 70.000



Process Technology 77.000



Filter Systems 79.000



Compact Hydraulics 53.000



Accessories 61.000

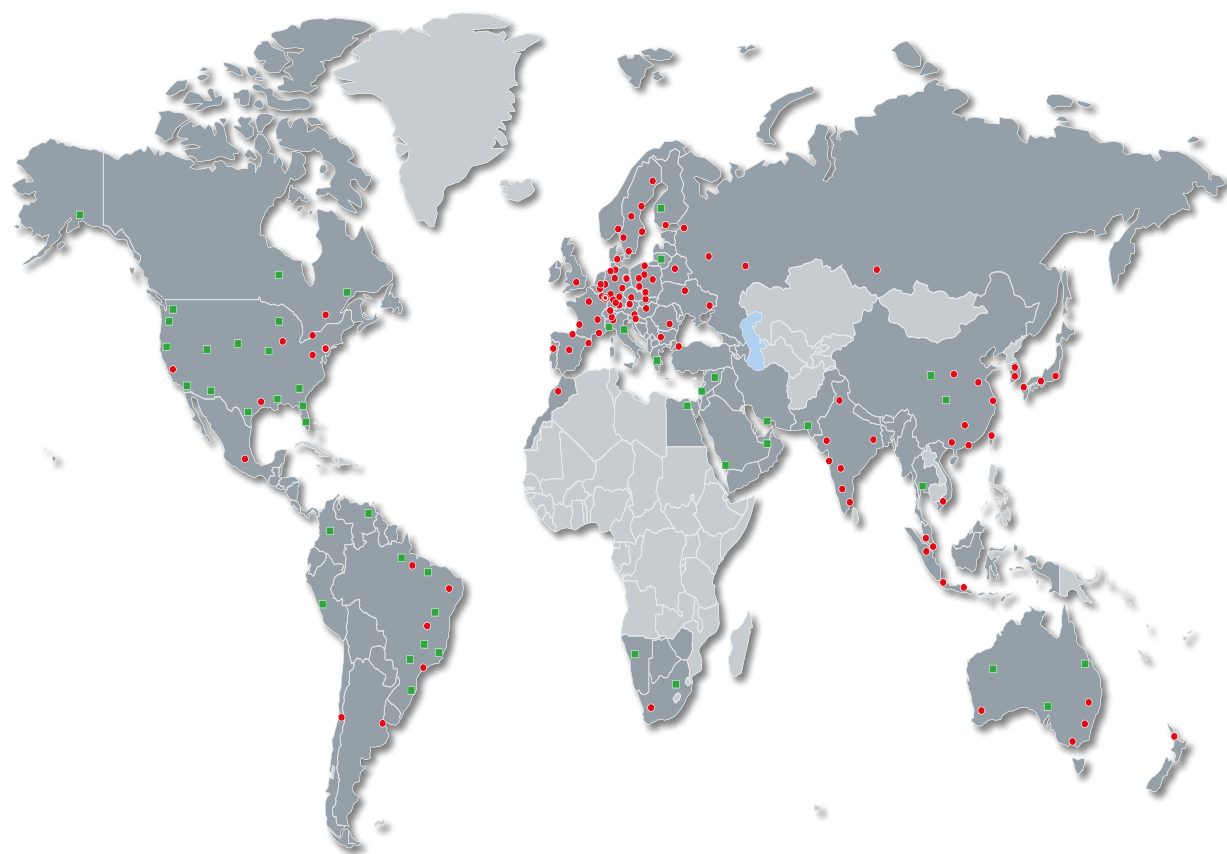


Electronics 180.000



Cooling Systems 57.000

**Global Presence.
Local Expertise.
www.hydac.com**



- HYDAC Headquarters
- HYDAC Companies
- HYDAC Sales and Service Partners

HYDAC INTERNATIONAL

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Note

The information in this brochure relates to the operating conditions and applications described.

For applications or operating conditions not described, please contact the relevant technical department.

Subject to technical modifications.

EN 10.130.0/06.18

HYDAC INTERNATIONAL

**Components,
Systems and Service
for Test Benches
and Test Systems**



EN 10.130.0/06.18

Your competent partner in test rigs

General overview

HYDAC is a leading company in the field of fluid power, hydraulics and electronics. Our extensive range of products, consisting not only of components but also systems, combined with our expertise in development, production, sales and service, enables the diverse requirements of test benches and test systems to be met worldwide.

System solutions: One supplier – one contact!

Speed is the main competitive factor! The time required to perform your tests must become shorter and at the same time the complexity and range of the test requirements are increasing. We have the know-how you are looking for! Together we will develop the best technological and economical solution for you.

- Engineering and simulation of the test system
- Energy-efficient design
- Active co-operation in close development partnership
- Pressures up to 1,000 bar
- High quality, therefore maximum availability
- Monitoring the hydraulic system, for example, by means of efficient Condition Monitoring
- Commissioning and service
- Worldwide technical and commercial support through our global presence

Engineering support and simulation

Mobile hydraulic test benches

Development test benches

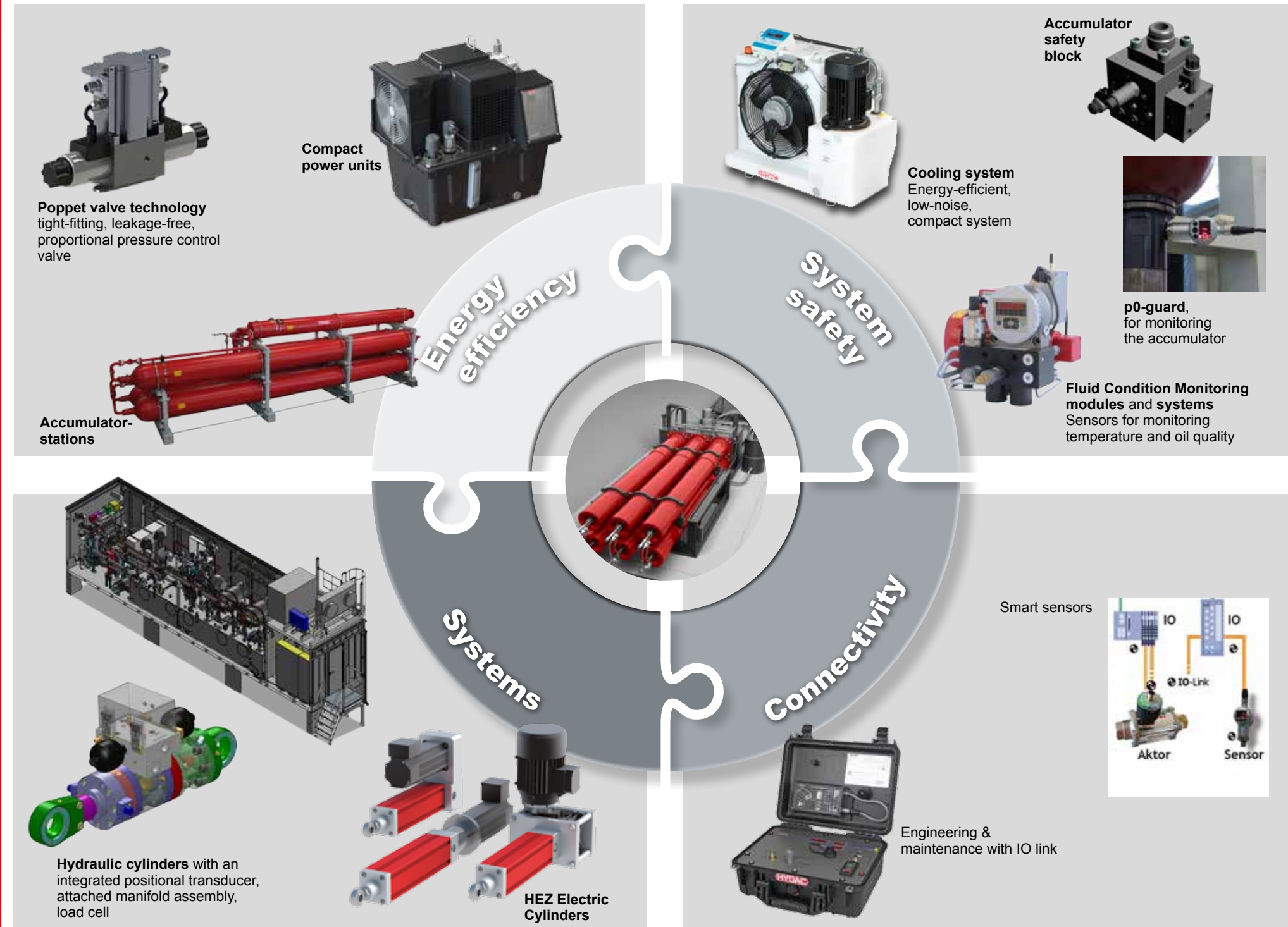
End-of-Line and application-specific test benches

Special tools / Condition Monitoring

Expertise, service and training



All from one supplier: HYDAC supplies the "heart" of your test bench drive



We can help you.

HYDAC system solutions. One supplier. One contact.



Wherever you need us, we are there to help you find the most effective solution – for every application, from components to a complete system.

We combine our expertise in testing technology and guarantee a network created with our development and production partners – worldwide!

All new test benches are subject to the provisions of the Product Safety Act (ProdSG) in conjunction with the current and relevant regulations implementing the European internal market directives such as the Machinery Directive (MRL, Directive 2006/42/EC), Low-Voltage Directive (Directive 2014/35/EU) and Pressure Equipment Directive (DGRL, Directive 2014/68/EU). Under MRL, test bench manufacturers are required to prepare technical documents such as operating manuals, maintenance manuals, etc.

Any operation performed on hydraulic test benches is subject to the Ordinance on Industrial Safety and Health (BetSichV). Owners must subject all their machines and therefore also their hydraulic test benches to risk assessment pursuant to §3 and may come to the conclusion, particularly in case of older test benches, that technical retrofiting is necessary.

Global and yet local.



With 9,000 employees worldwide, HYDAC is one of the leading suppliers of fluid technology, hydraulic and electronic equipment. Our wide range of products, combined with our expertise in development, production, sales and service, enables the diverse requirements of the shipping industry to be met worldwide. Our quality and environment certification to ISO 9001/2000 and ISO 14001 denote first class quality and responsible management of our resources.

HYDAC Applications on Test Benches

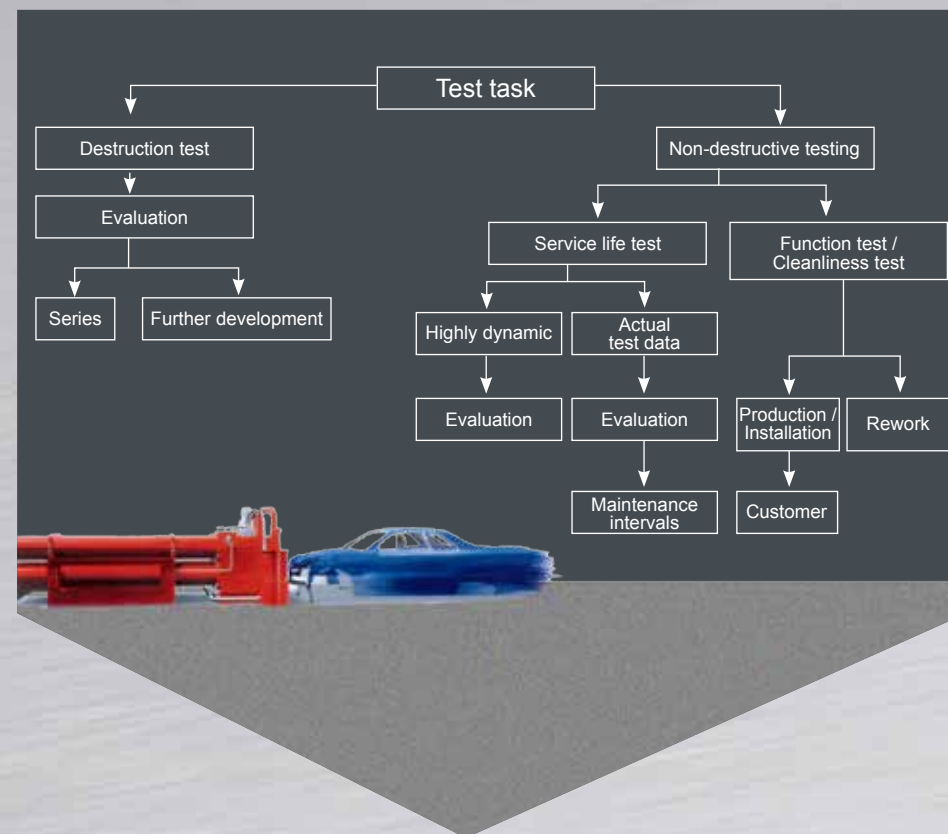


Development test bench

- Endurance test bench
- Life test
- Strength test bench
- and much more

End-of-Line test bench (EoL)

- Dynamometer
- Sequential controls
- Standards-compliant
- Tests in compliance with standards
- and much more



Your Partner

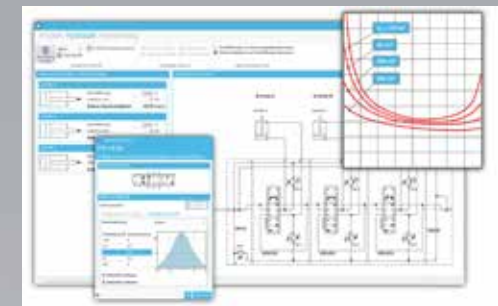
Engineering support and simulation

HYDAC - A competent partner, starting with the development phase through the analysis right up to the start-up

marpitem GmbH, our engineering service provider, has been entrusted with the mission of assisting our customers in the development of electro-hydraulic machines and systems. We develop tailor-made and easy-to-use simulation tools for your specific field of application, with user guidance and a range of functions that are specially adapted to your requirements.

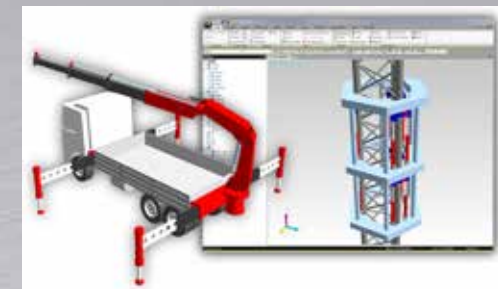
Hydraulic simulation

Hydraulic simulation makes it possible to perform extensive analyses and optimisations of the systems in early development phases, minimising time-consuming and costly re-design and work in the trial field.



Multi-body dynamics

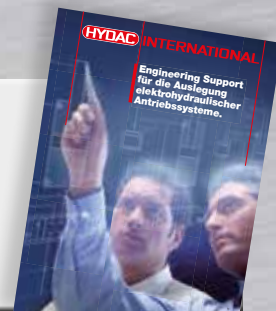
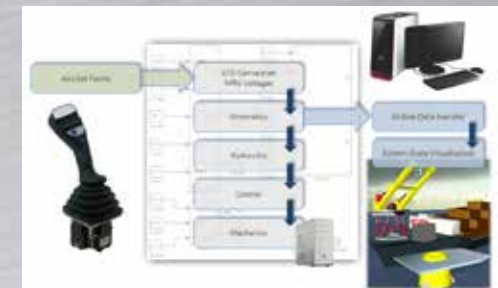
The multi-body simulation makes it possible to perform analyses of the interplay of forces and motions, even in the case of complex kinematic structures. This information provides valuable input for the design of the drive system.



Real-time simulation

Whenever simulation models need to communicate with electronic hardware components (for example, in virtual test machines for control systems) or when people interact with computational models using suitable operating elements (for example, driving simulators, virtual reality), the simulation needs to portray the corresponding processes in real-time.

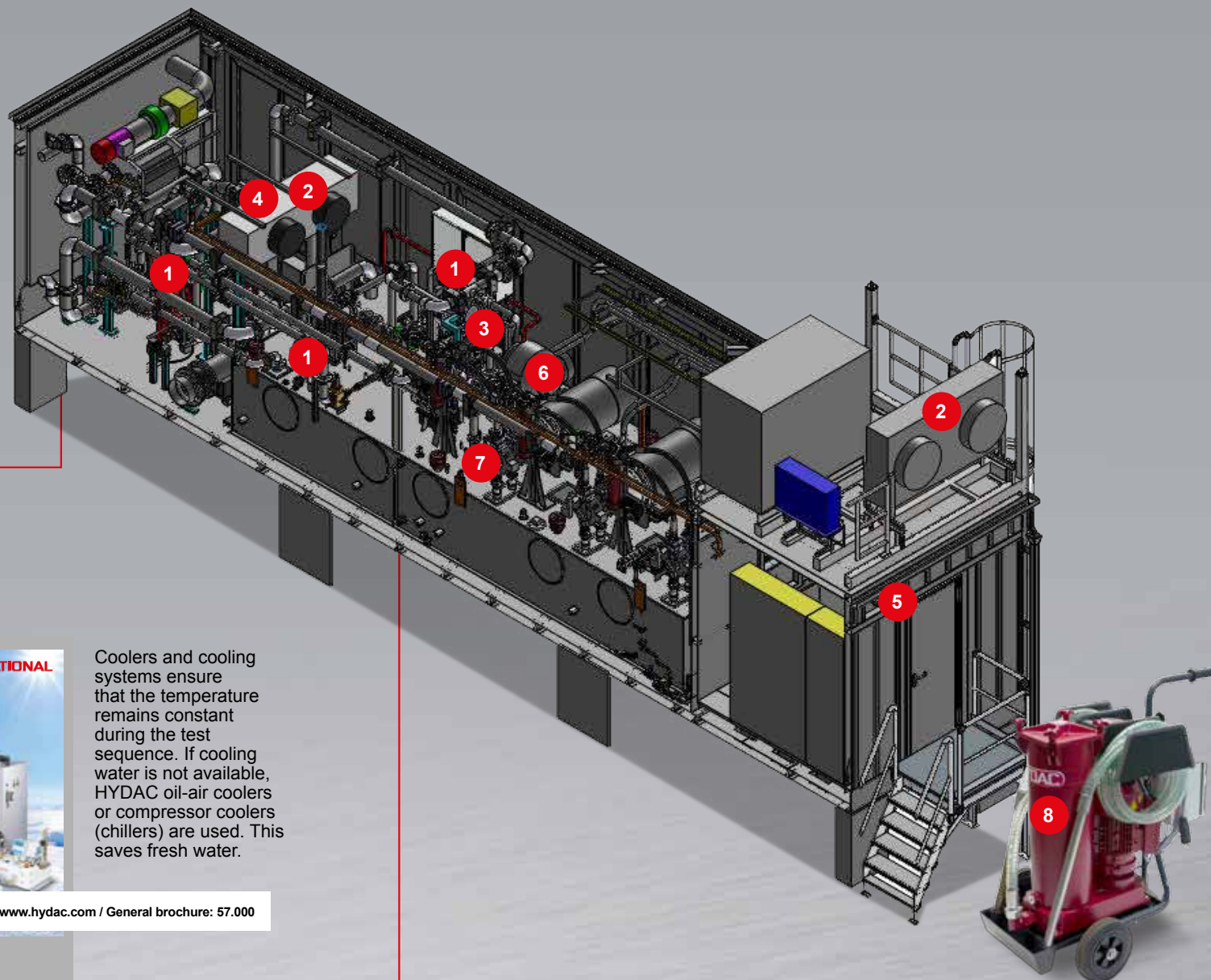
Performing simulations of this type requires specialised expertise which we are happy to provide to you.



HYDAC flexible – mobile hydraulic test bench

HYDAC offers components for diverse operations to be performed on test benches. Whether for development, end-of-line, high-pressure or electrical test benches, we will find a suitable solution based on our know-how.

The displayed view of the HYDAC 12-meter test container provides an insight into our HYDAC range of products.



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Fluidfilter.
Produktkatalog.



1 Visit our website: www.hydac.com / General brochure: 70.000

Every test system should work without downtime; highly sensitive valves are integrated into servo systems which require a clean medium.

Filtration increases the service life of pumps, valves and much more.

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Cooling
Produktkatalog



2 Visit our website: www.hydac.com / General brochure: 57.000

Coolers and cooling systems ensure that the temperature remains constant during the test sequence. If cooling water is not available, HYDAC oil-air coolers or compressor coolers (chillers) are used. This saves fresh water.

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HYDAC KineSys
Antriebssysteme



3 Visit our website: www.hydac.com / General brochure: 10.146

KineSys stands for optimisation of energy-efficient solutions, primarily in test systems.

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Speichertechnik.
Produktkatalog.



4 Visit our website: www.hydac.com / General brochure: 30.000

Accumulators and accumulator systems, as energy reserves for peak shaving and also for noise reduction in the system and damping of pulsation, etc., are crucial.

HYDAC INTERNATIONAL

Compact Hydraulik
Compact Hydraulics
Hydraulique Compacte



5 Visit our website: www.hydac.com / General brochure: 5.300

Valves, pressure transmitters, pressure relief valves, etc. are part of every hydraulic test bench unit.

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Pumpen
Spezifikationen



6 Visit our website: www.hydac.com / General brochure: 2.902

It is driven by the pump (pump motor), which is the heart of every system. Pumps up to 1000 bar, pumps for large and small volumetric flows... HYDAC has a solution for your application.

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Electronic
Produktkatalog



7 Visit our website: www.hydac.com / General brochure: 180.000

Sensors to monitor the hydraulic system, fluids, temperature, fill level, oil ageing, water content and also to measure and evaluate the test data.

HYDAC INTERNATIONAL

Filter Systems.
Produktkatalog



8 Visit our website: www.hydac.com / General brochure: 79.000

Every test system should work without downtime. A well-filtered medium is important when filling it in the tank (filter units), but suction pumps on hydrostatic bearings and also degassing filters are equally important to keep the surrounding area free of oil.

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HYDAC Accessories.
Produktkatalog



9 Visit our website: www.hydac.com / General brochure: 61.000

Components from the Accessories range are used for damping, pulsation and noise reduction. Monitored ball valves, fill level displays ensure a safe operation.



10

HYDAC supplies low-friction cylinders as differential or double rod cylinders for your testing tasks in accordance with the technical requirements.

Development Test Benches

Fully automatic test profiles or scenarios can be run on development test benches. HYDAC has an array of components required for these special and versatile test benches. Whether on test, transmission, simulation, endurance test benches or test benches for other range of tasks, we can meet your requirements using our know-how and components. Since we provide a wide range of services, some examples include:

Example 1: Total-cell fatigue test system

Here, in addition to testing complete aircrafts, aircraft components are also tested. In addition to the mobile test container (1 hydraulic power unit with controller), cylinders were also used here (2).



Example 2: Transmission test bench

To ensure optimum supply of lubrication oil, for example, to wind turbine transmission test benches, HYDAC builds complete supply units (including controllers) (3).

Other test bench drives for the wind energy sector were built at HYDAC. (4)

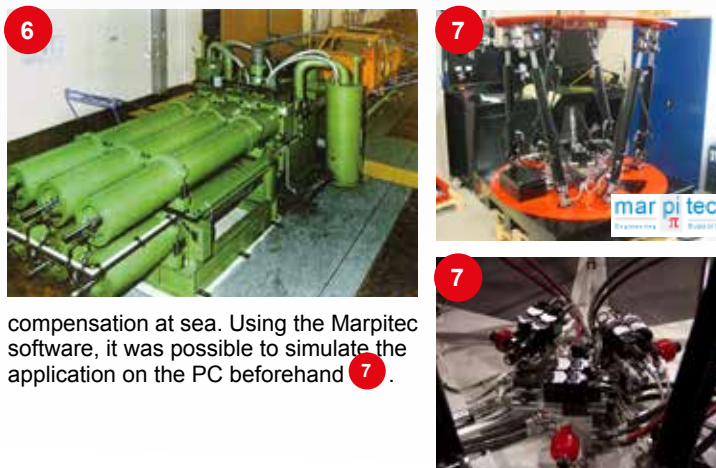


Example 3: Simulation test bench

Crash systems are equipped with HYDAC accumulator systems, pressure sensors, sensor system, etc. In these systems, vehicle collision tests are simulated for more safety not just in the vehicle (6).

A Hexapod is another simulation test bench. It is equipped with HYDAC components such as valves, accumulators, pumps, cylinders, controllers, etc.

They are used to test wave



compensation at sea. Using the Marpitem software, it was possible to simulate the application on the PC beforehand (7).

Example 4: Spin test bench

Components that spin at high speeds are tested with the spin test bench, also called as a centrifuge test bench. For applications of this type, HYDAC has developed, for example, hydraulic and oil system units (with different components such as fluid filters, plate heat exchangers, pressure switches, throttle valves) which are built into these test benches in order to test the quality of the turbine shafts.



Example 5: Vehicle testing system

A central power unit was built for an automobile manufacturer. The HYDAC hydraulics, the pipes and the assembly was incorporated herein (2).

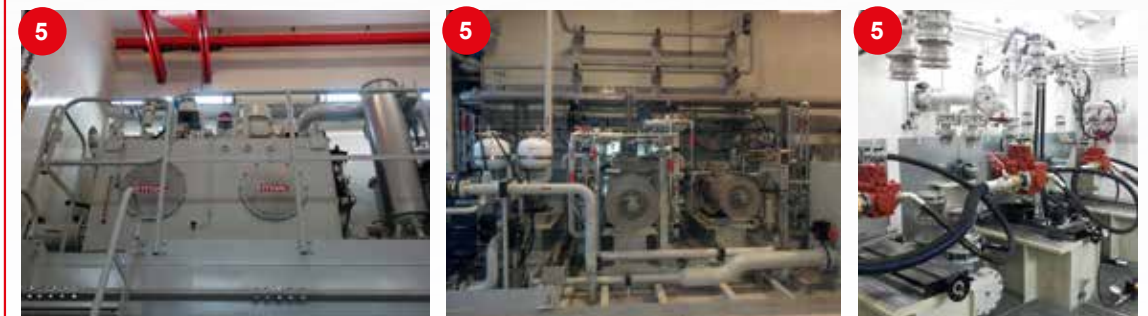


Example 6: Aerospace test equipment

For this application, HYCOM developed a pressure control station for universal equipment for testing a hydraulic system. Aerospace components are tested with this test bench using Skydrol, a drive medium. Bladder accumulators, hydraulic filters, accessories etc. for this application from our HYDAC range of products (3). To test the pressure of all the hydraulic circuits, another test bench is needed. Here, for example, ILF 2 type of safety filters are fitted upstream (4).



Example 7: Pump test bench



This particular test bench has 3 test stations with 250/90/30 kW drive powers (electric motors). It is possible to run a parallel operation of 2 stages. This test bench, which is driven by a diesel unit at 270 kW, is also installed in a climatic chamber which can be cooled to -15 °C. Equipped with the latest measurement software and sensor system (for example, pressure, volumetric flow, contamination, temperature sensors) for digital reading, recording, logging in real time. The different actuators can be controlled directly from the control panel (using a PLC) (5).

End-of-Line (EoL) Test Benches

The components are subjected to a function test at the end of the production line using end-of-line test benches which are integrated perfectly into the production sequence. Incorrect parts are immediately sorted out here and are not sent forward for further processing or production.

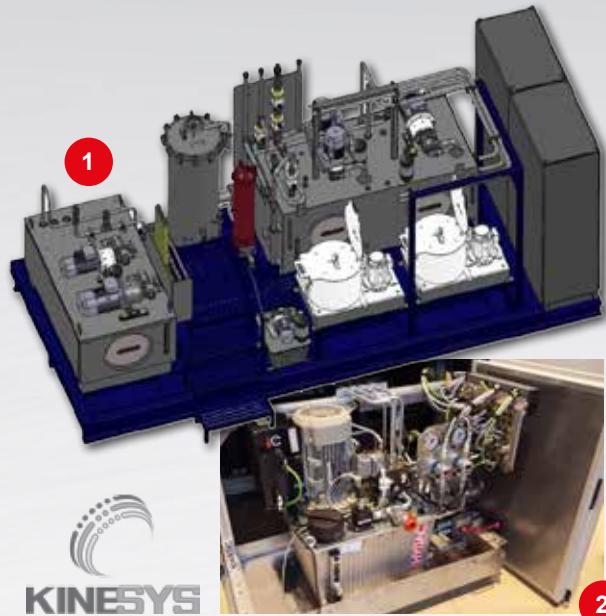
HYDAC components (valves, hydraulic pumps, cylinders, filter systems, plate heat exchangers, etc.) in these EoL test systems ensure a 100% quality of the production parts and reduce any rejection costs incurred. A broad, individual and competent HYDAC expertise will assist you with system solutions that are especially ideal for you.

Example 1: Hydraulic power unit for transmission test bench

1 Supply for testing and flushing transmissions. With this process, production residues such as chips are flushed out until the oil has a cleanliness level specified in ISO 4406.

Not only is the transmission cleaned by this system, but the oil is prepared for the system at the same time. Special filter element technologies are not only meant for filtering transmission oil components, but also for retaining oil components such as silicon anti-foaming additives. Equipped with multiple cooling circuits and also for temperature control of the oil by heating.

2 For an automobile transmission test bench, for example, a drive unit has been developed, containing an energy-efficient and variable-speed accumulator charging mode for three independent clamping circuits in addition to a fieldbus connection to the test bench controller. The pressure-reducing valves used earlier have been dispensed with for the HYDAC KineSys drive unit with a controlled supply of different levels of pressure.



Example 2: Start-stop clamping unit with cooling unit

This unit has been developed to fix and clamp the test items with a suitable control block.



Example 3: Valve test bench for valve functionality

Test bench for 100 % testing and adjustment of the pressure relief valves.

Test pressure / Test volume
● 100 - 700 bar at 6 l/min
● 20 - 220 bar at 30 l/min

BIERI
HYDAC INTERNATIONAL

Test bench for coaxial valves (CX)

All CX valves are tested with nitrogen at 120 bar so that the testing is 100 %.

The test is performed with nitrogen in order to prevent any dirt from entering the valves.



Application-specific test benches

High-pressure test benches

Cycle, burst or pressure pulse test stands for applications at pressures above 300 bar are referred to as high-pressure test benches. For this special application, too, HYDAC can provide its know-how and the appropriate components.

Examples:

Test bench for high-pressure containers

- Max. test pressure of up to 500 bar
- Containers of up to 240 l
- Max. frequency 15 s
- Delivered in full by HYDAC



Test bench for cylinders

- Up to a max. test pressure of 600 bar
- Flow rate: 2 x 65 l/min and 2 x 11 l/min
- Cylinder size up to Ø 180



Test bench for variable displacement pumps

- Max. test pressure of up to 700 bar
- Main drive power 75 kW with frequency inverter
- Tank volume: 2000 l



Electrical test benches

Example:

Checking clamping bands for repeat load

Circular segments which are positioned on guide carriages in the form of a circle relative to each other serve as a support for the clamping bands. The linear stroke of the electro cylinder is converted into a uniformly radial movement using a wedge. Application of force using KineSys electro cylinder HEZ in combination with a drive controller, including a safe downtime (STO) and operating control.



For further information on the "Electro cylinders HEZ" please visit our website www.hydac.com / General brochure 10.146.1

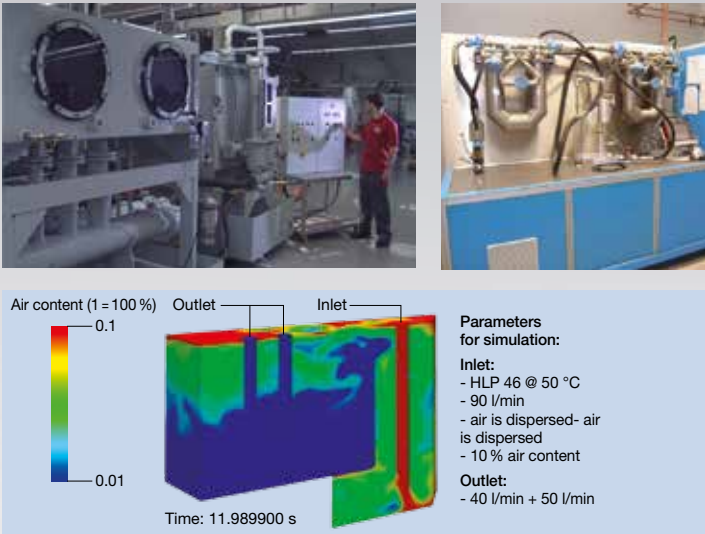


Special Tools

Optimum air separation in your tank

Increasingly smaller and more complex hydraulic tanks lead to significantly reduced air separation in the tank and therefore to an increased quantity of free air in the hydraulic fluid. Possible consequences of air in the oil include loss of pump efficiency, cavitation effects, noise emission, accelerated oil ageing, rise in temperature, changes in the oil characteristics and machine control problems.

Using our modern test equipment and our advanced knowledge, we are constantly solving new problems that our customers face.



Stat-Free® elements against electrostatic charging in the system

Zinc-free and ashless hydraulic fluids caused problems relating to electrostatic charging in hydraulic systems.

Product advantages:

- Prevents damage, such as:
 - Explosions in the tank
 - Accelerated oil ageing
 - Damage to the filter element
 - Destruction of electronic components
 - Damage to seals, for example in the valves and pumps
- Longer oil change intervals
- Cost savings due to longer service life of the oil, filter element change and system failures.



Further information on "Stat-Free®" is provided on our website www.hydac.com / General brochure 7.017

VarnishElimination Unit VEU against accelerated oil ageing (varnish)

The service-friendly VarnishElimination Units VEU are used to conditions mineral oils. They are particularly effective at removing oil ageing products (varnish) from mineral oils. The units are used in the bypass flow. The removal of varnish is based on reducing the oil solubility for varnish with subsequent filtration.

The advantages for you include:

- Increased system reliability due to reduced deposits on the hydraulic valves
- Increased service life of the fluid
- Available as a complete unit for retrofitting existing systems and for new systems



Further information on "VarnishElimination Unit VEU" is available on our website www.hydac.com

Condition Monitoring

Preventive maintenance to increase fluid service life

One of HYDAC's essential unique selling propositions is the wide-ranging programme of sensors for acquiring both process data (pressure, temperature, flow rate, etc.) and fluid data (oil condition, contamination, water content, etc.).

The combined evaluation of the process data (load situation of the machine) and the fluid data (fingerprint of the fluid) enables a remarkably expanded diagnostics depth which goes far beyond conventional threshold monitoring. An additional value is added if machine data provided by the system owner, such as the start-stop trigger, cycle times, power consumption, etc., is included in the data analysis.

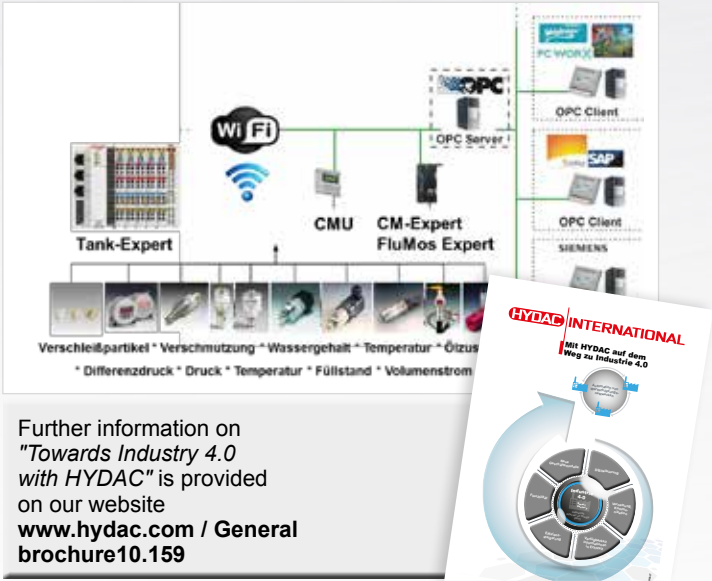
To reach this goal HYDAC offers an extensive product programme of components and systems as well as application specific service activities. The product portfolio thus includes solutions for all areas of condition monitoring systems.



Towards Industry 4.0 with HYDAC

HYDAC offers a wide range of products and services, possesses in-depth knowledge of applications and is therefore recommended as a partner for all kinds of I 4.0 developments.

Furthermore, we work with our customers on future-focused products, digital services and new business models.



Further information on "Towards Industry 4.0 with HYDAC" is provided on our website www.hydac.com / General brochure10.159

HYDAC CM-Expert: Monitoring which detects production weaknesses in time

HYDAC CM-Expert is a high-performance monitoring and control system which runs on any commercial PC. Its decentralised configuration makes the system extremely reliable and flexible for use in fluid power systems.

Since the controller is specific to the particular purpose, there are no limits to the connection of sensors and actuators, operating and signal components, to the control and regulating tasks or to the data exchange with other systems. All the physical parameters can be recorded and processed by the controller: temperature, pressure, differential pressure, viscosity, water content, particles, volumetric flow, etc.



Further information on the topic "CM-Expert" is provided on our website www.hydac.com / General brochure10.141

Expertise and service

HYCOM. Hydraulic systems for high-quality, efficient maintenance work in the aviation industry

HYCOM offers engineering and production services for aircraft inspection and maintenance:

- Complete service packages worldwide
- Expertise, speed and flexibility
- The right solution for every challenge (in the field of hydraulics)
- Mobile testing systems for airlines and maintenance companies
- Mobile hydraulic drives in the container for testing facilities



Further information on this HYCOM service is provided at www.hycom.nl

HYDAC FluidCareCenter FCC. Research and Development Centre

Our HYDAC FluidCareCenter was established to support application-specific development activities in the area of HYDAC filter technology:

- Experts in the areas of fluid filters, filter systems and process filters
- Development of application-oriented and customer-specific solutions
- Development of new filters and filter concepts
- Inspections and testing of fluids



Further information on our "HYDAC FluidCareCenter" are provided on our website www.hydac.com / General brochure 7.128

HYDAC Servicenter

Our HYDAC Servicenter offers a complete service program with a built system.

We offer:

- Commissioning
- Repair, revision and Condition Monitoring
- Fluid handling, fluid management and fluid analysis
- (Process) optimisation and project planning
- Calibration service
- Technical cleanliness
- Rental service and helpline



Further information on "Technical Cleanliness" is provided on our website www.hydac.com / General brochure 10.110.2



Training – Comprehensive, practical knowledge

Quality assurance is an essential part of any process and providing constant support to employees engaged in this area also ensures the long-term success of the company.

Hydraulic Trainer

This was developed to provide instructions and advanced training in hydraulic drives.

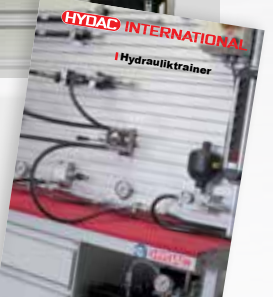
It is available in different levels with standard hydraulics, electro-hydraulics, proportional technology, measurement technology and the PLC package for extensive control and regulation tasks.

Literature

Find further information on hydraulics, electronics and pressure fluids summarised in HYDAC-books.



Further information on "Hydraulic Trainers" is provided on our website www.hydac.com / General brochure 6.001



For more details, please contact learning@hydac.com.



Has this brochure not provided you with a solution for your application, or do you have any questions?

Wherever you need us, we are there. Find a HYDAC employee closest to you!

Please contact one of our staff members or the corresponding specialist department in your area!