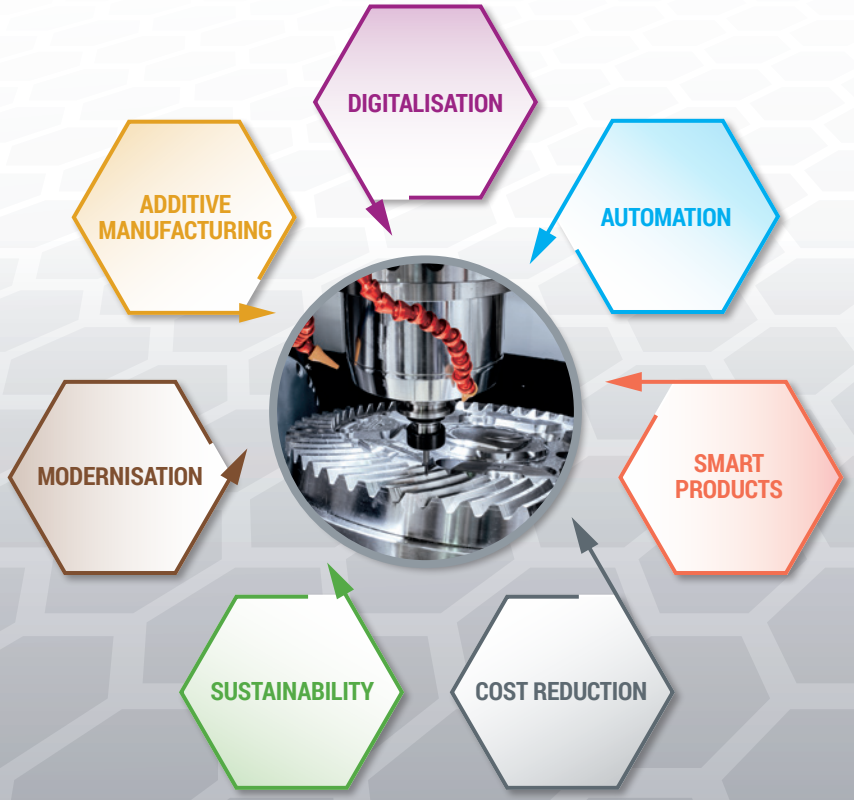
HYDAC INTERNATIONAL

Megatrends in Mechanical Engineering



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Megatrends in Mechanical Engineering

The world is changing – and so is machine tool engineering

“There is nothing permanent except change” – this was just as true in Heraclitus’ time as it is today, and this is no different in the machine tool industry. As well as small changes in the industry, which have always taken place, there are large, fundamental driving forces for change which companies in the industry need to adapt to: the megatrends.

With these trends, it’s no longer a question of “whether”, but rather “how” and “when”. Companies that answer these questions early on will help to shape the machine world of tomorrow. On the other hand, companies which fail to ask themselves these questions will only ever be able to respond to the standards of their competitors.

HYDAC has now been one of the leading suppliers of fluid technology, hydraulics, electronics and cooling equipment for 57 years and has over 9,500 members of staff worldwide. The breadth and depth of our product range, combined with our recognised expertise in development, manufacturing, sales and service, allows us to provide solutions worldwide for the diverse range of challenges in the machine tool industry.

We at HYDAC also embrace the megatrends of our time and help our customers to tackle any challenges that they face.

This overview gives you a brief summary of the current megatrends in machine tool engineering and provides examples of the types of solutions HYDAC has developed in relation to these topics.

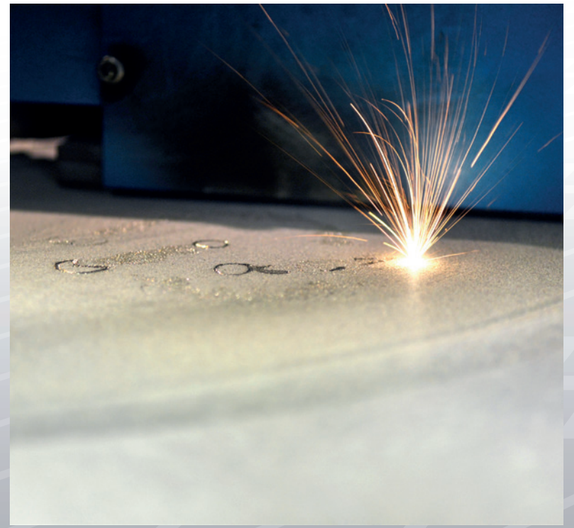
TREND: ADDITIVE MANUFACTURING

3D printing is already a key manufacturing process in prototype construction and is becoming increasingly important for rapid prototyping.

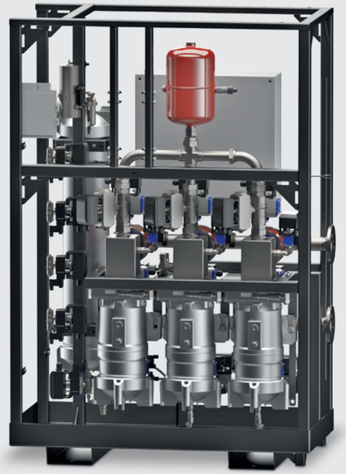
3D printing has gone from being a niche market subject to some ridicule to an important factor for production in the metal industry.

Additive manufacturing processes already have many uses when it comes to manufacturing prototypes, mock-up models and exhibition models as well as spare parts in very small-scale series. As product development and time-to-market periods keep getting shorter, 3D printing is also increasingly becoming a major component in the rapid manufacturing industry.

In the metal 3D printing industry, it is especially important that the actual production lines are operated in combination with the right peripheral devices. This is the only way that the technology can be used effectively and efficiently.



HYDAC SOLUTION: FlushPACK



Innovative filter design for additive manufacturing processes (SLM)

HYDAC's new FlushPACK filter design for additive manufacturing processes boasts significant potential cost savings for plant operators as well as the highest level of safety for users.

The filter design stands out due to its very high filtration performance made possible with a combination of fine filters and a cleanable pre-filter. The repeated cleaning of the pre-filters leads to a considerable increase in the filter service life in comparison to traditional filter designs.
An additional contamination lock with passivation also considerably improves occupational safety as any contamination collected is passivated to prevent it from igniting.

TREND: DIGITALISATION

People, machine tools and production are becoming increasingly interconnected; the fourth industrial revolution has begun.

In mechanical engineering, the transformation process has already been taking place for a number of years: smart factories and fully digitalised production processes are now becoming established.

The knock-on effect is that machine tool manufacturers are required to ensure that their systems can be integrated into the planned or existing digital structures.

These structures are not uniform as customers opt for different standards. Suppliers must adapt to these and need flexible digitalisation kits to be able to meet the various requirements of potential customers.

HYDAC SOLUTION: CMX SUITE

Hardware and software suite for the digitalisation of hydraulic processes – the easy way to Industry 4.0

HYDAC's CMX suite is equipped with hardware and software kits that provide individual modules for digitalising machine functions, states and processes either on local servers on the customer's premises or in the cloud.

In addition to sounding malfunction alarms and providing visual representations of machines and production lines, the suite is able to suggest recommended actions and identify potential optimisations.

The user can programme their own logic or integrate their own algorithms. The CMX suite undergoes constant development, especially in terms of responding to customer requirements.

TREND: AUTOMATION

The level of automation in the industry is continuing to rise, leading to ever-increasing system requirements.

The factory of tomorrow will be able to cope with less personnel. Unmanned “ghost shifts” are already taking place and goods are even being produced on weekends without any staff.

This doesn’t just increase the demands on the actual production and logistics equipment, automated processes also need to keep any necessary operating materials within the permissible range of values at all times.

HYDAC SOLUTION: FCU 5000

FluidControl Unit FCU 5000 – Automation and routine monitoring

In mechanical production, the chemical parameters of water-miscible cooling lubricants play a crucial role in determining product quality and manufacturing productivity. These parameters are currently often monitored with manual laboratory analysis and then manually readjusted. The FCU 5000 can be used to automate these routines and drastically reduce the associated costs.

The FCU 5000 can also be used in the context of “Industry 4.0” with its automatic adjustment of the cooling lubricant parameters. This doesn’t just mean that operation within control limits is possible without human intervention. It also enables optimum cooling lubricant usage in relation to consumption as the automated, real time measurement and readjustment leads to highly accurate cooling lubricant dosing without the potential for human error.

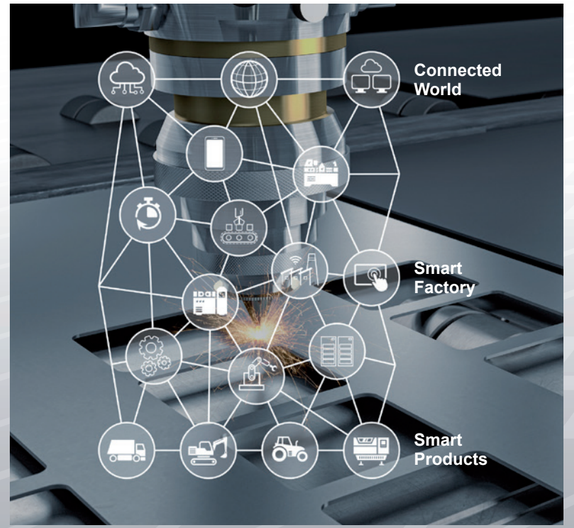
TREND: SMART PRODUCTS

Smart components for a smart machine.

Digital networks and smart components and subsystems are essential for smart machines and systems.

Smart sensors don't just monitor current process values, they even monitor themselves. They store additional information about their current status, service life and operating data history, enabling predictions to be made in terms of system integrity and maintenance requirements.

Specially designed, application-specific sensors are increasingly taking the pressure off central control panels thanks to integrated microcontrollers and intelligent algorithms. These can, for example, be used to control power units, monitor the functionality of hydraulic accumulators or determine the remaining service life of filter elements.



HYDAC SOLUTION: IO-LINK PRODUCTS

IO-Link – the digital communication interface for mechanical engineering.

To allow communication between actuators/sensors and the machine control and to connect the lowest field levels to the Internet of Things, HYDAC relies on the first IO technology to have been standardised worldwide (IEC 61131-9).

Bidirectionality and central data storage enable automatic self-parameterisation, leading to time savings and cost savings when it comes to servicing and commissioning.

Smart components provide a range of diagnostic information and play an essential role in system monitoring when it comes to condition-based, predictive maintenance of the entire system.

TREND: MODERNISATION

Modernisation projects are increasingly being implemented to enable existing machinery to be used for longer.

New investments are scrutinised even more than usual in uncertain times when the future is very difficult to predict. Existing systems and machines are, however, subject to continual wear and tear and are no longer as efficient as new systems.

This is why it makes sense to bring existing systems and machines up to date with modernisation projects that facilitate cost-effective increases in production performance, quality and energy efficiency.

HYDAC SOLUTION: RETROFITTING

Retrofitting considerably increases the service life of your systems and machines and leads to noticeable energy savings.

HYDAC supports MROs, OEMs and specialised service providers in modernising their machine tools. Modernising systems and machines is cheaper and more sustainable than new investments – with virtually comparable results.

Retrofit projects make existing systems more energy-efficient and economical. They also offer longer service lives and considerable improvements in system availability.

With components, systems, service and support, HYDAC is the perfect partner for your modernisation project e.g. in the machine tool industry.

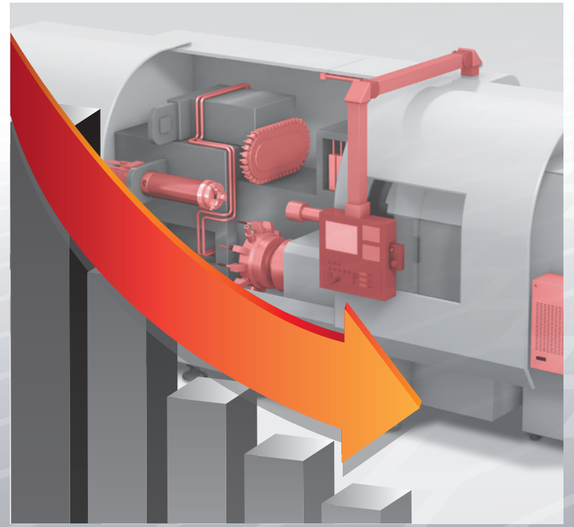
Integrating intelligent sensors can also enable smart condition monitoring of existing systems. Predictive maintenance and condition monitoring can then be used to minimise future downtimes.

TREND: COST REDUCTION

If you don’t go forwards you go backwards – even when it comes to costs.

Companies are exposed to permanent competitive pressure. Globally active competitors are always vying to gain favour with customers.

On the one hand, this forces companies to keep their technology under constant development – but that alone isn’t enough. Product costs and production costs also need to be continually optimised at the same time.



HYDAC SOLUTION: COST EFFICIENCY

HYDAC can help your customers to reduce costs with optimised components and systems adjusted to suit specific applications.

HYDAC’s constant innovations make us a competent partner for our customers’ cost-effective product developments.

These innovations range from software to help our customers calculate technical parameters and select the right product, to the provision of individual components with added value, such as hydraulic accumulators with online documentation or highly efficient filter systems and cooling systems. We even supply Plug & Play-ready hydraulic cabinets which reduce installation and commissioning costs.

Left: online documentation
Right: hydraulic cabinet
Foreground: Fluid-water Cooling System FWKS

TREND: SUSTAINABILITY

Machine manufacturers also want and need to play an active role in climate protection.

Resources such as raw materials and energy are vital for the production, use and consumption of products. But many of these resources are finite and using them has consequences for our environment.

This is why the sustainability of these “building blocks of our prosperity” must be strived for in all areas of our lives and the economy.

It is for this very reason that the mechanical engineering industry must also endeavour to produce systems which require as few resources as possible for their manufacture, operation and disposal.

HYDAC SOLUTION: DVA KIT + CO3 POWER UNIT

Variable-speed drives and frequency-controlled power units conserve resources.

With the speed-controlled “DVA kit” and “CO3” hydraulic power units, HYDAC KineSys is able to supply hydraulic energy as needed and completely turn off the supply when not required. The reduced energy input means that cooling the hydraulic oil is no longer necessary with the right dimensioning. The amount of oil used can also be minimised.

These power units can be configured and dimensioned according to requirements, making them an effective building block for machine manufacturers looking to create designs that conserve resources.

Top: CO3 hydraulic power unit
Middle left: DVA kit with HFI-MM drive controller and function module
Bottom right: DVA kit power unit

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.

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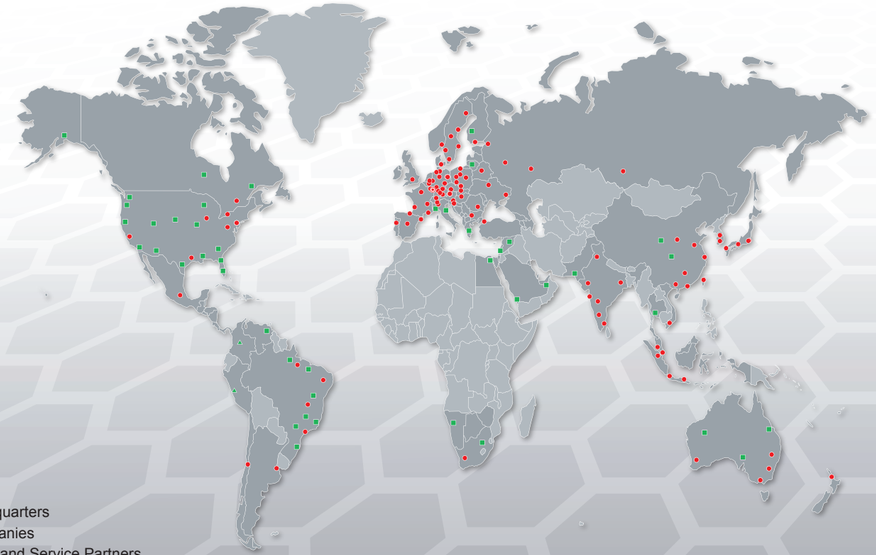

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Further information

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