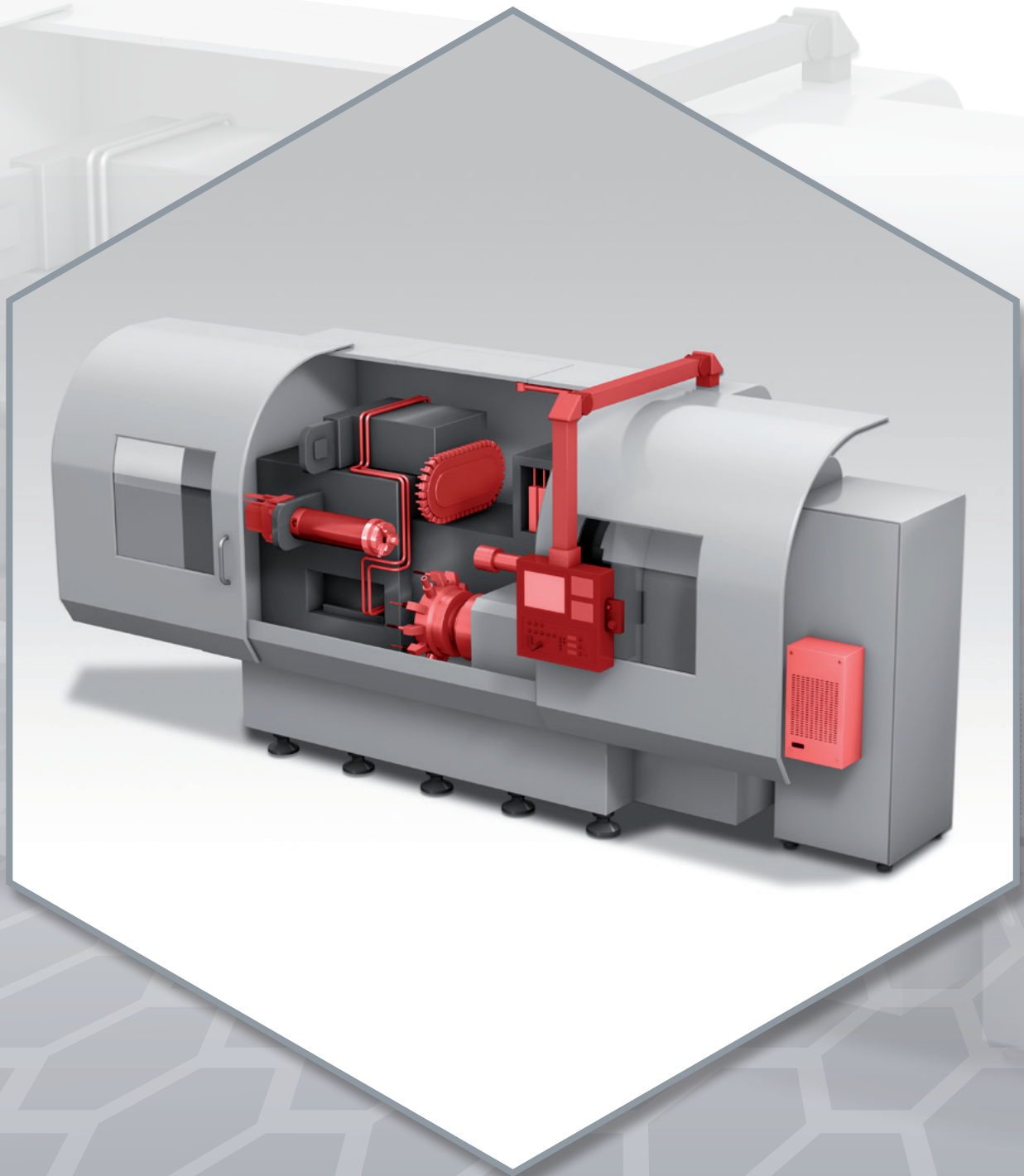


Components, systems and service for lathes



Innovative solutions specially developed for lathes ...

Your partner for expertise in lathes

HYDAC has been one of the leading suppliers of fluid technology, hydraulics, electronics and cooling equipment for more than 60 years and has over 10,000 members of staff worldwide.

The breadth and depth of our product range, combined with our recognised expertise in development, manufacturing and service, allow us to provide solutions worldwide for the wide range of requirements in the machine tool industry.

In addition to standard products, HYDAC has a wealth of components specifically developed for use in lathes. These components have evolved from the fields of hydraulics, cooling, electronics and coolant management. Intelligent integration of HYDAC products creates innovative and technologically advanced subsystems and complete systems for use in lathes.

Customer benefits

- Cost optimisation achieved by customised system solutions which use standard components
- Reduction in number of models through standardisation and modular design
- Global yet local: More than 45 subsidiaries and over 500 sales and service partners
- Fluid engineering and service: Support in technical design, in the case of complaints, commissioning, maintenance and training
- Customised solutions: Adjustment to suit individual customer needs, tailored solutions for your lathe

Hydraulics

Power units & controls for:

- Workpiece clamping
- Spindle brake
- Tailstock traverse
- Lubrication
- Tool change
- Tool turret indexing
- Axis clamping

Electronics

- Sensors (IO-Link, smart) and condition monitoring
- Network interface modules
- Measuring instruments and data recorders
- Accessories

Software

Digitalisation of machine functions, states and processes:

- Visualisation, evaluation and interpretation
- Documentation, warnings and recommendations

Filtration

- Inline filters for ultrafine filtration to protect components
- Compact back-flushing filters with low maintenance requirements
- Online measuring instruments for fluid parameter monitoring

Cooling

- Active and passive cooling systems for cooling spindles, motors, axes, switch cabinets and fluids in lathes

Accessories

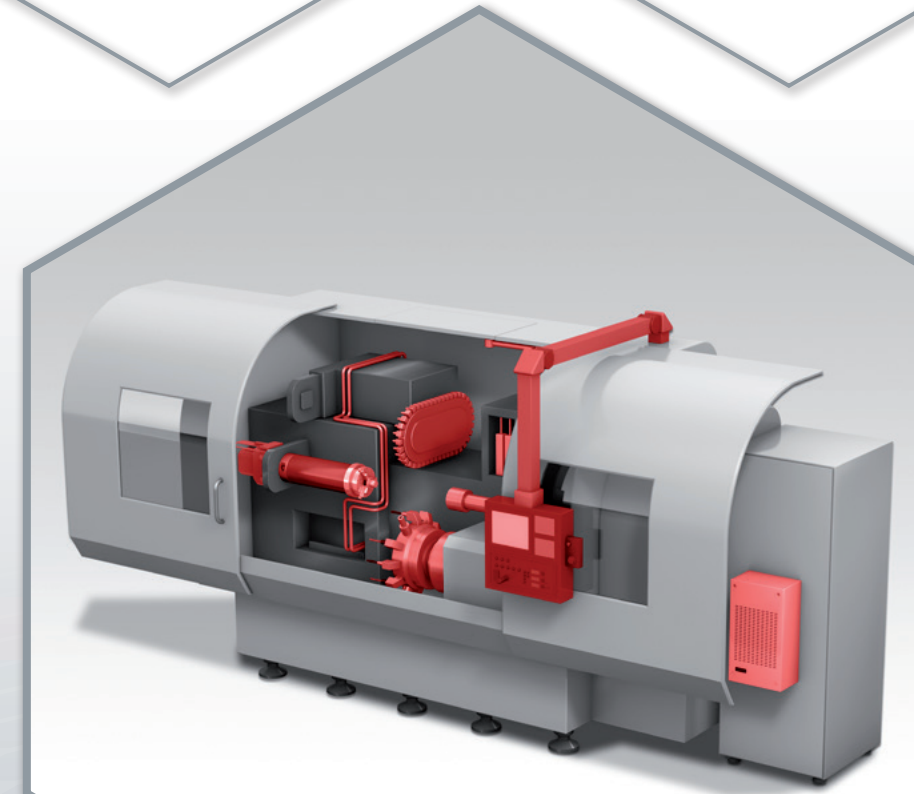
- Ball valves
- Fluid level gauges and fluid level sensors
- Mounting technology
- CX valves

System solutions

- Low-maintenance modules for continuous dewatering, filtration and degassing
- High-pressure cooling and lubricating units
- Custom, self-supporting units with all the components for fluid control

Valve technology

- Modular stacking systems for all auxiliary functions, such as workpiece clamping, tailstock, spindle brake, steady rest, turret, lubrication and parts gripper



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Electronics

Digitalisation of fluid technology, sensors and condition monitoring

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Filtration/coolant

Inline filters, automatic back-flushing filters, online sensors, filtration

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Cooling

Cooling systems, plate heat exchangers, cooling units

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Accessories

CX valves, ball valves, fluid level gauges and sensors, mounting technology

16-17

System solutions

Fluid panel, dewatering module, pressure boost station

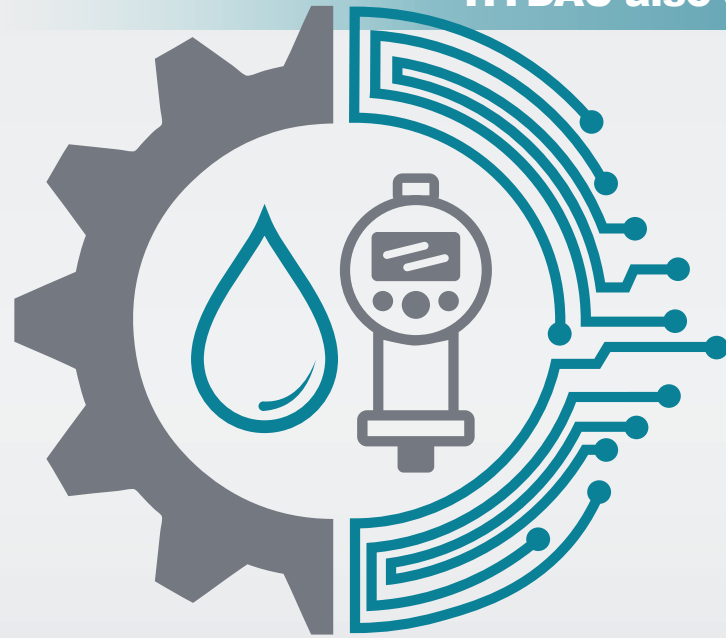
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Product innovations

Stat-X® filter element technology, MULTI Approval accumulators, innovative valve technology, Smart Compact Power Unit, smart sensor for filter monitoring, clamping pressure control valve

20-21

HYDAC also digitalises fluid power technology



Digitalisation of the lowest field level closes an important communication gap in terms of the Internet of Things. It also increases efficiency and improves machine availability.

Using the digital IO-Link communication protocol allows the transfer of information in addition to the process data, such as value status (validity of the process data) and incidents (error messages) as well as many types of device information (ID, operating parameters, diagnosis etc.). Thanks to the bidirectional communication with the sensors and actuators on the lowest field level via IO-Link, new services are made possible such as remote diagnosis, remote service and condition-based predictive maintenance.

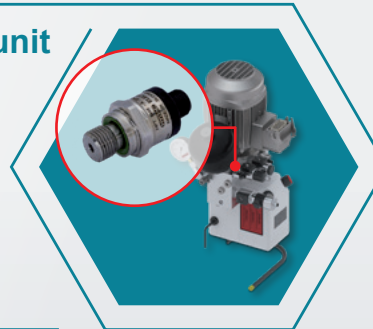
Remote or automated self-parameterisation speeds up and simplifies the initial start-up and maintenance of systems and plants.

“Plug & play” minimises sources of errors, reduces machine downtime and leads to cost savings when configuration parameters are transferred to the new device by the controller in a fully automated process.

Thanks to these functionality enhancements, these sensors and actuators are an integral component for digitalisation and the Internet of Things within the framework of “Smart Factory” solutions in the age of Industry 4.0.

CO1S – smart compact power unit with a high power density

- Smart sensor with IO-Link interface
- Automatable p_0 assessment
- Condition monitoring and notification when operating parameters are outside of the permitted range
- Pressure peak monitoring including operating hours counter



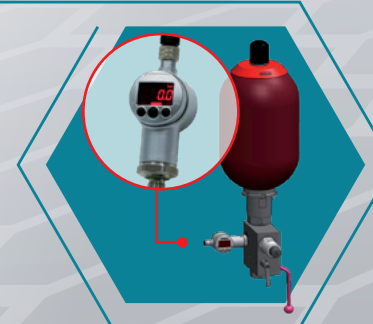
Smart pressure sensors for monitoring your fluid system

- Monitoring whether operation complies with specifications
- Recording of load profile & overload detection
- Detailed information on irregularities
- Data foundation for smart services and new business models



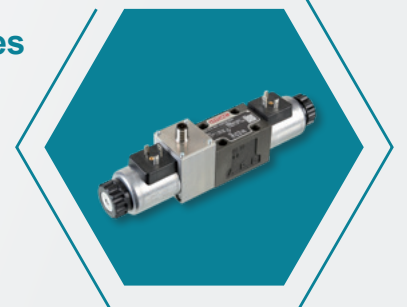
Smart hydraulic accumulators with p_0 monitoring

- Monitoring of gas pre-charge pressure
- Simple installation on the oil side
- Retrofitting for existing systems
- Accumulator charging function
- Data analysis in the pressure sensor



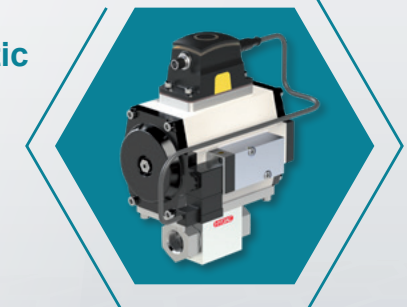
IO-Link actuators – smart valves with position monitoring

- Condition monitoring to comply with the safety principles according to DIN EN ISO 13849-2.
- Communication via IO-Link (type A)
- Diagnostic information



Smart ball valve with pneumatic actuator and IO interface

- Position sensor
- Switching time monitoring
- Cycle counter
- Direct control of the pilot valve



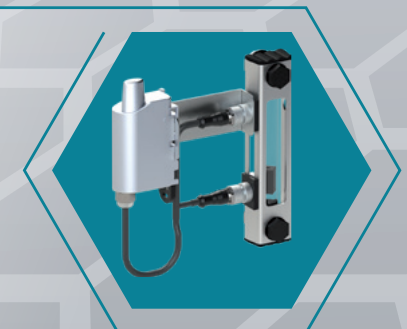
Smart filters thanks to the Virtual Fluid Lab (VFL)

- Filter monitoring
- Determination of remaining element service life
- Logging function for analysis
- Active system monitoring



Smart fluid level sensors with LoRaWAN

- End-to-end encryption
- No cabling needed
- Battery operation up to 10 years
- Can be retrofitted
- Wireless interface (LoRaWAN)
- Variable switch points



Electronics

Sensor systems and condition monitoring components contribute to increased productivity, a high level of machine safety, effective mechanical efficiency and the achievement of high quality machining.

To this end, HYDAC ELECTRONIC provides sensors for pressure, position, level, temperature, flow and oil condition monitoring with analogue or digital output signals as well as communication interfaces.

In the context of increasing digitalisation, the sensors are also available as smart sensors with IO-Link interfaces and a variety of diagnostic options such as device temperature, temperature-standardised operating times and measuring range monitoring, to mention but a few.

The product range also encompasses data recorders and measuring instruments for the parameterisation and evaluation of smart sensors. In addition, the HYDAC ELECTRONIC product range includes network interface modules (IO-Link Master) which enable connection to the control level and the Internet of Things.

Pressure sensors



Pressure transmitters: HPT 1000 Smart IO-Link, HDA 8000, HDA 4000 IO-Link;
Pressure switches: EDS 3000 IO-Link, EDS 824 IO-Link, HPS 2000 IO-Link

Features

- Robust wear-free measurement technology
- Long-term stability
- Simple and accurate adjustment:
 - Automated, e.g. via an IO-Link interface
 - Manually, e.g. based on a VDMA menu navigation
- Application-specific and customer-specific models
- Version for applications with increased functional safety
- Additional functions / diagnostic functions via smart sensors

Function

- Reliable pressure monitoring is of crucial importance for the machine's function and the quality of the workpiece.
Pressure transmitters and pressure switches are used to monitor:
 - Clamping pressure
 - Workpiece support
 - Coolant systems
 - Hydrostatic bearings
 - Accumulator charging pressure
 - Pneumatics
- Ensuring that machine operation meets specifications and simplifying troubleshooting in the event of errors, e.g. via overload detection

Benefits

- Increased machine availability
- Accuracy stability over the entire useful life
- Consistently high machining quality
- Time savings thanks to plug & play technology
- Optimised stock control
- Operating errors minimised thanks to self-parameterisation (for IO-Link)
- Simplified or optimised machine architecture/cabling
- Increased machine safety
- Smart sensors with added value:
 - Diagnostic information saved in the sensor
 - Monitoring of measuring range and device temperature
 - Automatic self-parameterisation
 - Remote diagnosis, remote maintenance
 - Condition-based predictive maintenance

Position sensors: Linear position, distance, angle, Inclinator



Linear position sensors: HLT 2500 flat housing IO-Link/profile design, HLT 1000 rod; Position switch: IES 2020; Distance sensor: HLS 528; Angle sensor: HAT 1400; Inclinator: HIT 1500

Features

- Linear position / distance sensors are based on various measurement methods
 - Magnetostrictive:
 - Wear-free and robust
 - High accuracy
 - Automated, e.g. via an IO-Link interface
 - Additional linear position and position sensors based on LVDT, Hall sensors, ultrasonic and optical
- Angle sensors
 - Measurement of angle of rotation on basis of non-contact, robust magnetic measurement method
 - Various designs
 - Angle transmitter with absolute measuring, single turn
- Inclinator
 - Based on MEMS technology
 - Highly robust sensor element
 - High dynamic performance
 - Good long-term stability
 - Motion compensated

Function

Increasing demands for precision, machine availability and improved safety require reliable measurement technology which is perfectly adapted to the application.

Linear position and position sensors are used in:

- Tailstock monitoring
- Valve position monitoring
- Position detection, e.g. for locks
- Detection of traverse paths

Benefits

- Increased machine availability
- Consistently high machining quality
- Simplified or optimised machine architecture/cabling
- Increased machine safety
- For general applications and applications with increased functional safety SIL 2/PL d

Level sensors



Level switches: ENS 3000 IO-Link, HNS 3000 IO-Link; Level transmitter: HNT 1000; Level switch: HNS 526

Features

- Wear-free measuring method
- Display of fluid level
- Simple and accurate adjustment:
 - Automated, e.g. via an IO-Link interface
 - Manually, e.g. based on a VDMA menu navigation
- Analogue resolution across entire measurement range
- Combined sensors, fluid level + temperature

Function

- Measurement and monitoring of fluid levels in oil or coolant tanks

Benefits

- Increased machine availability
- Time savings thanks to plug & play technology
- Accuracy stability over the entire useful life
- Consistently high machining quality
- Continuous fluid level measurement across entire measurement range, stepless
- Brief fluctuations in fluid level actively masked out from measurements
- Automatic fluid level detection and readjustment to central systems
- Fluid level measurement and temperature measurement combined

Temperature sensors



Temperature transmitters:
HTT 1000 Smart IO-Link, HTT 8000, ETS 4000 Smart IO-Link;
Temperature switch: ETS 3000 IO-Link; Temperature probe: TFP 100

Features

- Robust wear-free measurement technology
- Long-term stability
- Simple and accurate adjustment:
 - Automated, e.g. via an IO-Link interface
 - Manually, e.g. based on a VDMA menu navigation
- Application-specific and customer-specific models
- Additional functions / diagnostic functions via smart sensors
- Different probe lengths or remote temperature probe (TFP 100)

Function

- A consistently high product quality can only be achieved when the machining tools are at a constant temperature
- Temperature transmitters and switches are used to monitor the temperature of cooling fluids and hydraulic fluids
- Ensuring that machine operation meets the specification and simplifying troubleshooting in the event of errors via overload detection

Benefits

- Increased machine availability
- Accuracy stability over the entire useful life
- Consistently high machining quality
- Time savings thanks to plug & play technology
- Optimised stock control
- Minimal operating errors
- Simplified or optimised machine architecture
- Smart sensors with added value:
 - Diagnostic information saved in the sensor
 - Monitoring of measuring range and device temperature
 - Automatic self-parameterisation
 - Remote diagnosis, remote maintenance
 - Condition-based predictive maintenance

Flow sensors / flow meters



Flow rate transmitters: EVS 3100, HFT 2100, HFT 2500 (structurally identical);
Flow switch: HFS 2000; Flow meters: HFS 256

Features

- For water, oils, coolants
- High level of measuring accuracy and switching accuracy
- Robust design
- Viscosity-compensated
- Low Δp
- Ensures sufficient cooling/lubrication

Function

Flow sensors are used to measure and monitor the flow rates of fluid media:

- Monitoring hydraulic oil circuits
- Monitoring the flow rates to the tool in internally cooled tools

Benefits

- Evaluate and optimise processes, e.g. optimise the tool use by checking the flow rate
- Pump dry-running protection
- Early detection of leakages
- Increased machine availability

Oil condition sensors



Aqua sensors: AS 1000, AS 3000 IO-Link;
Oil condition sensor: HLB 1400 IO-Link

Features

- Online measurement of oil condition
- 2 in 1 combined sensor: for the detection of water in oil
 - Saturation level
 - Temperature
- 4 in 1 combined sensor: for the detection of oil ageing or mixing with other fluids
 - Saturation (rel. moisture)
 - Temperature
 - Dielectric constant
 - Electrical conductivity

Function

The humidity/oil-condition sensors enable hydraulic oils and lubrication oils to be monitored continuously, accurately and online.

Benefits

- Early detection of water problems / oil degradation enables needs-based maintenance / fluid conditioning
- Increased machine availability

Measurement technology



Measuring instrument / data recorder: HMG 4000;
USB IO-Link programming adapter ZBE P1

Features

- Measuring instrument / data recorder HMG 4000
 - Up to 38 sensors can be connected
 - Up to 100 measurement channels can be displayed simultaneously
 - 5.7" colour graphic touch display
 - IO-Link interface for parameterisation
- Programming adapter ZBE P1 for programming HYDAC sensors in connection with a PC

Function

The HMG 4000 measuring instrument and data recorder is designed for:

- Data collection and analysis, data storage
- Sensor parameterisation

Benefits

- Simplifies service and commissioning
- Remote diagnostics, remote maintenance and condition-based predictive maintenance
- Measurement and analysis
- Connection to the Internet of things

Network interface



Network interface: IO-Link Master



Features

- Network interface module IO-Link Master
 - with 4 or 8 ports
 - Class A or Class B

Function

- Connects IO-Link field device with automation system / PLC

Benefits

- Simplifies service and commissioning
- Remote diagnostics, remote maintenance, predictive maintenance
- Measurement and analysis
- Connection to the Internet of things
- Simplified, faster and less costly cabling of the entire system via IO-Link Master

Hydraulics

Variable-speed drives

Lathes require large oil flow rate ranges at constant pressure ratios. To reduce downtimes and speed up processing times, the clamping cylinders must be operated as quickly and reliably as possible when clamping the workpieces. For this purpose, the variable-speed power unit facilitates the maximum flow rate possible to make the low, system-related leak flow rate of the rotating clamping cylinders available. This is just one example of the great potential of the modern drive technology from HYDAC KineSys.

The robust gear pump and electrical drive control work together in a symbiosis, which perfectly combines the benefits of hydraulics and electronics.



CO3 – reduced to the essentials

The variable-speed hydraulic power unit CO3 is a standardised pressure supply unit. Designed for the needs of the majority of lathes, it is the perfect continuous operation machine with an efficient cost structure. Including cooling for the oil and motor, and for the drive controller, the system can be integrated into the machine with plug & play installation.



DVA Kit – for individual requirements

The hydraulic power unit based on the DVA Kit is a variable-speed pressure supply unit that can be tailored to suit all kinds of requirements in lathes.

Contrary to the CO3 unit, all degrees of freedom are available. Performance, tank volume, valve stacking systems, various pressure circuits and accumulators, cooling, etc. can be precisely tailored to suit the machine's needs.

Benefits

- **Simple integration into the machine:**
Plug & play means needs-based variable-speed pressure supply that is ready to use straight away. For easily controlled functions, consistent pressure systems and continuous operation.
- **No machine controller** or programming needed in simple applications such as closed-loop pressure control.
- **No switch cabinet** needed as drive controller is motor-mounted.
- **Sensors for unit condition** can be wired directly to drive controllers, evaluated and read to the machine controller via a fieldbus interface (pressure, fluid level, temperature, filter contamination).
→ No wiring or integration of the power unit sensor system into the machine controller needed.
- **Simple troubleshooting:**
Error codes can be sent in plain text via fieldbus.
- **No knowledge of the drive controller software needed:**
All interfaces for remote control and condition monitoring can be transferred in standardised form via a fieldbus protocol or realised with analogue and digital signals.
- **Merging of interdisciplinary systems:**
hydraulics, electrical engineering and programming fully coordinated.
- **Standard modules** with uniform components.
- **Easy to configure** (configurator and guided question sheet & design documents).



Stacking system

HL controls with flexible valve solutions

Features

- Can be used as individual modules or in stacking configurations locally in the machine
- Installed close to the particular actuator
- Can easily be extended to achieve the required range of functions
- Tried-and-tested cartridge valve technology in conjunction with Cetop valves in Δp -optimised, modular housings
- High energy-saving potential due to zero-leakage poppet valves in conjunction with an accumulator charging function
- A selection of standardised valve cavities combined intelligently in the particular module allow various circuits to be achieved entirely within the module
- Very high levels of in-house production make us highly flexible in accommodating customer requests

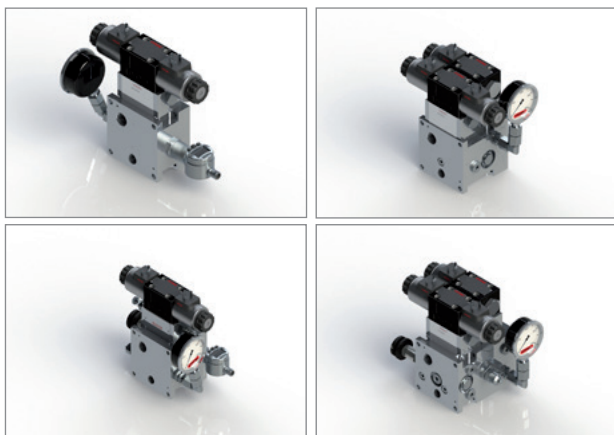
Function

The HL stacking system is a control logic for the auxiliary functions in a lathe. It is made up of individual standard modules arranged side by side that can achieve the customer's desired function thanks to flexible valve solutions. Each function module can be used both independently and in stacking configurations. The sequence of modules depends on the control task, as does the use of pressure, flow control, shut-off and directional valves on the module.

The system can easily be customised as adding and exchanging components is very simple.

Benefits

- Energy efficiency
- High level of integration
- Plug & play
- Reliability

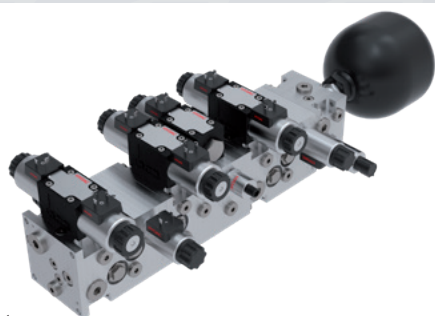


Individual modules for different applications

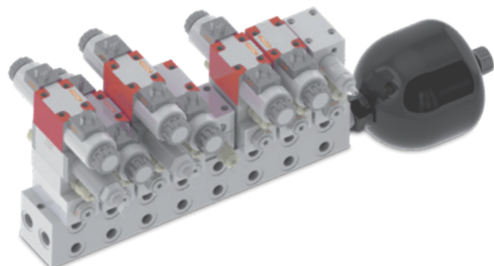
HL stacking systems vs conventional stacking systems

The compact design of the HL stacking system, which was specifically developed for the numerous hydraulic applications of lathes, has significant advantages over conventional stacking systems, e.g. in terms of installation space, weight, costs and flexibility.

- Cavity: -35%
- Weight: -40%
- Costs: -10%
- High flexibility thanks to modular design
- Almost all hydraulic functions possible



HL stacking system



Conventional stacking system

Filtration and coolant

Automatic back-flushing filter AutoFilt® RF12



Automatic back-flushing filter AutoFilt® RF12,
conical filter elements

Features

- Separation of solid particles from low-viscosity fluids
- Filtration rating from 30 to 1000 µm
- Flow rates up to 80 l/min
- Compact design
- Particularly suitable for filtering coolants in machine tools with individual supply

Applications

- Self-supplied machine tools
- Filtration of coolants in low-pressure applications

Benefits

- Self-cleaning automatic filter
- Discontinuous filtration
- Energy-optimised filtration and back-flushing principle
- Not dependent on pressure of filtrate
- Efficient alternative to a cyclone separator
- Simple integration and flexible adaptation to the machine tool
- Maintenance-friendly design

Automatic back-flushing filter AutoFilt® RF4



Automatic back-flushing filter AutoFilt® RF4, conical filter elements

Tried-and-tested function principle, compact design

Features

- Separation of solid particles from low-viscosity fluids
- Filtration rating from 20 to 1000 µm
- Flow rates up to 385 l/min
- Compact design
- Efficient thanks to automation
- Powerful thanks to isokinetics
- Optional: AutoFilt® Control Unit ACU with open connectivity to all standard interfaces (Ethernet, RS-232 C, RS 485) for self-diagnosis, system diagnosis, remote monitoring and process monitoring

Function

The medium flows through the filter elements from the inside to the outside. Contamination particles then collect on the smooth inside of the filter element surface. As the level of contamination increases, the differential pressure between the contaminated and clean sides of the filter increases. When the differential pressure reaches the pre-set trigger point, back-flushing starts automatically.

Benefits

- Fully automated function
- Turnkey unit
- Maximum utilisation of the filter area
- Full filtration performance following back-flushing
- Complete cleaning of the conical filter elements
- Low maintenance
- Low operating costs

Automated coolant management FCU 5000 and FluidController 5000



FCU 5000

FluidController 5000

Features

- Continuous monitoring and control of concentration, pH value, electrical conductivity, temperature and tank level
- Automated dosing of coolant concentrate and refilling of the tank with ready-mixed emulsion allow the specified target concentration and tank level in the coolant tank to be kept constant
- Documentation of all measured parameters

Applications

- Fully automated fluid management for central systems
- Fully automated fluid management at up to 10 measuring points for linked, decentralised systems

Benefits

- Fully automated system solution
- Increased productivity: Payback periods of <1 year possible
- Ensures key coolant parameters in chip-removal machining processes
- Direct connectivity to cloud and control center
- Creation of digital lab reports (Employers' Liability Insurance Association-compliant in acc. with TRGS 611)
- Integrated self-monitoring for consistently reliable measurements

Inline filters LF / DF / FLND / FMND



Change-over filter FLND

Ultrafine filtration for component protection

Features

- Separation of solid particles from hydraulic fluids and coolants
- Filtration ratings from 3 to 50 µm
- Flow rate up to 420 l/min
- Pressure up to 420 bar
- Filters to DIN 24550 available
- Change-over filters possible

Function

As the fluid passes through the filter element, the particles are retained and become embedded in the deep structure of the element. The large internal surface provides a high contamination retention capacity and long filter service life. Thanks to excellent filtration, even of ultrafine particles, the downstream components, such as rotary joint, internally cooled tools and high-pressure valves, are protected from damage.

Benefits

- Desired cleanliness class is guaranteed
- Protection of downstream components
- Low pressure loss
- Compact and space-saving design
- 24h operation with duplex change-over filters
- Low leakage when element changed
- Available with/without bypass valve

Cooling

Fluid-air cooling systems FLKS



Fluid-air cooler FLKS-2EC

Features

- Cooling of circuits which use water glycol or mineral oil
- Compact design with plastic tank, circulation pump, cooling element and fan
- Various sizes with cooling capacities up to 4.5 kW/K and flow rates up to 300 l/min

Function

The pump conveys the cooled operating medium from the tank through the component that is to be cooled. The fluid absorbs heat from the component and then flows back to the heat exchanger, where it is returned to a cooler temperature by the air flowing from the installed fan.

Benefits

- Cost-effective and efficient cooling system
- Compact and lightweight: sizes FLKS-1 to FLKS-5 are equipped with plastic tank housings
- Energy-efficient thanks to optimised and tailored drives with heat released directly to the surroundings
- Optional: speed-controlled systems:
The temperature of the operating medium is controlled by adjusting the fan speed to a defined differential to the ambient temperature

Fluid-water cooling systems FWKS



Fluid-water cooler FWKS-2-2

Features

- Cooling of circuits which use water glycol or mineral oil
- Compact design with plastic tank, circulation pump and plate heat exchanger
- Various sizes with cooling capacities up to 250 kW and flow rates up to 300 l/min
- Can be used as temperature-controlled intermediate circuit. In this way, the contamination and corrosion in the coolant circuits which could arise as a result of direct cooling with poor water quality is prevented.

Function

The pump conveys the cooled operating medium from the tank through the component that is to be cooled. Once there, it absorbs the heat and flows back to the plate heat exchanger where it is cooled down again by the available cooling water.

Benefits

- It is also possible to cool to temperatures below the ambient temperature (depending on the temperature of the available cooling water)
- Low release of heat to surroundings and low noise emission
- Thermostatically or electronically controlled proportional valve available as an option: the temperature of the operating fluid can therefore be maintained at a specific temperature value

Plate heat exchanger – gasketed or brazed



Brazed and gasketed plate heat exchangers

Function

Thanks to their compact design, highly turbulent flow and use of the countercurrent principle, plate heat exchangers can generate extremely high levels of heat recovery. Temperature harmonisations of up to 1 K can be achieved.

Gasketed plate heat exchangers

Features

- The stack of heat transfer plates and gaskets is clamped together in a frame with clamping bolts.

Benefits

- High thermal performance thanks to CFD-optimised wave field of the heat transfer plates
- Cleaning and maintenance simplified thanks to visual seal identification and use of clip-on seals.
- Designs as safety heat exchanger with double plates and a special sealing system to prevent media from mixing even in the event of plate damage

Brazed plate heat exchangers

Features

- The stainless steel heat transfer plates are brazed with copper as standard and are pressure-stable up to 30 bar.

Benefits

- Service- and maintenance-friendly thanks to highly efficient self-cleaning based on turbulent flow in the flow gaps
- Efficient cooling capacity combined with low cold-water consumption
- Wide-ranging applications, including aggressive media, or with double plates to prevent media mixing

Plate heat exchanger with closed-loop control WTRE



Plate heat exchanger with closed-loop control

Features

Water cooling system, consisting of:

- a brazed plate heat exchanger
- a flow control valve
- an electronic controller
- a temperature sensor for measuring the fluid temperature or, additionally, the air temperature

Function

The WTRE is used as an intermediate circuit for cooling motor spindles, gears, hydraulic power units and coolants. It is generally used in combination with the existing cooling unit. The coolant is pumped from the cooling unit pump through the WTRE plate heat exchanger to the machine tool. If the available plant cooling water is cold enough, the compressor is not needed and remains continuously switched off.

Benefits

- Fixed set-point control of the media temperature; as an option, the temperature of the operating fluid can also be kept at the ambient temperature (air or machine bed temperature)
- Highly accurate electronic controller
- Reduced operating costs due to energy savings
- Simple conversion: interference with the machine tool's electrics or PLC is not necessary

Compressor cooling system RFCS



Compressor cooler RFCS

Features

- Fluid cooling system as separate auxiliary cooler or for integration into a machine
- Cooling capacities from 0.3 to 200 kW
- Can be used for any cooling tasks
- Stand-alone control of the system due to innovative controller design
- Condenser available as water-cooled or air-cooled variant
- Several cooling circuits possible
- Precise temperature control accuracies of up to ± 0.1 K

Function

The RFCS cooling unit allows various fluids such as water, DI water, water glycol and oil to be cooled. The cooling system consists of the chiller, pump, tank and controller and is able to set the temperature of the operating medium to a previously configured setpoint independently. The energy-efficient, patented mixer principle makes this system the ideal component for your machine tool.

Benefits

- Natural refrigerants (propane, CO₂) available
- Large range of options
- Compact dimensions
- User-friendly control interface
- Plug & Play solution
- Easy to service and user-friendly

Accessories

HYDAC offers a good standard range of common valves available on demand and from stock for use with vacuum, gaseous, liquid, gelatinous, abrasive, contaminated and aggressive media.

CX valves – direct-acting and pilot-operated



Available as single valves and in a modular design

Features

- High flow rates with low pressure loss
- Flow rates of up to $47.2 \text{ m}^3/\text{h} = 787 \text{ l/min}$
- Safety assured by proven technology and experience
- Compact design
- Robust design and high level of protection against back pressure

Function

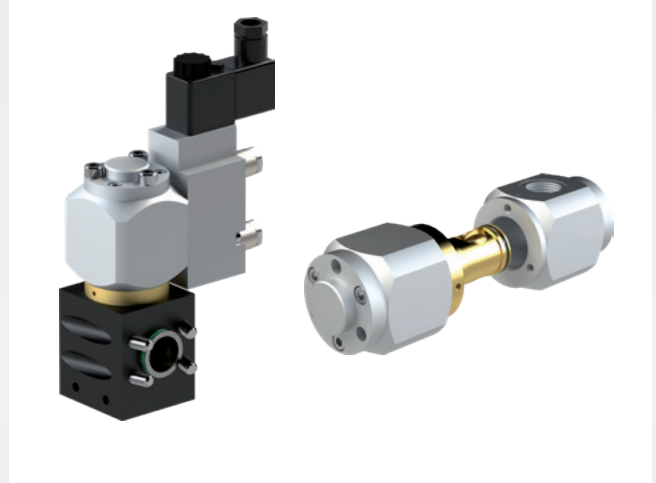
CX valves open and close by axial motion. Compressed air or solenoid force moves a tube in a horizontal direction and opens the valve seat.

The CX valve technology is a tried-and-tested element for controlling vacuum, gaseous, fluid, abrasive, contaminated and aggressive media, and is therefore universally applicable. A broad range of sizes and connection types combined with seal materials and housing materials which are compatible with the medium make it possible to develop tailor-made solutions for an almost unlimited range of applications.

Benefits

- Rapid opening and closing times
- Highly contamination-resistant and durable
- High Kv values and viscosities are possible, therefore also suitable for gelatinous, highly viscous, paste-like and contaminated media
- Very compact design
- The geometry of these valves allows them to be built as module blocks (space-saving, maintenance-friendly and minimises the time and effort required for installation)
- No pressure differential required
- Resistant to back pressure and flow possible in both directions

CX valves – cartridge version



CXC DN10 & CXC DN15

Features

- Can be used up to 200 bar
- Compact design
- Closed-loop control of high pressures combined with high flow rates
- Pilot control thanks to standardised 5/2 directional Namur valves
- Magnetic field sensors used to detect valve position

Function

Cartridge valves are also referred to as slip-in valves. The valve cartridges are mounted in the valve body with three bolts. Once it has been installed in the pipe system, the system has the advantage that the valve cartridge can be changed in a matter of minutes when needed. Using a large spanner to clumsily remove the entire valve body from the piping is no longer necessary; only the three bolts need to be loosened.

Benefits

- Optimised for installation (no disassembly of the piping)
- Can be used as single valve or multiple block
- Maintenance-friendly as the valve cartridge is simply screwed into the valve body
- Significant reduction in required installation space

Accessories for every sector. HYDAC's comprehensive product range can supply the right components for all your fluid power requirements, whether this involves locking, switching, control, fastening lines and components, screw-in connections, couplings or damping.

Ball valves



Manual or with pneumatic actuator

Function

Secure blocking and redirecting of your media. We supply a wide range of high-quality materials for the biggest challenges in your application. Manually operated or switched automatically, with a pilot valve and additional position monitoring on request, from analogue to bus communication or IO-Link. We supply custom solutions for almost any application. Our expertise ranges from the requirements analysis and development to the finished product. Get in touch – we will gladly assist you with your project from the outset.

Benefits

- Full-flow passage to ensure unrestricted flow of the medium
- Self-sealing due to sealing principle with floating ball
- Easy actuation, even at high pressures
- Maintenance-free, no adjustment of the seal necessary
- 100% individual testing of the ball valves

Fluid level gauges and fluid level sensors



Fluid level gauge FSA / fluid level sensor FSK

Function

Visualisation and monitoring of fluid level values. The range spans from our series product line to especially robust, break-proof and zero-leakage custom solutions. There is a large range of materials and designs to choose from, along with temperature ranges from -50 °C to +160 °C.

Benefits

- UV and temperature-resistant
- Custom designs and models
- Large number of connectors and switching functions for FSK
- Optional temperature monitoring
- Tank stop for simple maintenance
- Specially selected materials for demanding media
- Special versions with LED and wireless remote monitoring

Mounting technology



Tank, component, pipe, cable and hose mounting

Function

For the mounting of tanks or components of different shapes and materials, along with pipes, hoses, cables, sensors, switches and/or all other parts, the HY-ROS range from HYDAC supplies solutions suitable for all kinds of applications.

Benefits

Series strips:

- Bundled, secure and optimised mounting
- Simple and rapid installation
- Protection of sensitive components
- Compensation of pipe and cable tolerances
- Different diameters in one series strip

DIN 3015 and Buegu clamps:

- Damping of shocks, vibrations and noise, as well as compensation of pipe tolerances
- High strength
- Surface protection
- Safe overhead installation

Clamping bands:

- Simple installation thanks to hinged closure system
- System solution with support base and other attachment parts
- Individual shaping of the clamping bands for extra flexibility
- Various materials for any application
- Reduced vibration and noise level
- Produced in-house – custom-made or standardised

System solutions

Fluid panel



a Coolant/ media control

CX valves, ball valves,
piston control valves, high pressure pump,
automatic back-flushing filter

b Electronics

Sensors, electrical control

c Hydraulics

Hydraulic power units, valve stacking
systems, hydraulic accumulator units,
mounting technology

d Pneumatics

Supply unit, valves, modules

e Lubrication systems

Lubrication units, dosing units,
pressure filters

f Cooling

Air, water and/or compressor
cooling systems

g Level display

FSK LED

Function

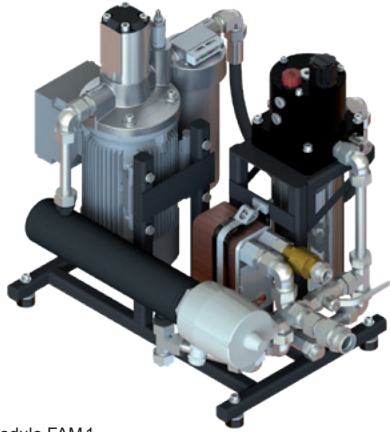
A fluid panel is a self-supporting unit which combines all the fluid control components of a machine tool. It includes the cooling, electronics, coolant, hydraulics and pneumatics.

By using defined interfaces accurately coordinated with the machine tool manufacturer, it is possible to design a subsystem to concentrate all the fluid control for a machine tool in one area. From the technical calculation, through to the installation including piping and wiring, right up to function testing the unit, HYDAC is your system partner with all the expertise.

Benefits

- Simple and rapid installation thanks to defined hydraulics, pneumatics and electronics interfaces (quick release couplings, connectors, etc.)
- Concentration of all the fluid control in the machine
→ Better overview, more maintenance-friendly, easier troubleshooting
- Machine tool manufacturer has one contact for cooling, electronics, coolant, hydraulics and pneumatics.
- All from a single source – reduces the number of interfaces and minimises number of suppliers

Dewatering module FAM 1



Dewatering module FAM 1

Compact, automatic degassing and dewatering unit with bypass filter

Features

- Achievable water content <50 ppm (depending on oil type)
- Degassing rates of up to 8 l/h (for 20% gas content)
- Compact design
- No controller – incorporated into customer's machine control
- Optional heater (to increase system performance) possible

Function

In this unit, which is installed in the bypass flow, moisture and gases from the oil are gently released into the air by reducing the pressure and heating the air in the integrated vacuum column. The integrated filter ensures efficient solid particle separation.

Benefits

- Additive-free, automatic and reliable dewatering and degassing of the hydraulic oil
- Longer oil change intervals
- Improved component service life
- Reduction in the system's monitoring and maintenance workload

Custom pressure boost station



Pressure boost station

Safe high-pressure cooling and lubrication

Function

Coolant pressure boost stations are used in the chip-removal industry to boost the pressure and the flow rate of the coolant needed for the processes. Adequate pressure and flow are vital for optimal function of the machine tool, the related process reliability and a long machine tool service life.

A pressure boost station for coolants consists of one or more pumps, media control valves for control of various machine functions and monitoring sensors to complete the closed-loop control circuit with an internal or external controller. Depending on the particular requirements, a receiver tank for the coolant and automatic and protective filters can supplement the pressure boost station.

As an experienced fluid specialist, HYDAC supplies custom solutions that meet all specific requirements. We make use of our entire range of services from the individual specialist areas and combine individual components to form compact assemblies. Our subsystems are developed in collaboration with our customers and developed to reduce the amount of work needed for integration and commissioning to a minimum.

Product innovations

Stat-X® filter element technology



Filter elements to combat electrostatic charging in the system

Features

Over the past few years, the trend towards ash-free hydraulic fluids, more compact systems and finer filtration has led to increasing problems of electrostatic charging and discharging in hydraulic and lubrication oil systems.

Using the ground-breaking Stat-X® element technology means you can verifiably reduce electrostatic discharge and high oil charging even in extremely critical systems in combination with excellent ultrafine filtration.

Benefits

- Maximum safety for employees and the system due to a proven reduction in spark discharge
- Reduction in oil degradation products (varnish), longer oil change intervals
- Safe operation in potentially explosive atmospheres
- Reduction in unscheduled downtimes
- Reduced maintenance costs and longer maintenance intervals

MULTI Approval accumulators



MULTI Approval accumulators for worldwide use

Features

Hydraulic accumulators and pressure vessels are subject to legal regulations and requirements which depend on the country of installation. HYDAC hydraulic accumulators fulfil these requirements and can be used worldwide.

By combining common approvals, HYDAC is able to offer a MULTI Approval accumulator in addition to single approval accumulators. MULTI approval accumulators come with several approval classifications straight from the factory.

With this expansion to our product range, the same accumulator can be used in several countries.

Benefits

- Wide variety of uses in the original equipment sector and the spare parts business
- Reduced machine documentation workload
- Optimised warehouse management and logistics management

Innovative valve technology



Broad and innovative product range – all from a single supplier!

Features

- Complete directional valve product range for applications in machine tools – up to 350 bar and size 32
- Valves with switch position monitoring; sensor (Hall principle) with analogue or IO-Link type A
- Valves with reduced power consumption; 8-watt valves for control directly from the PLC
- Valves with on-board electronics and integrated pressure sensors

Benefits

The switch position-monitored valves enable system monitoring and an increase in the diagnostic coverage. Information on all the completed switching cycles is also provided.

In addition to saving energy during operation, the valves with reduced power consumption lead to cost savings due to reduced electronics expenses.

The valves with on-board electronics and the integrated pressure sensors enable a closed-loop control circuit to be formed. They also allow continuous condition diagnostics combined with a compact design.

Smart Compact Power Unit CO1S



CO1S goes Smart

Features

The machine tool power unit CO1...MCF21 Smart with pressure filtration for clamping and tensioning functions. Smart sensors are used to diagnose the condition of the power unit, filter and hydraulic accumulator. Hydraulic accumulators with safety devices and valves are combined to form a compact unit located right inside the power unit flange.

Benefits

- Continuous condition monitoring with messages when the set operating parameters are exceeded prevents hydraulic failures and increases system availability
- Servicing can be planned more easily
- Filter element integrated into the flange and remaining service life display
- Flange can be expanded as needed thanks to the HYDAC ML stacking system
- Very compact design as the accumulator, pressure gauge and pressure switch etc. are integrated into the flange

Smart sensor for filter monitoring



Features

The HYDAC Virtual Fluid Lab (VFL), is a smart concept that not only determines the remaining service life of filter elements but also facilitates predictive maintenance. A reduction in life cycle costs and therefore an increase in machine availability are additional crucial advantages. Using sensors for measurement of pressure difference or for back pressure measurement, the concept can be used regardless of the filter type and size. The Virtual Fluid Lab is available either with CAN bus or IO-Link as a communication system.

Function

The Virtual Fluid Lab is a smart sensor for filter monitoring. The pressure loss as flow passes through a filter element is used to determine the element's load condition and to estimate its remaining service life. The following process data are output:

- Remaining service life of the filter element in hours
- Operating hours of the filter element
- Pressure value
- Filter load

Benefits

- Maximum utilisation of the element service life
- Conservation of resources
- Optimal planning of service work
- No unscheduled downtime or failure
- Reduced life cycle costs
- Improved machine availability
- Integration into internal digital processes

Compact, proportional clamping pressure control valve



Features

With automation forging ahead and machining tasks increasing in complexity, there is a high demand for proportional clamping pressure adjustment. The valve that HYDAC has developed combines high reliability with a compact design.

Benefits

- Implemented as a Cetop size 6 sandwich plate
- Variants with preset nominal value via 0–10 V, 4–20 mA or IO-Link available
- No additional electronics needed in the switch cabinet
- Depending on accuracy standards, compensation can be performed via the PLC
- Perfect for integration into HYDAC HL stacking systems

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Comment

The information in this brochure relates to the operating conditions and applications described.
For applications and operating conditions not described, please contact the relevant technical department.
Subject to technical modifications.