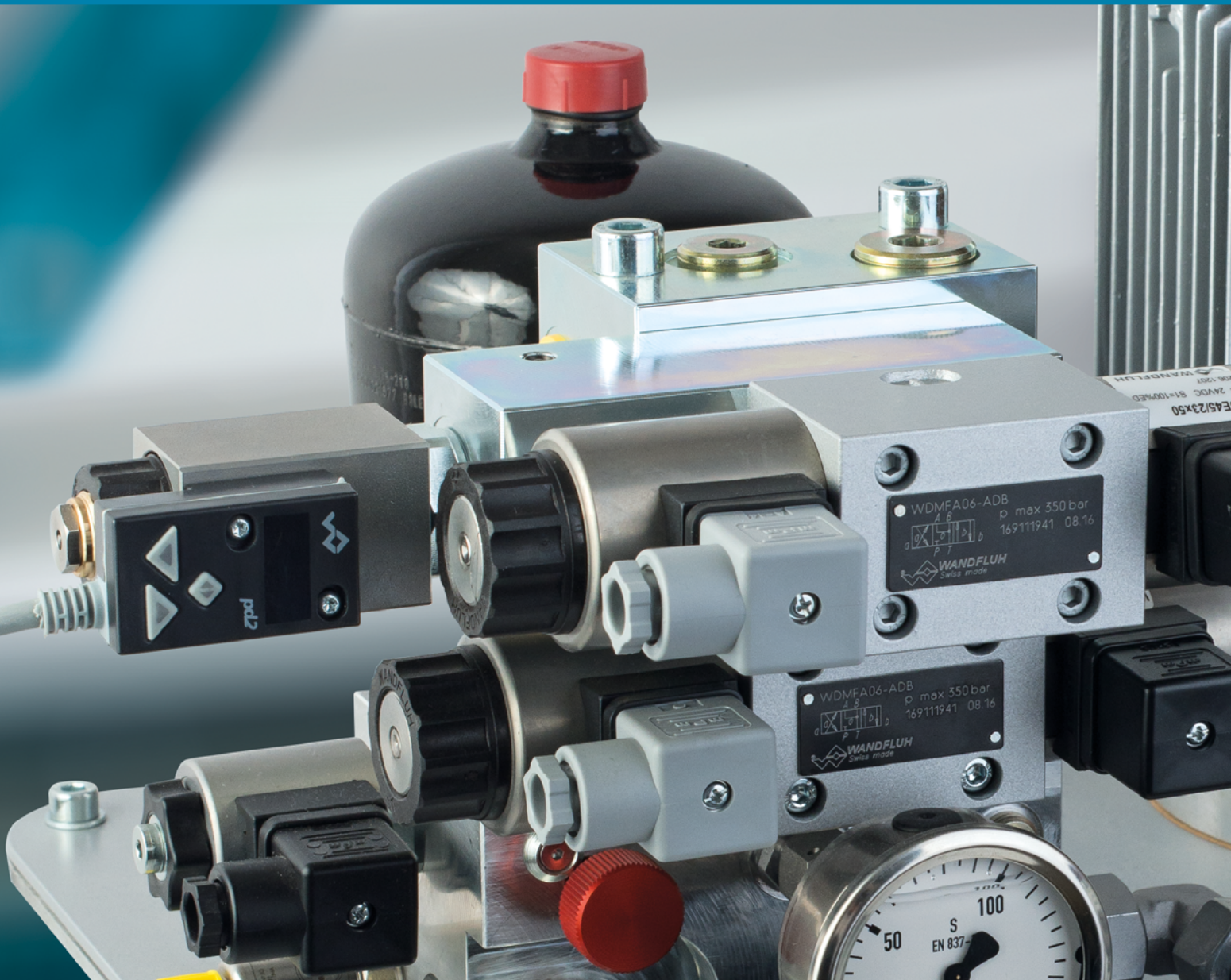


Quality products for
demanding use



PROGRAMME OVERVIEW

“ We want to provide our clients around the world with high-quality products and get engaged as a valued partner in the development of technically demanding hydraulic systems. ”

————— Hansruedi Wandfluh and Matthias Wandfluh —————

ABOUT US

Since 1946, Wandfluh provides and develops high-quality products tailored to various markets. Apart from the standard products, Wandfluh also offers valve and system solutions specifically developed and produced according to particular customer needs.

WANDFLUH GROUP



WANDFLUH AG

Frutigen / CH



WANDFLUH OF AMERICA, INC.

Mundelein / USA



WANDFLUH GMBH

Emmingen / D



WANDFLUH UK LTD

Southam / UK



WANDFLUH SARL

Saint-Priest / F



WANDFLUH CO. LTD

Shanghai / CN



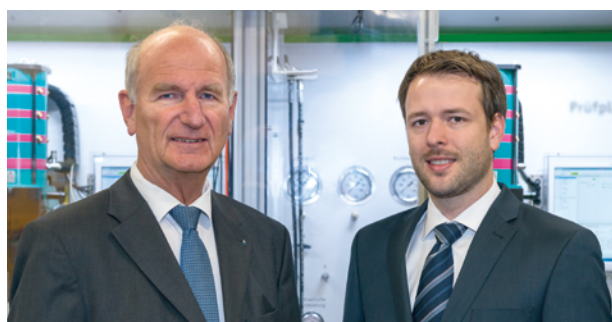
WANDFLUH GMBH

Dornbirn / A



WANDFLUH PRODUKTIONS AG

Frutigen / CH



Hansruedi Wandfluh (President, Wandfluh Holding AG) and Dr. Matthias Wandfluh (CEO)

WORLDWIDE

- Own companies in Europe, North America and Asia
- Distributors in over 30 countries around the world
- Flexible and solution-oriented handling of customer needs
- High-quality, cost-effective and punctual processing of projects

PARTNER

- A partner for demanding hydraulic projects due to technical specialists in every field
- Efficient processing of projects from planning to maintenance
- A partner for customer-specific adaptations

KEY POINTS

- High level of in-house production
- Swiss manufacturer
- Quality products and services
- Fast delivery times from prototype to series production
- ISO 9001 certified, since 1992 documented quality
- ISO 14001 for the responsible handling of our resources
- OHSAS 18001 for the protection and safety of our staff

WANDFLUH INDUSTRY

Industry applications have always been geared towards precision, efficiency and reliability. With Industry 4.0, these terms are now becoming even more prominent. Although other techniques and procedures are being implemented to some extent, hydraulics continues to play an important role in fast and powerful motion sequences and clamping devices on processing machines. Stable performance coupled with a high level of repeatability are an indispensable part of this.

FOCUS

Industrial production is in transformation. Industry 4.0 will change the production environment in future and thus also the requirements of hydraulic systems developed for industry. The needs for valve and electronic components will significantly increase. These needs range from redundant switching position monitoring through to customer-specific constructions.

However, one of the industry's key objectives is to develop a precise type of hydraulics that can be adapted to different machinery and has sensitive control characteristics. This can be achieved successfully with intelligent electronics and the corresponding software and guarantees precise and dynamic motion sequences in an industrial production facility.

APPLICATION EXAMPLES

- Axes positioning in machine tools
- Industrial robots
- Cutting feed control with positioning
- Variable workpiece clamping
- Controlled force transmission in cutting installations
- Hydraulic support
- Tension control of coiling machines
- Actuation and control of presses and bending machines

...designed to ensure **reproducibility** and **precision**



INDUSTRY

CHARACTERISTICS

- Precise adaptation to a hydraulic system by means of electronics developed in-house and intelligent software
- Valve technology with switching position monitoring
- High power density (up to 450 bar / 1600 l/min)
- Compact constructions (NG3-Mini, NG4-Mini)
- High precision
- Good repeatability
- Sensitive control characteristics
- Ease of maintenance
- Individual customer-specific adaptations
- Worldwide customer service



WANDFLUH MOBILE

High power density and reliability in all weather conditions have always been important requirements for the use in the mobile sector. In order to carry out heavy work with large machinery efficiently and yet also precisely, hydraulics that are well-adapted to the machinery are required. Precise proportional technology with the corresponding electronics and software are the key to success here.

FOCUS

Components for the mobile sector meet a broad spectrum of requirements. In addition to being suitable for all weather conditions, they must have a high power density and show a high robustness against external influences. Depending on the requirements, explosion protection and/or corrosion protection executions of the valves are also available. The quality of the valves and electronics generally becomes apparent once they are used on a daily basis in mobile devices and machinery, where shocks, vibrations and sharp temperature fluctuations are a part of everyday operations. The focus at Wandfluh is on these factors, when developing valves and electronics for the mobile sector. The specific layout of hydraulic components has led to a significant increase of the reliability and availability of a mobile machine in numerous projects.

...designed to ensure **high power density** and **robustness**



MOBILE

APPLICATION EXAMPLES

- Brake systems and couplings
- Port crane control
- Construction machinery
- Forestry machinery
- Salt spreader vehicles
- Fan drives
- Machinery with lifting functions (forklift truck, lifting platform, etc.)

CHARACTERISTICS

- High volume flows
- Sensitive control characteristics
- Low hysteresis
- Low weight
- Robust construction
- Secure against vibrations and other external influences
- Hydraulically efficient valve technology
- Smart control by means of electronics developed in-house via a bus system
- Corrosion protection valves (up to stainless steel)
- Explosion protection valves including electronics
- Individual customer-specific adaptations
- Worldwide customer service



WANDFLUH OIL+GAS

Work involving highly explosive liquids and gases requires accordingly secured technology. Especially in the oil and gas exploration sectors but also in mines with high dust generation or gas influx, explosion protection is a hugely important issue. In order to carry out heavy work without risks in such hazardous areas, an explosion-protected valve technology was already developed and implemented years ago.

FOCUS

Apart from explosion protection, the requirements placed on valve technology in the oil and gas sector are extensive, since energy sources are often to be found either in very warm or in extremely cold areas in the world. With valves for ambient temperatures of down to -60 °C or up to +90 °C, a large temperature range can be covered. Explosion-proof valves are often also used outside in harsh environmental conditions. They not only come into contact with salt water but are also exposed to corrosive gases or substances. Explosion-protection valves are therefore mostly made from corrosion-resistant or stainless materials. Over decades, Wandfluh has developed a broad portfolio of valve and amplifier technology that has proven highly successful in numerous projects.

...designed to ensure **safety** and **reliability**



OIL+GAS

APPLICATION EXAMPLES

- Oil drilling head control
- Winch power control
- Flap control on oil and LNG tankers
- Process control
- Drilling vessels
- Compressor stations
- Gas separation
- Pipelines

CHARACTERISTICS

- Explosion-protection certification for various countries and regions
- High reliability
- Broad explosion-protection range of switching and proportional valves
- Corrosion-protection valves, from Zi/Ni through to stainless steel
- Redundant systems
- Valve technology with switching position monitoring
- Reduced electrical power
- Individual customer-specific adaptations
- Worldwide customer service



WANDFLUH MARINE

Wandfluh valves are increasingly being used in the marine sector. By using stainless materials or equivalent surface treatments, corrosion protection is guaranteed even in wet and salty conditions. When using water glycol as a hydraulic fluid, the inner workings of the valves are adapted accordingly.

APPLICATION EXAMPLES

- Ballast water management (actuation of ball valves and butterfly valves)
- Ship's hatch control
- Brake systems for winches
- Thruster control in underwater robots
- Control of the manipulator arms (ROVs)
- Precise positioning with port cranes

CHARACTERISTICS

- Corrosion protection valves (up to stainless steel)
- Explosion protection valves including electronics
- Valve technology for high external pressure
- Valves for water glycol
- Valves with reduced leakage
- Miniature valves

...designed to ensure **corrosion protection** and **low leakage**



MARINE

WANDFLUH ENERGY

Redundancy and switching safety combined with a long service life are the main characteristics of components used in the energy sector. The hydraulic switching circuits at the heart of these installations often are a part of the system-relevant and sometimes safety-critical control elements in power plants.

APPLICATION EXAMPLES

- Steam flap controllers
- Adjustment of the rotor blades of wind generators
- Control of disc brakes
- Turbine controllers
- Butterfly valve control

CHARACTERISTICS

- Valve technology with switching position monitoring
- Precise adaptation to a hydraulics system by means of electronics and intelligent software developed in-house
- Parameterisable controller electronics with bus connection (HART, Profibus, etc.)
- Sensitive control characteristics

...designed to ensure **extreme forces** and **a long service life**



ENERGY

VALVES FROM SMALL TO BIG

Depending on the load capacity, field of application and installation location, hydraulic valves with different performance characteristics and thus also different nominal sizes are used. Apart from the current ISO standards, the Wandfluh product portfolio comprises also other, partly smaller valves that are suitable for the energy-efficient pilot control of larger valves, or for applications with low space requirement.

CHARACTERISTICS

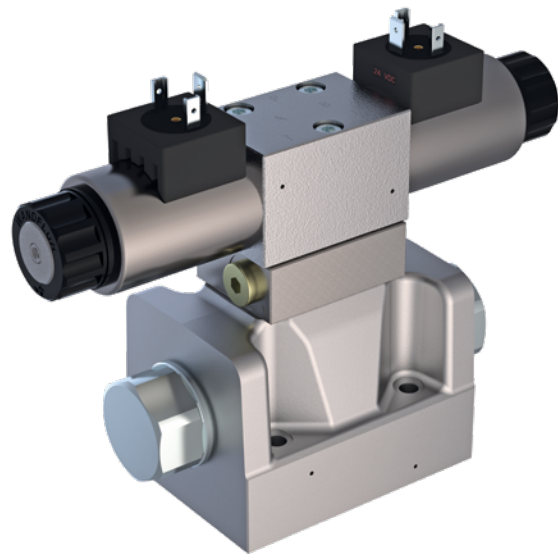
- Proportional valves and switching valves
- Direct and pilot operated
- Hydraulic or mechanical actuation

PRODUCT RANGE

- Flange and sandwich valves according to ISO 4401 NG3–NG10 (10–160 l/min)
- Cartridge valves according to ISO 7789 M18–M42 (2–400 l/min)
- Cartridge valves according to UNF or Wandfluh standard
- 2-way built-in cartridge valves according to ISO 7368 NG16–NG40 (200–1600 l/min)

FUNCTIONS

- Spool valves
- Poppet valves
- Pressure valves
- Flow valves
- Customer-specific functions



WVMFA10



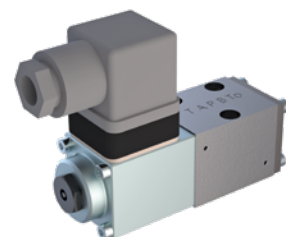
WVPPM42



CSEN32



MDPPM16



BM4Z3

SPOOL VALVES

Spool valves are primarily used to control the direction of movement and to move hydraulic cylinders and motors. To realise a high availability of such a hydraulic circuit, the switching power and possible leaks of the valves must be already taken into account when the system is designed. Solenoid spool valves are suitable for machine tools and all types of mobile handling systems.

CHARACTERISTICS

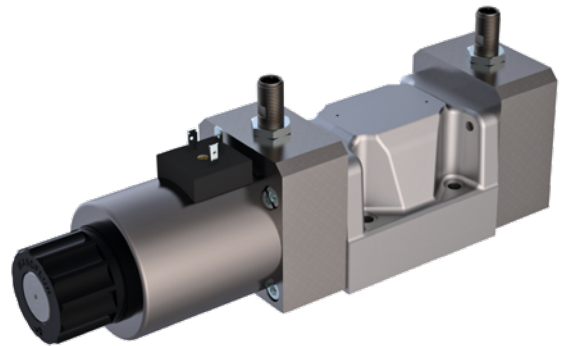
- Direct and pilot operated
- Detented, spring-centered or with spring reset
- Precise spool fit
- Low leakage

ACTUATIONS

- Solenoid actuated by means of switching solenoid
- Manually actuated by means of hand lever
- Mechanically actuated by means of roller
- Pneumatically actuated
- Hydraulically actuated

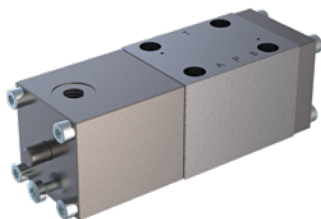
ADDITIONAL EXECUTIONS

- Special spools
- Soft-switching executions
- Enhanced corrosion protection
- Special spool play for low leakage
- Sandwich executions
- Explosion protection
- Switching position monitoring
- Various types of electrical connections
- Special voltages
- Electrical low power

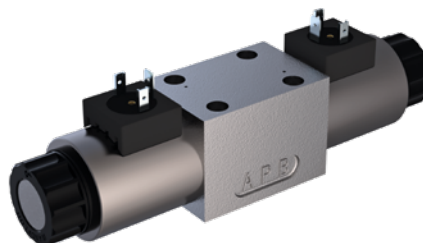


WDMFA10_Z72

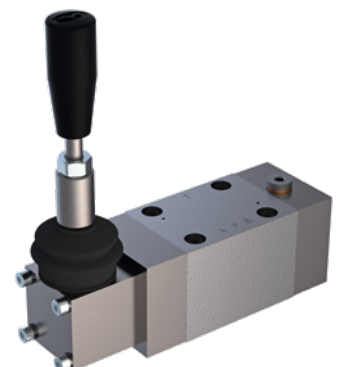
FLANGE	NG3	NG4	NG6	NG10
Qmax [l/min]	15	30	80	160
Pmax [bar]	350	350	350/420	350



AK4Z6



WDMFA06



AH4D6

POPPET VALVES

Poppet valves are used where tight closing functions are essential like leakfree holding of loads, clamping or gripping. Depending on the execution, the poppet valve spool can be opened or closed with a switching solenoid or by the opposite spring. Poppet valves are used in all branches in different executions.

CHARACTERISTICS

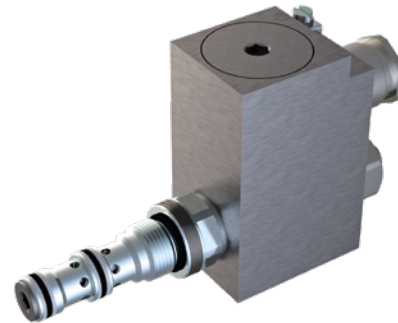
- Excellent durable tightness seal as a result of metallically sealing seat
- Direct or pilot operated
- Guided poppet design with equal surface areas and pressure balanced on both sides
- Seal tight in all directions of flow
- 2/2- and 3/2-way executions
- Cartridge, flange and sandwich construction

ACTUATIONS

- Solenoid actuated by means of switching solenoid
- Manually actuated by means of hand lever
- Pneumatically actuated

ADDITIONAL EXECUTIONS

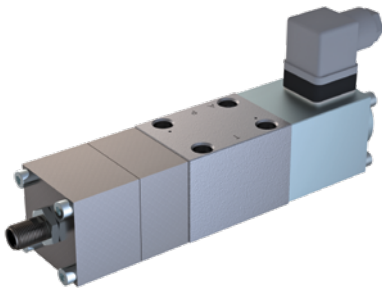
- Special symbols
- Soft-switching execution
- Enhanced corrosion protection
- Special actuations
- Explosion protection
- Switching position monitoring
- Detented execution
- Various electrical connections
- Special voltages
- Power reducing plug



SDYPM22

FLANGE	NG3	NG4	NG6	NG10
Qmax [l/min]	6	15	40	80
Pmax [bar]	350	350	350	350

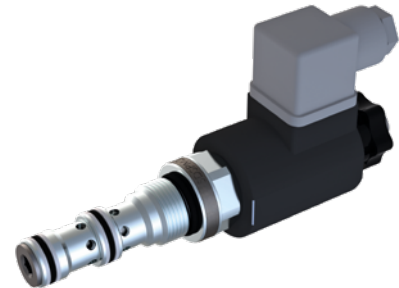
CARTRIDGE	M18/U08	M22/U10	M33	M42
Qmax [l/min]	50	80	150	300
Pmax [bar]	350	350/420	350	350



AS32060_Z603



BH22041



SDSPM22

PROPORTIONAL VALVES

When hydraulic pressures or volume flows are continuously controlled, proportional hydraulics is used. The use of proportional solenoids enables a continuous and proportional control of the valve. Proportional valves are operated with an electronic control device that transforms a control signal into a corresponding solenoid current for the valve. This solenoid current ensures an optimum, sensitive and precise control of the valve.

CHARACTERISTICS

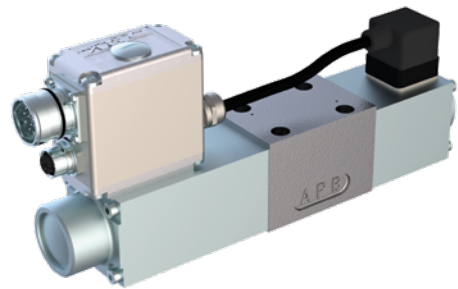
- Direct and pilot operated
- Nominal voltages 12 VDC and 24 VDC
- High resolution
- Good repeatability
- Low hysteresis

FUNCTIONS

- Spool valves
- Pressure relief valves
- Pressure reducing valves
- Flow control valves

ADDITIONAL EXECUTIONS

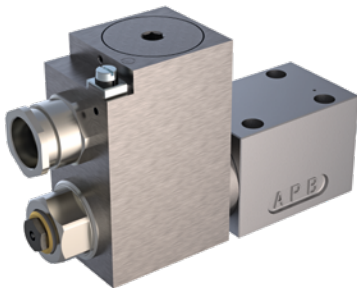
- Valves with integrated electronics (DSV)
- Spool position control with LVDT
- Electronics with additional controller for an external control circuit
- Inverse functions
- Enhanced corrosion protection
- Explosion protection
- Various electrical connections



WDRFA06

FLANGE	NG3	NG4	NG6	NG10
Qmax [l/min]	10	20	60	200
Pmax [bar]	350	400	400	400

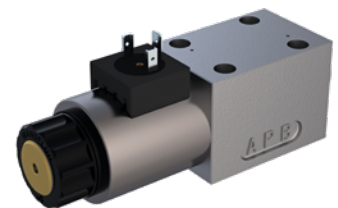
CARTRIDGE	M18/U08	M22/U10	M33	M42
Qmax [l/min]	25	100	150	400
Pmax [bar]	400	400	400	350



WDBFA06



WDPPU10



WDPFA06

CONTROL ELECTRONICS

For the control of proportional valves, electronic control devices are required. They control the solenoid current on the valve and thus guarantee a highly sensitive, low-hysteresis valve control by means of Pulse Width Modulation and a superimposed dither signal.

The control devices are equipped with a microprocessor. This extends the functionality and flexible utilisation in a control system. The various electronic devices offer amplifier

CHARACTERISTICS

- High operating comfort
- Easy handling
- High functionality as a standard
- Support of all current, voltage and frequency signals
- Linear ramp functions
- Fixed command values
- Programmable travel profiles
- Expandable as per customer-specific requirements
- Fieldbus interfaces CAN, Profibus

FUNCTIONS

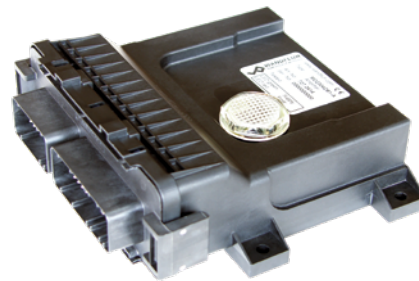
- Digital amplifiers with high quality solenoid current controllers
- Digital 1-axis and 2-axis controllers
- Position controllers
- Force limiting position controller
- Pressure controllers
- Flow controllers
- Various fieldbus interfaces
- Freely programmable (PME)
- Display and keyboard

CONSTRUCTION

- Connector execution
- Snap-on modules
- Mobile execution
- Integrated into the valves (DSV)



Amplifier/controller module Industry



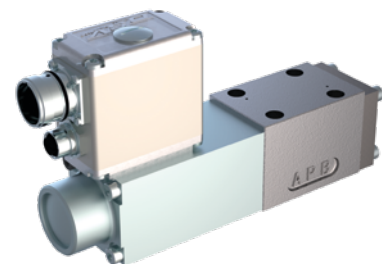
Amplifier/controller module mobile



Programmable display



Amplifier electronics



Integrated Electronics

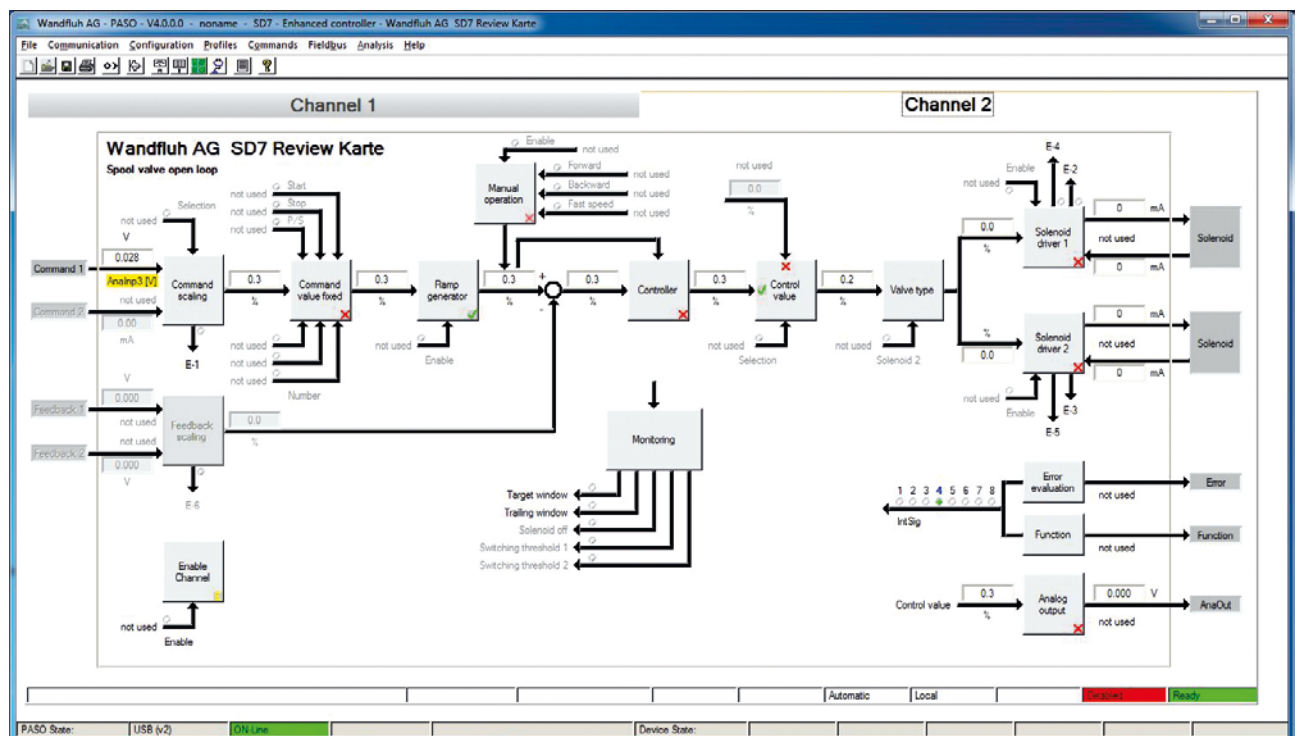
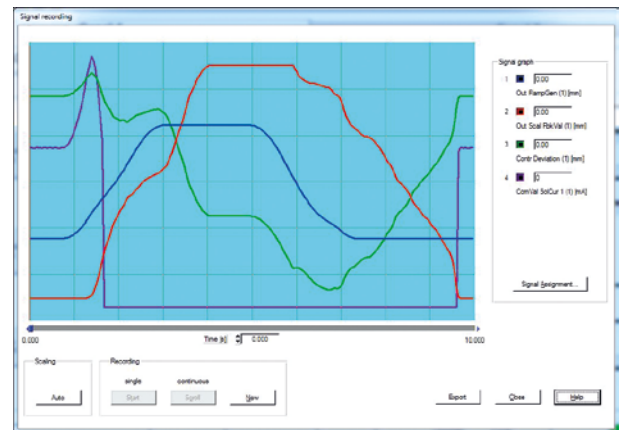
and controller functions with an optional field bus interface to provide a simple connection to superordinate control systems. The electronic devices are very easy to use. For the adjustment of the different parameters and the diagnosis when setting up or in the case of maintenance, a parameterisation software is available which graphically displays the possible functions and provides the user with numerous tools for analysing and adjusting the device.

PARAMETERISATION AND PROGRAMMING

- PC software PASO (freely available)
- Process data display
- Integrated oscilloscope
- Remote control functions
- Support of fieldbus
- Individual process data monitor
- Universally usable for all control devices
- Communication with control device via USB

ADDITIONAL EXECUTIONS

- Customer-specific software expansions
- Hardware expansion for additional functions
- Software for solutions optimized with respect to application
- Flexible interface definition
- Electronics integrated into the valve



EXPLOSION PROTECTION

CORROSION PROTECTION

Flammable gases, vapours and dust can form an explosive atmosphere when mixed with oxygen. To avoid the risk of explosion hazards, there are corresponding protective regulations for the various equipments, these aim to guarantee a high level of safety. The solenoid as an electrical actuation in the valve technology must therefore demonstrate a type of protection that is in line with the explosion protection standard.

Valves that are in constant contact with salt water and atmospheres containing salt, or that are constantly exposed to severe weather conditions require enhanced corrosion protection for an increased service life.

DESCRIPTION

- Extensive product range
- Electrical equipment for all explosion hazard areas
- Solutions for valves and systems
- Optionally enhanced corrosion protection right up to stainless executions

CHARACTERISTICS

- Type of protection flameproof enclosure (Ex d) for Zone 1+2
- Type of protection intrinsic safety (Ex i) for Zone 0
- Certified solenoids for surface and mining areas
- Certificates for ATEX, IECEx, EAC, Inmetro, NEPSI, UL/CSA, Australia, MA

FUNCTIONS

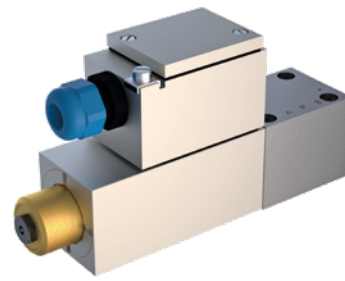
- Solenoid spool valves
- Solenoid poppet valves
- Proportional spool valves
- Proportional pressure valves (relief and reducing)
- Proportional flow valves (throttle and flow controller)
- Electronics integrated into the valve for proportional functions

CORROSION PROTECTION

- **K8: > 800 h salt spray test**
Zinc-Nickel-coated, or made of stainless material
- **K9: > 1000 h salt spray test**
Mainly made of stainless and acid-resistant AISI316L high-grade steels. The solenoids are zinc-nickel coated.
- **K10: > 1000 h salt spray test**
All elements are made of stainless materials (AISI316L) or coated with stainless material.

LOW TEMPERATURES

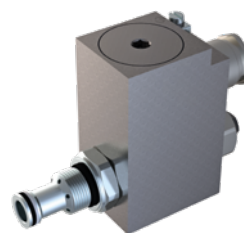
- **Z604: -40 C°**
Adapted seal, fitting clearance partly adapted
- **Z591: -60 C°**
Special materials, special seals, increased fitting clearance



WZFA06_Z546



MQBPM22_M248



BDBPM22



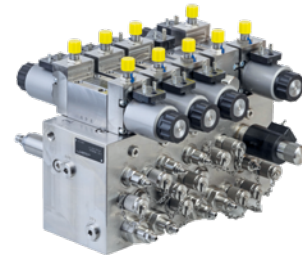
BVDPM22_K9

INDIVIDUAL SOLUTIONS

Based on existing components, Wandfluh offers a variety of individual solutions. With the customer, the requirements are defined and then further developed into an optimum product. The extensive experience of our engineers and the flexibility of our production help to find the optimum solution for your needs.

CONTROL UNITS

- Compact control units for machine tool and other applications
- Complex functional units
- Safety relevant functions
- Explosion proof control units for onshore and offshore applications
- Control units for powerful systems with up to 10'000 l/min and 420 bar
- Modular mounted manifolds



Stainless System block for Water glycol

SYSTEMS

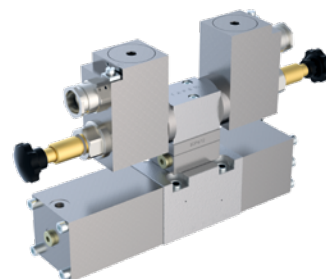
- More than 30 years of experience, the specialist for hydraulic system construction
- One face to the customer, from engineering to commissioning
- Cost and space optimised serial powerpacks for machine tool industry applications
- Energy efficient standard powerpacks
- Sophisticated systems for test facilities
- Demanding electro-hydraulic functional units
- Plant construction with complete installation and commissioning in the field of water hydro power plants



Customer-Specific Hydraulic powerpack

VALVES

- Combination of several proven functions within an element
- Application and customer-specific solutions with the experience from standard components
- Implementation of explosion and corrosion protection requirements
- Special valve actuations
- Inclusion of special materials, surface treatments and processing procedures
- Special functions



Electrically and hydraulically controlled Ex-Protection valve, with manual override

ELECTRONICS

- Customer-specific expanded software
- Hardware for additional functions
- Software for application optimized solutions
- Flexible interface definition
- Adaption to various fieldbus systems
- Electronics integrated into the valve



CI-711 with customer-specific display

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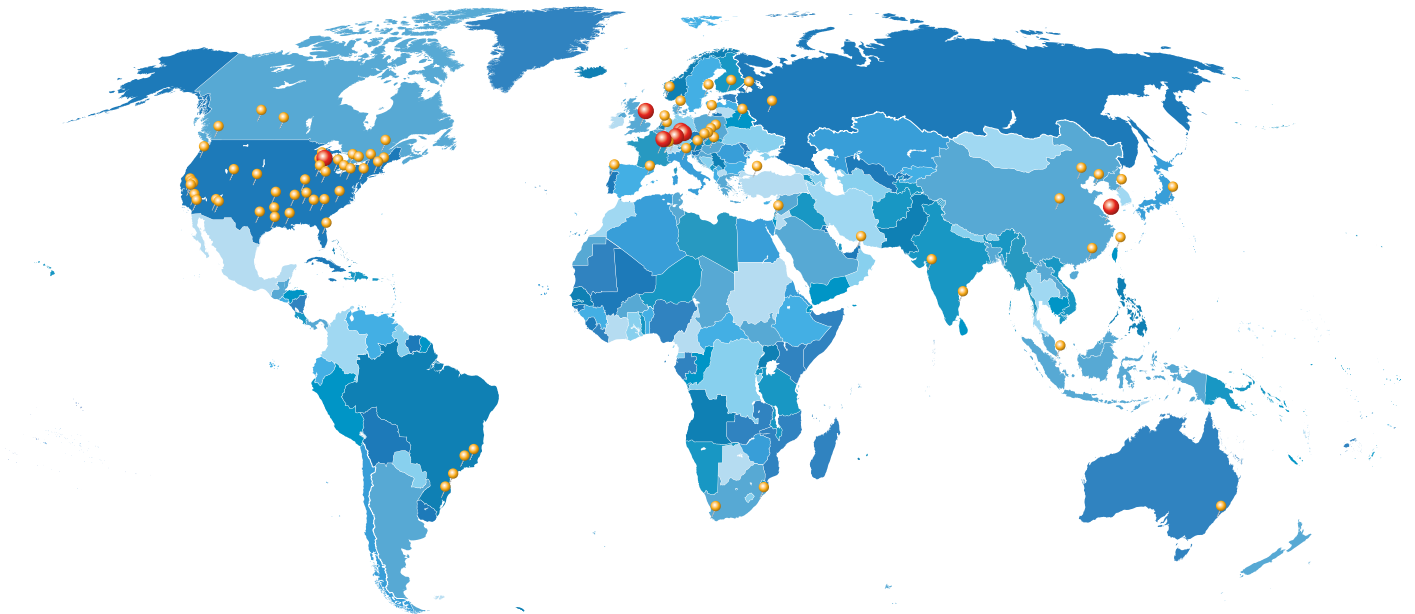
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SOLUTIONS **SINCE 1946**