

*Quality products for
demanding applications*



WANDFLUH MARINE

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

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

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.

FOCUS

The harsh conditions at sea require robust and proven technology that works reliably within a relatively high temperature range. In the marine sector, the Wandfluh portfolio focuses on corrosion and explosion protection valve technology with low leakage. The range of marine products additionally includes valves constructed specially for the underwater world which, thanks to their pressure compensation, are designed for underwater robots with diving depths of 6,000 m. These valves are often powered by biodegradable water glycol. On numerous projects, Wandfluh has collaborated closely with its customers to develop partial or complete solutions that meet the high demands of the sector and the customers.

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



MARINE

APPLICATION EXAMPLES

- Ballast water management (actuation of ball valves and butterfly valves)
- Ship's hatch control
- Brake systems for winches
- Control of the manipulator arms of ROVs
- Thruster control in underwater robots
- 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
- Anti-cavitation protection
- Smart control with electronics developed in-house via a bus system or directly on the valve
- Miniature valves
- Redundant systems
- Individual customer-specific adaptations
- Worldwide customer service



APPLICATION ACTUATORS

All over the world, goods are transported by ship or pipeline from the producer to the consumer. To ensure safe loading and unloading, for example, ball valves are opened, throttled or closed via a hydraulic rotary actuator. When used in explosion-hazard areas such as on oil tankers, explosion-protected valves with corresponding certificates are used.

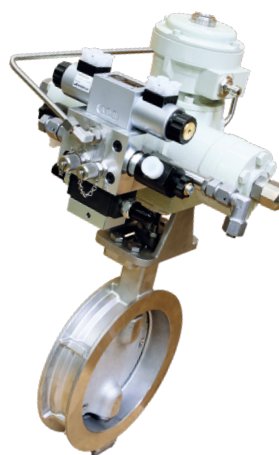
FUNCTION

The rotary actuators of the ball valves are usually controlled directly from the ship bridge or the command centre. In the event of a power failure, the industry standard stipulates that all ball valves must be completely closed via the accumulator poppet operation. So-called 3/2-way poppet valves are used for a leakage-free hydraulic circuit, while 4/2- and 4/3-way spool valves allow only an almost leakage-free hydraulic circuit. On platforms that draw their energy from power generators, valves with reduced power are mostly used. Especially with valves in continuous operation, the power requirement can be significantly reduced.



COMPONENTS

Screw-in cartridges or flange valves from the standard range can often be used to control the rotary actuators. These are available as leakage-free poppet valves or as low-leakage directional spool valves in explosion-protected execution. In order to meet special requirements or constructions, more and more customer-specific valves are being developed and adapted to the various rotary actuators.



SPECIALTIES

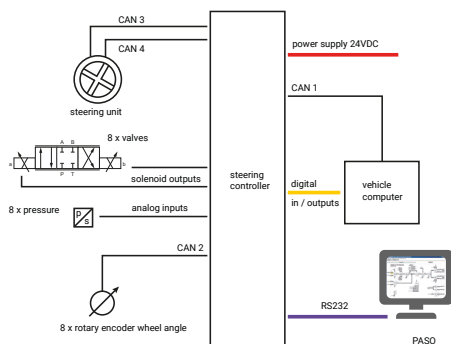
- Standard valves with customer-specific adaptations possible
- Available as standard or Ex-protection execution
- Valves with power reduction
- Valves in various corrosion protection classes up to K10

APPLICATION STRADDLE CARRIER

In a globalised world where container ships with several thousand containers call at the world's largest ports, the loading and unloading of ships is supported by fully automated systems. The containers are stacked by self-propelled lifting cranes, so-called straddle carriers, in an intermediate storage facility in the port area. The hydraulics and electronics installed in straddle carriers are often in use 24 hours a day, with any system failure leading to delays and high costs.

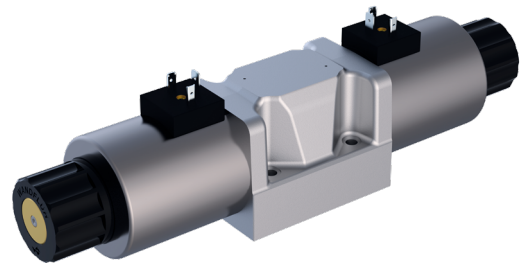
FUNCTION

Several straddle carriers are controlled from one control room. The dispatcher only indicates the desired end position of the container to the vehicle, everything else is managed independently by the vehicle. Due to its high payload, a straddle carrier has six to eight axes that are individually controlled, regulated and monitored hydraulically via proportional valves. For safety reasons, the entire hydraulics, including control electronics and axes control, is kept redundant, similar to aircraft construction. In addition to increased security, the system also gains significantly in availability. System failures and the associated time delays in 24-hour port operation are thus practically eliminated.



COMPONENTS

The heart of the system is the SIL2-capable steering controller. The steering unit transmits the values via a redundant CAN bus system to the controller, which compares and regulates the positions with robust angle sensors. The proportional amplifier electronics then controls the proportional spool valves and regulates the steering angle of the axes. All components are aligned with each other, allowing easy commissioning and controlled operation.



SPECIALTIES

- Manual vehicle steering and various driving modes selectable
- Flexible safety functions can be extended at any time
- Intuitive parameterisation software for commissioning and maintenance
- Aligned hydraulics and electronics from a single source

APPLICATION WINCHES

Hydraulic winches are used in various fields all over the world. One of the most demanding applications is surely on board ships, where salt water and high temperature differences affect the construction. Outstanding reliability and availability are certainly among the most important features of all systems used on the high seas.

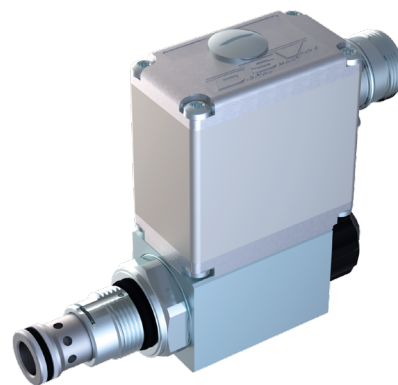
FUNCTION

Winch systems on ships are used for lifting and lowering anchor chains, for installing underwater cables or for setting down and hauling nets and fish traps for fishing. In many applications, precise control of the rope tension in every operating phase is of the highest importance. Whether it is to avoid damage or to ensure the safety of the workers on the ship. The winch control is usually integrated into an overall system and interacts with a crane boom control or a linear cable engine, for example. Especially on large ships in rough seas, extreme forces act on the individual systems. These must be able to absorb the forces and have a high reliability so that the loads can be quickly hauled in the event of an impending storm.



COMPONENTS

Valves with increased corrosion protection and stainless external parts are mostly used for controlling the winches. When proportional valves are used, the associated control devices are pre-parameterised on the basis of the system reference values, so that the customer only has to readjust them slightly in the overall system using the intuitive PASO software.



SPECIALTIES

- Explosion protected valves
- Corrosion protected valves
- Valves with integrated electronics and controllable via CAN bus
- Customer-specific adaptations possible

APPLICATION ROV

Remotely Operated Vehicles (ROV) are state-of-the-art and precisely controllable underwater robots that are often operated in shifts from a vessel by an operator. They descend to great depths, where they carry out repairs and manipulations on oil platforms, pipelines, etc. Pressure-compensated valves are used for positioning the ROV and for the complex motion sequences of the manipulation arms.

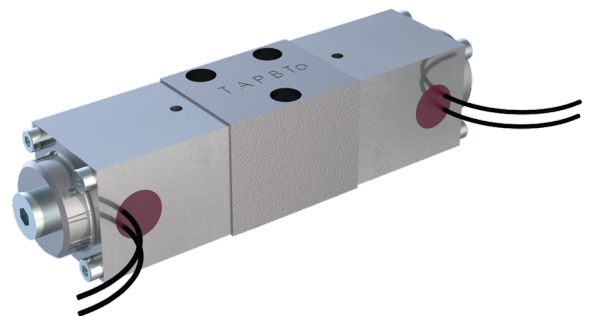
FUNCTION

The ROV is controlled from the mother vessel via connecting cables. The entire hydraulics is located on the ROV and is designed for high pressures at great depths. It is equipped with special, pressure-compensated valves for this purpose. The operator's control commands are transmitted as electrical signals from the water surface to the ROV at a depth of over 3000 m and converted by NG3-MINI valves into a precise movement of the manipulation arms in real time. The manoeuvring and positioning of the robot is performed by thrusters, whose hydraulic motors are driven and controlled by large pressure valves with high volume flows.



COMPONENTS

The partly high volume flows for the thruster control are controlled by large and powerful proportional pressure reducing valves with a nominal volume flow of up to 250 l/min (nominal size M42). For the control of the manipulation arms, however, the small spool valves of the NG3-MINI series are sufficient. These miniature hydraulic valves were developed as pilot valves as well as for special applications such as ROVs or sewer robot cameras and cover a niche in many areas of modern mechanical engineering. The advantage of these miniature valves is on the one hand their size and weight and on the other hand their low electrical power consumption, which is particularly important for remote-controlled or autonomous systems.



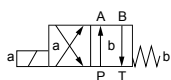
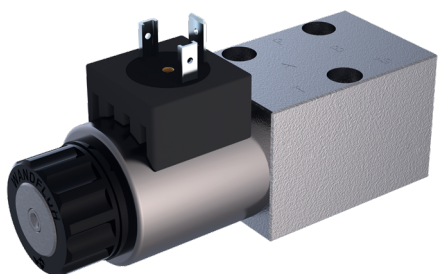
SPECIALTIES

- Valves with pressure compensation
- Integrated on-board electronics
- Various connector variants or potted cables for easy installation
- Execution for water glycol as hydraulic fluid

TYPICAL VALVES AND ELECTRONICS

Valves adapted to the various applications ensure that the different requirements such as small leakage, freely adjustable volume flows or pressures as well as seat tight closing of control lines can be readily realised. Perfect coordination of valve and electronics leads to simple drive solutions for precise movements and sensitive valve actuation.

SPOOL VALVES, FLANGE WDMF



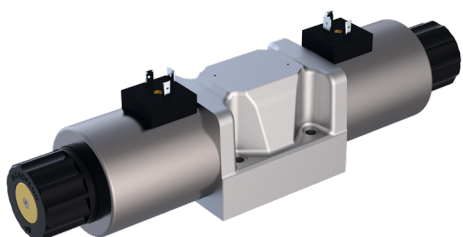
CHARACTERISTICS

Controls the oil flow and can thus, for example, determine the direction of movement of a cylinder. The valve is screwed as a flange onto a standardised mounting interface.

FEATURES

- Solenoid valve remotely controlled via intelligent electronics
- Direct or pilot operated
- Optionally detented, for safety in the case of power failure
- Small losses due to low leakage
- Soft switching for reduction of shocks
- Switching position monitoring
- Pressure max. 350 bar
- Flow max. 160 l/min
- Nominal sizes NG3, NG4, NG6, NG10

SPOOL VALVES FLANGE WDPFA



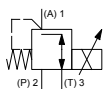
CHARACTERISTICS

The volume flow is controlled proportionally to the solenoid current. A cylinder can thus be moved forward and backward at variable speed.

FEATURES

- Progressive characteristic
- Good repeatability
- Direct or pilot operated
- Pressure max. 350 bar
- Flow max. 200 l/min
- Nominal sizes NG3, NG4, NG6, NG10

PRESSURE REDUCING VALVES MDPF, MVPP



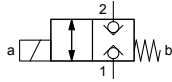
CHARACTERISTICS

Reduces the input pressure to the desired output pressure. The pressure in A is continuously adjusted via the solenoid current.

FEATURES

- Linear characteristics and precise reproducibility
- Direct or pilot operated
- Pressure max. 350 bar
- Flow max. 250 l/min
- Nominal sizes M16, M18, M22, M33, M42, U10

POPPET VALVES SVSPM, SDSP



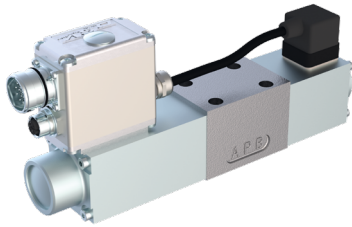
CHARACTERISTICS

For tight closing functions, to hold loads in position or to close lines tightly.

FEATURES

- Cartridge, flange and sandwich construction
- Solenoid actuation
- Direct or pilot operated
- Metallically sealing seat
- Detented or with spring reset
- Pressure max. 420 bar
- Flow max. 300 l/min
- All constructions and nominal sizes

SPOOL VALVES WITH INTEGRATED ELECTRONICS WDRFA06



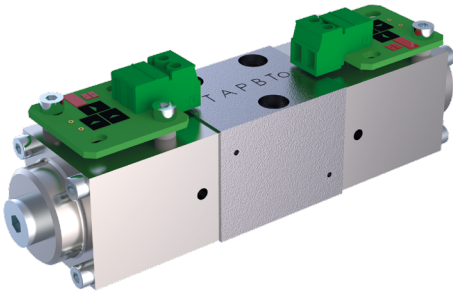
CHARACTERISTICS

The volume flow is controlled proportionally to the command value signal. The valve is factory set.

FEATURES

- Linear characteristics
- High dynamics (35Hz)
- Precise reproducibility and very small hysteresis
- Direct operated
- Integrated amplifier electronics with spool position control
- Optional with controller function
- Pressure max. 350 bar
- Flow max. 40 l/min
- Nominal sizes NG4, NG6

ROV CONTROL VALVES FOR WATER DEPTH UP TO 6000 M



FEATURES

The valve utilisation in ROVs (Remotely Operated Vehicle) in the underwater area requires a resistance to a high external pressure.

CHARACTERISTICS

- Different solenoids with pressure compensation bore
- With screw terminal connections
- Potted loose cables without connectors
- Status display by means of LED

ELECTRONICS SD7



CHARACTERISTICS

Digital controller module for regulating position, pressure or volume flow including integrated amplifier.

FEATURES

- Controller mode selectable: pressure, position, speed
- Solenoid current regulated, with superimposed dither
- Command and feedback values as voltage or current
- Up to 7 digital inputs and up to 4 outputs
- Optionally with fieldbus (CANopen, Profibus DP, HART)
- Housing for dome rail mounting
- SSI interface
- Analog output

EXPLOSION PROTECTION CORROSION PROTECTION

Flammable gases, vapours and dust can form an explosive atmosphere when mixed with oxygen. In order to ensure a high level of safety, appropriate protective regulations exist for the various operating equipment to avoid the risk of explosion hazards. 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 exposed to continuous contact with salty water and atmospheres that contain salt or to harsh weather conditions demand enhanced corrosion protection in order to prolong their service life.

EXPLOSION PROTECTION

Description

- Electrical operating equipment for all explosion hazard zones
- Solutions for valves and systems
- Optionally enhanced corrosion protection up to stainless steel executions

Functions

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

Features

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

CORROSION PROTECTION

K8: 500 - 1000 h salt spray test

- Zinc-nickel coating, or made of stainless materials.

K9: > 1000 h salt spray test

- Mainly made of stainless and acid-resistant steel AISI 316L. The solenoids are zinc-nickel coated.

K10: > 1000 h salt spray test

- All elements made of stainless materials (AISI 316L) or coated with stainless materials.

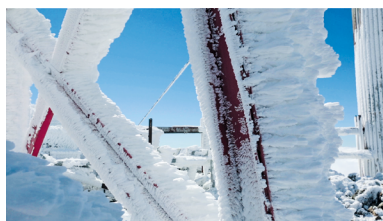
LOW TEMPERATURES

Z604: -40° C

- Adapted sealing, adjustment tolerances partly adapted

Z591: -60° C

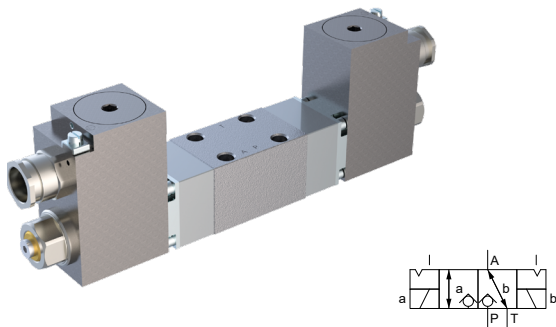
- Special materials, special sealings, adjustment tolerances enhanced



SPECIAL VALVES

Wandfluh valves are constructed in a modular way and are thus very flexible in their composition. This allows different standard functional elements to be combined, so that individual solutions can be easily realised.

POPPET VALVES WITH DETENT FUNCTION AEXD3206RR



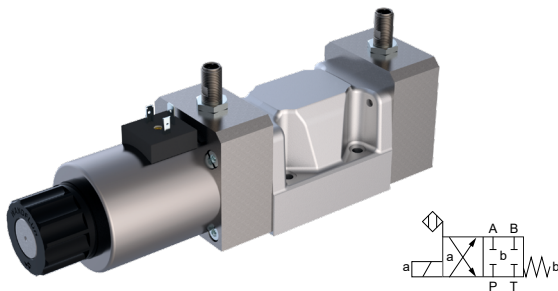
CHARACTERISTICS

The practically leakage-free poppet valve spool can be opened or closed against the applied spring pressure and mechanically detented in the desired position by an electrical impulse.

FEATURES

- 3-way function
- Electrical actuation with standard or Ex d solenoids
- Combination of an electrical actuation with a mechanical actuation possible
- Spool position monitored with position sensor
- Pressure max. 350 bar
- Flow max. 40 l/min

VALVES WITH SWITCHING POSITION MONITORING WDMFA_Z



CHARACTERISTICS

Electronic sensors detect the switching position of the valve spool. The evaluation of the command/feedback signals considerably increases the safety of an installation.

FEATURES

- For various spool and poppet valves
- In combination with standard and Ex d solenoids
- Inductive switching sensor
- Pressure max. 350 bar
- Flow max. 160 l/min
- Nominal sizes NG6, NG10

SEAT TIGHT PRESSURE CONTROLLERS MSDPM22



CHARACTERISTICS

Controls the set output pressure independently of the volume flow and closes seat tight. This leads to a significant reduction of losses in a hydraulic system.

FEATURES

- Manual adjustment of the output pressure
- Good pressure control in case of volume flow fluctuations
- Seat tight
- Pressure max. 350 bar
- Flow max. 20 l/min
- Cartridge with cavity M22x1,5

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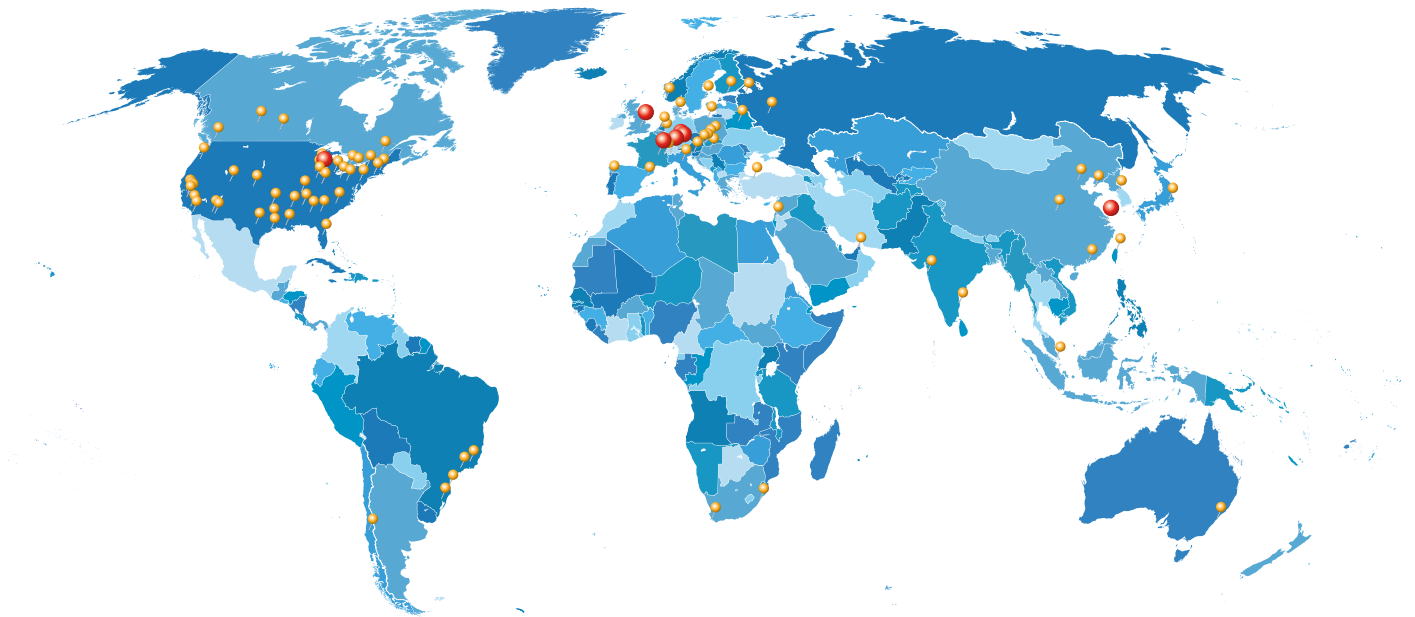
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