Quality products for demanding applications

WANDFLUH ENERGY

SOLUTIONS SINCE 1946
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.

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FOCUS
In energy plants, extremely high forces are bundled and controlled. Since the advent of hydropower, hydraulic control systems have been used for this. They regulate water supply, for example, and control the angles of turbine blades. In the wind energy sector, the position of the rotor blades angles are adjusted hydraulically in a similar way as with water turbines. In addition, hydraulic brake systems are used in wind power plants to decelerate the turbines in case of heavy winds to prevent any damage to the installations. In thermal power plants, a typical application is controlling butterfly valves, which reduce the steam pressure quickly and in a controlled way in the event of an emergency. In all of these applications, safety is the top priority. Frequently redundant systems with switching position monitoring are used here which can be precisely adapted to the relevant system together with the customer.

CHARACTERISTICS
- Corrosion protection valves, from zinc-nickel through to stainless steel
- Redundant systems
- Valve technology with switching position monitoring
- Precise adaptation to a hydraulics system by means of electronics developed in-house and intelligent software
- Parameterisable controller electronics with bus connection (HART, Profinet, etc.)
- Sensitive control characteristics
- Precise proportional valves
- Reduced electrical power
- Ease of maintenance
- BlueCompetence products
- Individual customer-specific adaptations
- Worldwide customer service

APPLICATION EXAMPLES
- Steam flap controllers
- Adjustment of the rotor blades of wind generators
- Control of disc brakes
- Turbine controllers
- Process control
- Butterfly valve control
- Continuous positioning of solar panels

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.
Large process valves are often equipped with hydraulic actuations, since the high power density of the hydraulics enables a compact solution. Depending on the field of application, different requirements are placed on the hydraulic valves. This ranges from standard valves to valves with low leakage, explosion protected executions through to corrosion and acid-resistant components.

**FUNCTION**

On large process valves, a hydraulic actuator is mounted which is generally a hydraulic cylinder. By means of Wandfluh valves, a precise and secure controlling of the hydraulic cylinder is ensured. Since often only very small oil volumes are employed, compact and low-leakage control valves are of great importance. For the different actuators, a wide product range of spool valves and poppet valves is available.

**CONTROL**

The actuators are mainly operated with on/off spool valves that have reduced leakage. Since in an installation many valves are controlled by means of a unit in the accumulator unloading operation, the leakage accumulates. For this reason, the smallest leakages possible are very important, but without impairing the switching reliability in harsh environments. In oil and gas environments, the valves are equipped with explosion protected solenoids. This execution is often related with high demands concerning corrosion. It is covered with a zinc/nickel coating or with stainless materials (AISI316L).

**SPECIALITIES**

- Low leakage spool valves, <15 ccm/min at 150 bar
- Tight, compact poppet valves with direct cable outlet
- Ex d spool valves, Ex ia spool valves with reduced leakage
- Manual overrides in various executions, also stainless
REGULATING STEAM FLAPS

Steam flaps and butterfly valves are generally used in thermal power stations. So far, these were mostly coal, oil or nuclear power stations, although recently renewable energy sources are being increasingly important for steam production. The butterfly valves used serve as safety valves for the controlled release of overpressures in the system and are continuously electronically monitored by the existing safety systems.

FUNCTION
In safety valves, butterfly valves have the safety function of guaranteeing that no inadmissible pressures prevail in the main system. Wandfluh valves and electronic control cards ensure that the butterfly valve operates in conformity with safety standards. For varying opening and closing times, a wide product range of proportional spool valves and electronic control cards is available.

CONTROL
Butterfly valves are actuated in a closed control loop with proportional spool valves that have an optimised flow capacity. As a result of the safety requirement, the valves are controlled by means of control electronics that ensure the tight pressure, the boosting of emergency closing and the failure function.

SPECIALITIES
- Proportional valves with optimised flow capacity
- Control electronics with adapted software
- Valves available in various executions, including stainless steel
HYDROPOWER APPLICATION

The generation of hydroelectric power involves large quantities of water under high pressure driving several water turbines and the associated generators. The job of regulating and controlling these extremely high forces is done by the hydraulics.

To guarantee a shutdown in emergency situations too, hydraulic valves amongst other things have been developed that are controlled by the applied water pressure.

HYDRAULIC TURBINE CONTROLLER

Hydraulic Francis turbine controller for continuous operation, 24 h / 365 days a year. Redundant pump circuits make it possible to exchange pump units as well as filter elements during running operation. The hydraulic control is mounted on a 600 l tank and a stainless collecting tray. For emergency shutdown, rapid NG25 DIN cartridges are integrated. In order to position the turbine guide blades, a dynamic NG10 proportional spool valve is used. The innovative and energy-efficient concept with regulating pumps and accumulator elements is combined with a very compact construction.

HYDRAULIC POWER UNIT FOR WATER CATCHMENT

The hydraulic power unit for a water catchment controls inlet and outlet gates, de-sander and other shut-off devices of the water catchment in a power station. Given the harsh environmental conditions at altitudes of more than 2,000 m, all pipes and sheet metal parts are made of stainless steel. With their special surface coatings, all hydraulic valves meet higher corrosion protection requirements. All valves actuated by solenoids are additionally equipped with star handle manual overrides. The modular valve arrangement ensures that also the manual operation of the unit is very clear. A pressure accumulator provides the energy to ensure continuous water catchment operation also in the event of temporary power failures.

SPECIALITIES

• Designed for the highest availability and continuous use for at least 40 years
• Special surface coatings for increased corrosion protection
• All valve functions are equipped with easy-to-operate manual overrides
• Very compact construction
• Redundant components to increase availability and the possibility of exchanging during running operation
• Stainless steel actuators for the pilot control of the hydraulics with water
• Water-pressure controlled stainless steel actuators for the pilot control of the hydraulic system control of ball valves in hydroelectric power stations
Wind power plants are designed to withstand the enormous forces of nature even in storms. However, this only functions due to a sophisticated self-protection, so that the rotor blades turn out the wind and the cell is held in a certain position. These enormous forces are controlled by hydraulic valves, which perform an important and safety-relevant function for the entire system.

**BRAKE SYSTEMS**
To control the forces caused by high wind speeds, the turbine brake systems are equipped with proportional pressure valves and tight poppet valves.

**PITCH CONTROL (ROTOR BLADE ADJUSTMENT)**
To ensure that as much wind energy as possible is converted into electrical energy, the rotor blades are optimally positioned in the wind. For this, a closed hydraulic control loop is necessary, which is achieved with precise proportional spool valves and the corresponding digital control electronics.

**SPECIALITIES**
- DSV valves with integrated electronics
- Valves with position monitoring
- Seat tight valves for the brake
- Enhanced corrosion protection
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 LOW-LEAK WDMF**

**CHARACTERISTICS**
Actuators that are supplied in conjunction with an energy-saving pressure accumulator supply are dependent on minimal losses.

**FEATURES**
- Direct operated
- Very low leakage
- Detented, spring-centred or with spring-reset
- Precise spool adjustment
- Nominal sizes NG4 and NG6

**PROPORTIONAL SPOOL VALVES WDRF**

**CHARACTERISTICS**
The volume flow is controlled proportionally to the command value signal. Is suitable for regulating tasks with high requirements on precision and dynamics. Valve factory pre-set.

**FEATURES**
- Linear characteristics
- High dynamics (35Hz)
- Very good repeatability and very small hysteresis
- Direct operated
- Integrated amplifier electronics with spool position control
- Optionally with additional controller function
- Pressure max. 350 bar
- Flow up to 40 l/min
- Nominal sizes NG4 and NG6

**PRESSURE CONTROL VALVES MPPP**

**CHARACTERISTICS**
The pressure at the output is continuously adjusted with the solenoid current and independently regulated by the valve.

**FEATURES**
- Linear characteristics and good repeatability
- Direct operated or pilot operated
- Smallest leakage for direct operated valves
- Pressure max. 350 bar
- Flow up to 200 l/min
- Nominal sizes M16, M18, M22, M33, M42 and U10
EXPLOSION PROTECTION POPPET VALVES SDYP

For seat tight closing functions such as leak-free load holding, clamping and gripping or for pilot control of larger valves.

FEATURES
- Excellent durable tightness as a result of metallically sealing seat
- Direct and pilot operated
- Poppet spool construction with equal areas and pressure compensation on both sides
- Tight seal in all directions of flow
- 2/2- and 3/2-way execution
- Cartridge, flange and sandwich construction

ELECTRONICS SD7

Digital amplifier module for controlling a proportional valve. PD2 electronics with cable connection, with MPS version mounted fixed on a solenoid.

FEATURES
- IP67 housing
- Solenoid current regulated
- Command value as voltage or current
- Digital input
- Parameterisable by means of PASO software or display and buttons on the device
- Optionally with fieldbus (CANopen or J1939)
- Housing with cable connections or mounted on the solenoid

ELECTRONICS SD7

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

HART INTERFACE

Simple communications interface for valves and actuators in the processing industry. Option for SD7.

FEATURES
- Protocol for bidirectional data transmission
- Signal transmission via 4-20 mA analog signal
- Allows status and diagnosis queries of the device
- Parameterisation via HART
- Electronic Device Description (EDD) available
Inflammable gases, vapours and dust form an explosive atmosphere when mixed with oxygen. To avoid explosion hazards, there are appropriate protective regulations for the various operating of equipments, which should guarantee a high level of safety. The solenoid as an electrical actuator in the valve technology must therefore have the type of protection category that complies with the explosion protection standard. Valves that are exposed to continuous contact with salty water and atmospheres that contain salt or to severe 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, Inmetro, NEPSI, UL/CSA, Australia, MA

**CORROSION PROTECTION**

**K8: > 800 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 AISI316L. The solenoids are zinc-nickel coated.

**K10: > 1000 h salt spray test**
- All elements made of stainless materials (AISI316L) 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
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 Valve with Detent Function**

**-characteristics**
The valve holds the closed position without having to be permanently energised. One electrical impulse is sufficient for it to be subsequently held mechanically in position.

**features**
- 2-way or 3-way function
- Electrical actuation with standard or Ex d solenoid
- Combination of an electrical actuation with a mechanical actuation possible
- Valve state can be displayed with position sensor
- Pressure max. 350 bar
- Flow up to 80 l/min
- Nominal sizes NG6

**Valve with Switching Position Monitoring**

**-characteristics**
An electronic sensor detects the switching position of the valve. By detecting and evaluating a switching error, the safety and availability of the overall system can be increased.

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

**Seat Tight Pressure Controller**

**-characteristics**
Controls the adjusted output pressure independent of the volume flow and closes seat tight. This reduces losses in the system.

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