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INTRODUCTION OF SERVO VALVE OF BOSCH REXROTH AND APPLICATION FOR TESTING MACHINE

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ABSTRACT

Bosch Rexroth (BR) has three categories control valves. One is the standard proportional valve, second is high response control valve and final one is servo valve. These three valves are applied to feed back control system for position, speed, force and acceleration. In this presentation, each valves design and performance are explained. And also applied applications for testing machine by Bosch Rexroth are introduced.
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KEY WORDS

Servo control, Proportional valve, High response valve, Servo valve

COTROL VALVE CATEGORIES

Proportional valves
Many controls would hardly be conceivable without proportional valves with integral electronics (OBE). They reduce the cabling effort and simplify handling while offering exact reproducibility and low manufacturing tolerances.
-Performance profile
< Pressure and flow control and directional valve variants in sizes 6 to 52
< Maximum flow 2800 L/min

Figure 1 High response valve

Maximum operating pressure 350 bar
< Proportional solenoid with electrical closed-loop position control for high accuracies (> 1 %)
< Rugged electronics for stationary and mobile applications

High-response valves
High-response valves are compact and robust. They are convincing in their high dynamics and control accuracy. The core product of size 6 and size 10 can be combined with main stages of up to size 160 with a nominal flow of up to 18000 liters.
-Performance profile
< Maximum flow 50000 L/min
< Maximum operating pressure 420 bar
< Sizes 6 to 160
< Highly dynamic valves with zero overlap for use in closed control loops
< Direct and pilot operated
< For subplate mounting and block installation

Servo-valves
Servo-valves are hydraulically pilot operated 2- or 3-stage directional valves with porting pattern to DIN 24340 form A. They are mainly used for closed loop-controls of position, force or pressure and velocity.
They are characterized by:
– Compact build

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– Low electrical power consumption
– High dynamics and
– Excellent quasi-steady-state values
-Performance profile
< Maximum flow 1600 L/min
< Maximum operating pressure 315 bar
< Sizes 6 to 32

Figure 2 Servo valve

Cartridge Servo-valves

This is high response cartridge valve operated by pilot servo valve. Two way and three way is available. High flow and high response closed control is achieved.
-Performance profile
< Size 32 to 160, Maximum flow 17,000 L/min
< very short switching times, low hysteresis
< Integrated control electronics type available

Figure 3 Cartridge servo valves

APPLICATION EXAMPLE

Testing equipment

Testing equipment for testing the durability of vehicles has a modular structure. The use of standardized subassemblies combined with intelligent engineering yields individual concepts, which can be integrated in the individual testing equipment in the form of self-contained overall systems.

Testing of functions and components

With the testing rigs in the form either of testing function rigs for hydraulic components/vehicle components or of testing component rigs for testing the durability of vehicle components, weak points are identified and eliminated, and product quality is documented.

Figure 4 Testing machine

Central hydraulic power station

Typical test centers of car manufacturers and OEM car part suppliers need to supply a wide range of hydraulic actuators of different testing and simulation equipment. For this purpose it is of high advantage to install a central hydraulic power station with a programmable controller to control the pressure supply. This comprises in house pipe work with a pressure, tank and leakage oil line, the shut-off valves and monitoring sensors.

Inverse crash facilities

The automotive industry continuously is facing demands for tougher safety standards which has been compelled to build high-precision test equipment. Real and inverse crash facilities are the answer to this question. They are used in the laboratory to investigate accident situations to get information about the passive safety of the vehicle and its components.

By converting deceleration into acceleration, it is possible to simulate a situation from standstill which would occur due to collision with an obstacle at high speed. Outstanding advantage is that the specimen does not get destroyed and the test can be performed several times for little costs to the user.

Figure 5 Inverse crash facilities

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