Drive and Control Systems for Commercial Vehicle Superstructures

From Gear Pump to Electronic Crane Control
Unique Variety
Permits Customised Systems

Rexroth supplies a unique variety of components and systems designed to provide custom solutions for the drive and control systems of commercial vehicles. Rexroth has exactly the right system for the particular requirements of the machine. With our product range, we are able to cover the full spectrum of applications. In the "Commercial Vehicle Bodies" application center, where specialists from the different product divisions work together as a team, we provide comprehensive assistance, from the selection of optimal components to the drafting of complete system solutions.

**Products:**
- Implement hydraulics, from the simple throttle control to the technically sophisticated LUDV control.
- Complete control systems for optimal handling.

**Everything From a Single Source**
At Rexroth you will find the complete range of commercial vehicle drive and control systems from a single source: the Mobile Hydraulics technology division of Bosch Rexroth is able to join forces with other product divisions, namely Axial Piston Units, External Gear Units, Radial Piston Motors, Mobile Controls, Gears and Mobile Electronics, in order to provide each system with all the equipment required.
Foundation for Optimal Operation

Our powerful drive and control systems are essential components of the machines they equip and therefore provide the basic foundation for optimal operation of commercial vehicles. They are characterised by reliability, economy, high productivity and ease of use. For the implement hydraulics, qualities such as economy, handling capacity and ease of use are the main criteria. In addition to conventional throttle control, increasing use is now being made of user-friendly and energy-saving load-sensing or LUDV systems.

On-site all Over the World

The Rexroth sales network spans 80 countries. This network gives us a global presence of production sites, trading subsidiaries, distributors and service centers. So, wherever you may be in the world, you and your customers will enjoy the support of expert partners in drive and control systems.

Application Center: System Consulting, Project Planning and Optimization

The Rexroth Application Centers have the function of analysing current and future customer requirements in the field of drive and control technology and working out appropriate solutions – from individual components to complete systems. The future belongs to vehicles and machines that simultaneously can be made more powerful, more rapidly available and more competitively priced. Drive systems that can be specifically optimized for individual applications are therefore necessary. With our Commercial Vehicle Application Center we provide the requisite application-oriented know-how, the latest modern simulations and powerful test systems. In close co-operation with our customers and partners, we devise complete turnkey systems with a minimum of interfaces and with perfectly matched components. In addition, in our Application Centers, we make use of the effects of synergy between the various Rexroth divisions specializing in different technologies.
Drive Hydraulics for Tippers, Hook Appliances, Dump Trucks and Toll-off Dumpers

To load and unload commercial vehicles, the vehicles are often equipped with special devices and attachments, such as tipper cylinders. The hydraulic pumps are generally mounted on the side of the vehicle’s gearbox integrated power take-off units (PTOs). The PTOs are engaged and disengaged by means of the truck’s pneumatic system.

Hydrostatic Transmission

Rexroth KFA-type fixed displacement pumps are axial piston pumps based on the proven bent-axis principle. They are available in the nominal sizes 23, 32, 45, 63, 80, 107 and 125 cc/turn, with working pressures up to 350 bar, respectively 300 bar for size 125. KFA pumps are used for open circuits. This range of pumps is characterised by extra-quiet running, particularly robust transmission and minimal dimensions.

One special feature compared to rival pumps is the patented system for easily inverting the direction of rotation from outside, without having to dismantle the pump. The threaded high-pressure flange is simply screwed into the opposite thread. This screw-in pressure flange also adjusts the pump for minimum noise and pressure pulsation of the fixed displacement pump.
Sophisticated Hydraulic Systems

Loading and unloading systems are designed as load-sensing systems with open-center inlet unit. The Rexroth M4-12 valve block permits highly sensitive proportional control of the individual loads. The actuating system can be mechanical, hydraulic or electro-hydraulic. The four shafts and static support are actuated electro-hydraulically by proportional or stepping control. An emergency cut-off valve can also be integrated in the inlet unit. In addition, an internal pilot oil supply is provided. Finally, for modern actuating systems, a built-in electronic unit for analogue and digital signals (CAN system) is available.
Drive Hydraulics for Loading Cranes, Cargo Cranes and Timber Loading Cranes

Sophisticated variable displacement pumps based on the axial piston principle are used for the drive hydraulics of truck loading cranes, piece cargo cranes and timber loading cranes. Wherever dynamic performance, economic operation and fast working speeds are the main priorities, variable displacement pumps, with different control systems depending on the specific requirements, provide the ideal solution. Rexroth systems are optimally tuned to the particular application and are customised to meet individual user requirements. They are characterised by high reliability, safety and ease of use, even under difficult operating conditions.

Assembly and Loading Cranes in the Power Class up to 10 mt with LUDV Control
In this application range, the main requirements are good mobility and high load capacity of the crane. Rexroth systems are ideal for rapid and powerful material handling. SX control blocks are based on the LUDV system, which distributes the oil flow independently of the actual load. LUDV control systems enable a number of operating movements to be performed simultaneously and independently of one another. In addition, the SX control block provides two speed stages, for sensitive and aggressive operation of the loads. An emergency stop switch and pressure transfer line are already built into the inlet unit. The SX control block replaces the old dual-circuit systems.

Assembly and Loading Cranes in the Power Class over 10 mt with Load-sensing Control
In these systems, there is constant interaction between the pump and control block in order to supply each individual crane cylinder with only the quantity of oil actually required for the current operating function. Several functions can be operated at the same time, because the variable displacement pump always delivers exactly the quantity of oil that the combined loads require. When none of the loads are in operation, the pump automatically switches to “standby” mode. In this mode it delivers about 3 litres/min against a set pressure of 25-30 bar, corresponding to a power input of less than 1 kilowatt.
Load-sensing Control Block

The Rexroth M4 load-sensing control block provides a reliable basis for high-pressure applications with maximum pressures of 350/420 bar. The M4 is able to control all the functions of an assembly crane. The central inlet unit can distribute high volumetric flows to up to ten valve functions.

**Rexroth M4-12 (LS system)**

- Inlet unit with reversible shaft for emergency stop, static support and crane operating functions.
- Primary pressure safety system
- Integral pilot oil supply
- Cut-off for pilot oil supply (secondary cut-off system)
- Simple conversion from open-center to closed-center variants
- Electro-hydraulic actuation with manual override lever
- Built-in CAN electronic system with positional sensor for safety cut-off
- Stroke limit for maximum flow setting
- LS pressure limiting valves for supply pressure control
- Secondary pressure feed valves for securing dynamic loads
Pioneering and Competitive
Drive Hydraulics for Commercial Vehicle Equipment

**Rotary Group and Body Superstructure**
- Rotary group proven millions of times
- Low intrinsic weight
- Slim construction (due to cramped installation conditions)
- Bent-axis axial piston design
- Self-priming for open circuit
- Spherical, self-centring control area
- Cylinder transmission without universal joint

**Operating Principle and Features**
- The volumetric flow is proportional to the drive speed and the displacement volume per turn, which, in the case of the variable displacement pump, is infinitely variable between 0 and $V_{g_{\text{max}}}$
- Suitable for simple throttle control (KFA) or user-friendly load-sensing systems (KVA)
- The favourable dimensions and lightweight construction (aluminium housing) provide advantages of easy installation and reduced vehicle weight
- Tapered piston sealed with piston rings
- Forced lubrication of all moving parts
- Reduced pressure pulsation due to the noise-optimised transmission
- No drain line required: internal drain to the pump inlet side
- Two shaft sealing rings, sealing the inside and outside. A relief hole between the two seals prevents any pressure accumulation
- The drive shaft and mounting flange are suitable for direct mounting on the PTO of all common truck transmissions conforming to the European standard (DIN)
- The systems have robust conical roller bearings, so that they are also suitable for mounting on drive shafts with universal joints
- High overall efficiency
- Patented simple system for changing the direction of rotation
Comparison between drive systems with throttle control and load-sensing control clearly shows the energy-saving possibilities of the LS control system. In addition to improved ease of use and sensitivity, energy costs are reduced.

**Throttle Control with Fixed Displacement Pump**

The fixed displacement pump is designed for the maximum required power and therefore delivers 100% of the drive power. When the power requirement is reduced, the excess oil flow is throttled, converted to waste heat and cooled down by large heat exchangers.

**Load-sensing Control with Variable Displacement Pump**

The drive power of the variable displacement pump is adjusted to the relevant requirements by the LS controller. In this system, no excess oil flow is produced by the variable displacement pump, so that no power is lost in the form of waste heat.

**Fields of Application**

**Tipper Vehicles**
- Rear tippers,
- 3-sided tippers
- Roll-off dumpers, dump trucks
- Hook tippers

**Self-propelled Cranes**
- Loading cranes, timber loading cranes
- Lift platforms
- Service cranes (mobile cranes)

**Local Authority Vehicles**
- Refuse disposal trucks
- Road-sweeping vehicles
- Fire engines

**Tankers**
- Tankers for liquids, granulates and flour
- Drives for feed pumps and compressors

**Special Vehicles**
- Refrigerated vehicles
- Glass transporters, stone transporters
- Washing and vacuuming vehicles
- Drives for generators
- Additional ground drives

**Fan Drives**
Overview of Components

Axial piston units, external gear units, radial piston motors, mobile controls, gears and mobile electronics. Rexroth offers you the complete range of equipment from a single source.

KVA Variable Displacement Pump
Open circuit operation
Nominal pressure 300 bar
Peak pressure 350 bar
Data sheet RE 92 250

KFA Fixed Displacement Pump
Open circuit operation
Nominal pressure 300 bar
Peak pressure 350 bar
Data sheet RE 91 501

External Gear Pump/Motor
Fixed displacement pumps in standard and silence versions
Nominal pressure 250 bar
Peak pressure 280 bar
Data sheet 1 987 760 100 and data sheet 1 987 760 101

Axial Piston Pump A10VO
Open circuit operation
Nominal pressure 250 bar
Peak pressure 315 bar
Data sheet RE 92 703

LS Control Block M4-12
Hydraulically or electro hydraulically operated
Nominal flow 100 l/min
Operating pressure up to 420 bar
Data sheet RE 64 278

Axial Piston Pump A11VO
Open circuit operation
Nominal pressure 350 bar
Peak pressure 400 bar
Data sheet RE 92 500

LS Control Block M4-15
Hydraulically or electro hydraulically operated
Nominal flow 150 l/min
Operating pressure up to 420 bar
Data sheet RE 64 282

Fixed Displacement Motor A2FM
Open and closed circuit operation
Nominal pressure 400 bar
Peak pressure 450 bar
Data sheet RE 91 001

LUDV Control Block SX14
Mechanically, hydraulically or electro hydraulically operated
Nominal flow 120 l/min
Operating pressure up to 300 bar
Data sheet RE 64 125

RC Control Unit
For closed-loop and open-loop control of hydrostatic drives and implement hydraulic functions.
Data sheet RE 95 051
Technical systems for commercial vehicles are being constantly improved and advanced. In this process of development, Rexroth lays particular emphasis on the possibility of operating equipment at higher pressures and speeds. At the same time, Rexroth developers are constantly working to reduce the weight and installation space of the components. A trend towards bus systems can also be discerned. The aim is to develop hydraulic systems that are more economical, ecological and user-friendly. Rexroth meets this challenge with intensive collaboration and constant dialogue with its customers. These steps form the foundations for success in the future.