

# Tractor efficiency and comfort: Innovative hydraulics from Rexroth





# The right solution for every application

The demands on modern tractors are high: more energy efficiency and compatibility with the environment, consistent cost optimization and innovative functions for more efficiency and comfort. But these demands almost always have different priorities depending on the region. With our unique product line and long years of experience, Rexroth offers tractor manufacturers around the globe the right hydraulic and electronic solutions.



## **Quality and expertise in hydraulics and electronics**

The tractor is the universal machine in agriculture. Its functions are accordingly varied. When it comes to hydraulics and electronics, manufacturers can rely on the quality and performance of Rexroth solutions. From the very beginning of development we place the greatest emphasis on compact design, modularity and a perfect interaction between the components and systems. We provide individual solutions for the modern tractor.

## **Long years of experience for lasting success**

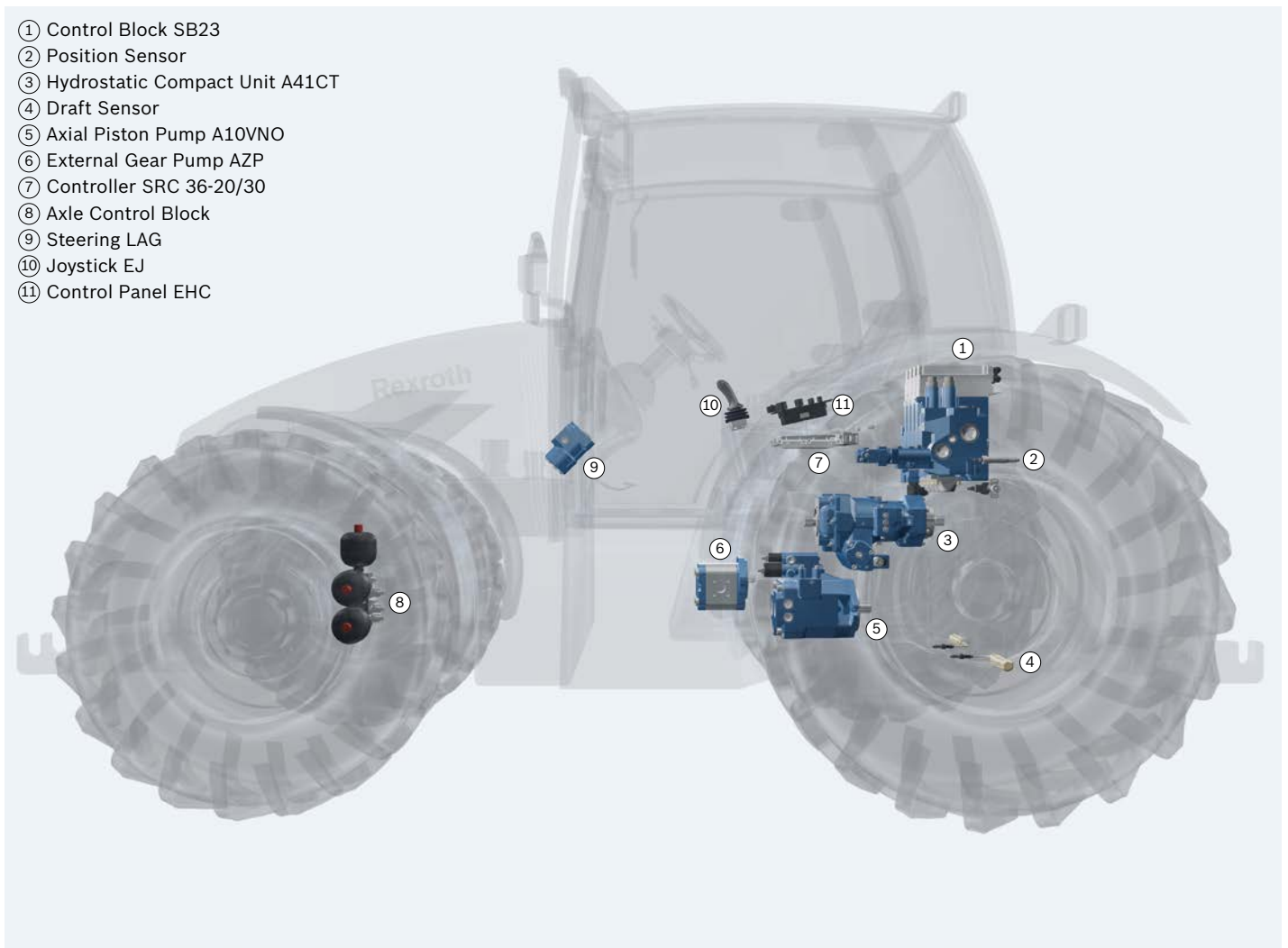
For more than 50 years Rexroth has stood for innovation and continuous improvement of its products. The most familiar example is the EHC Electrohydraulic Hitch Control, a success for over 30 years, without which the tractor world would be unimaginable.

With our technological know-how, our applications experience, and consulting expertise, we see ourselves as a partner in the development of the tractor as an overall system. Because service is important at Rexroth, we are a partner who will be there for customers even after the project is complete, supported by our global service facilities.

# Everything from a single source

Whether large or small quantities, whether a standard product or custom development: at Rexroth tractor manufacturers everywhere in the world get the right components, groundbreaking systems, and expert advice and consultation from a single source. Our comprehensive product and service spectrum makes possible flexible concepts for any combination of application and function – from small vineyard tractors to high-performance all-purpose machines, from the especially quiet gear pump to the complete electronic system controller. And all with the highest value placed on economy and efficiency.

- ① Control Block SB23
- ② Position Sensor
- ③ Hydrostatic Compact Unit A41CT
- ④ Draft Sensor
- ⑤ Axial Piston Pump A10VNO
- ⑥ External Gear Pump AZP
- ⑦ Controller SRC 36-20/30
- ⑧ Axle Control Block
- ⑨ Steering LAG
- ⑩ Joystick EJ
- ⑪ Control Panel EHC



Rexroth uses their comprehensive product range together with a deep understanding of the application to create future-oriented solutions for advanced tractors. We thereby always demonstrate our ability to innovate in every area of activity.



#### **Tractor hitch control:**

The Rexroth EHC Electrohydraulic Hitch Control, used successfully for over 30 years, is an updated advancement with a series of various functions that can be added for even better results in tillage and for greater operating comfort (pp. 6–7).

#### **Load-sensing technology:**

Rexroth load-sensing technology was a groundbreaking entry into energy savings for high-powered tractors, using A10VO, VNO, and CNO pumps. Rexroth takes the lead again with the new A1VO variable-displacement pump, making load-sensing an economical alternative now for the lower power class as well (pp. 8–9).

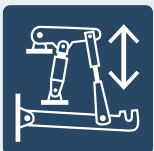
#### **Transmission drives:**

Compact and efficient hydraulics for the travel drive is the key to further advancements especially with respect to installation space and energy consumption of modern continuously variable transmissions (CVT). Here again Rexroth is breaking new ground and is the first to combine bent axis and swashplate technology in a single housing for a more compact CVT with even higher efficiency (pp. 10–11).

#### **Electrohydraulics:**

Electrohydraulics and electronics, which have become an indispensable part of today's tractors, have been significantly contributed by Rexroth. With rugged hardware, reliable controllers, and valves based on automotive standards, Rexroth combines its experienced software programming for customer-specific applications (pp. 12–13).

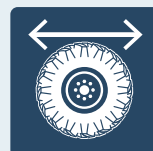
Unique  
hitch control



Energy-efficient  
drive hydraulics



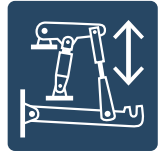
Modern  
travel drives



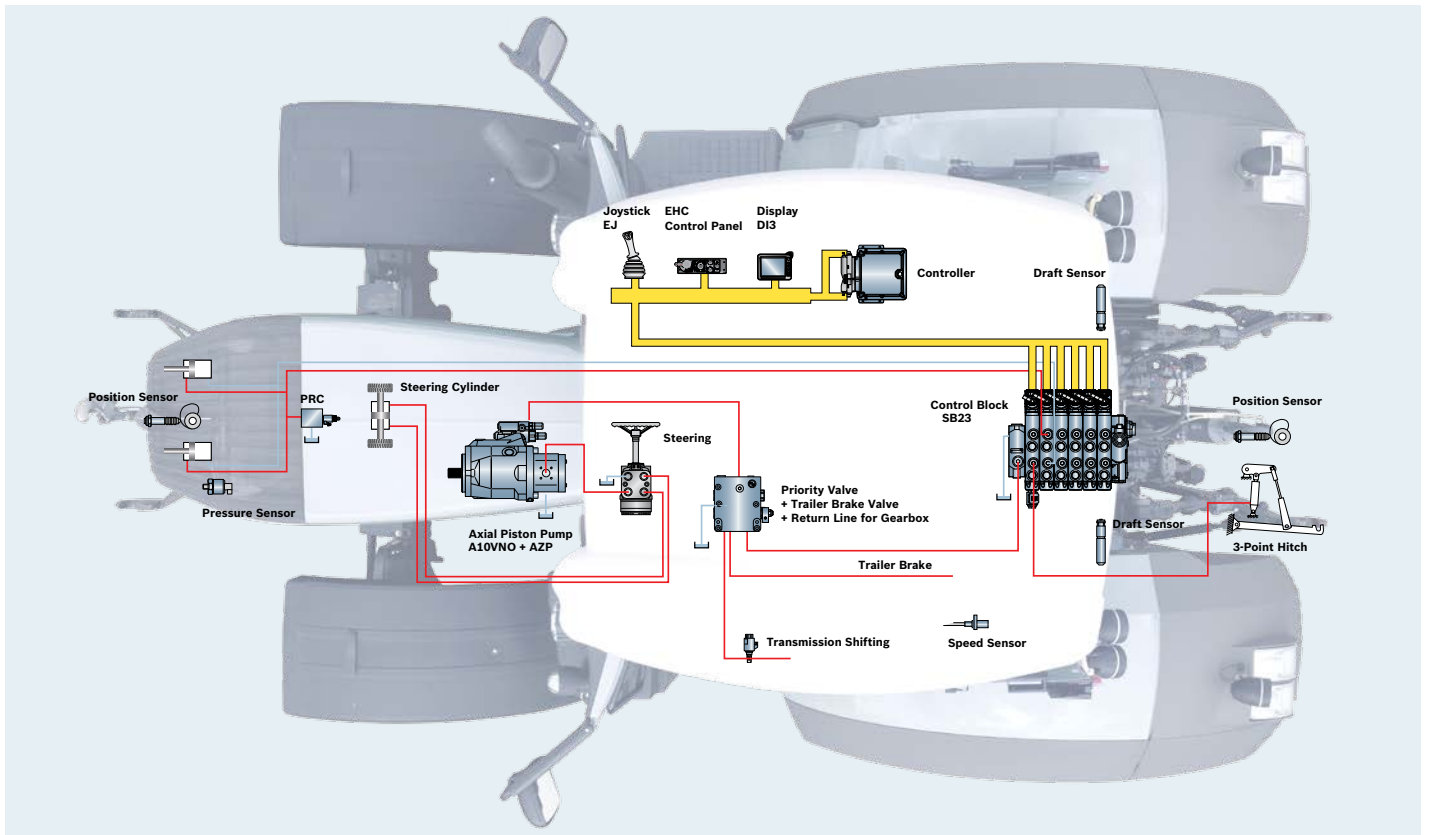
Reliable  
hardware and software



# EHC from Rexroth: An innovation becomes standard



30 years of experience stand behind the EHC Electrohydraulic Hitch Control from Rexroth. It forms the solid basis for the continual advancement of this global success story. Innovative expansions adapt the EHC to the various needs of our customers – you, too, can benefit!



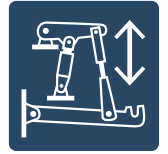
## The standard:

### EHC Electrohydraulic Hitch Control

Force and position control, mixed control, and active vibration damping are the basis for high-quality work.

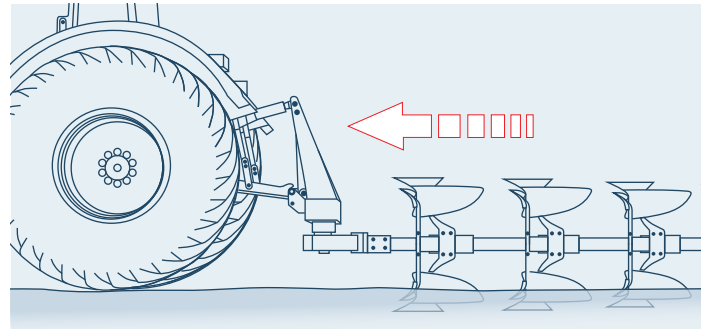
These individual elements of our EHC combine to create a rugged, user-friendly, and reliably working unit. A proven technology with a wide selection of components for any tractor application.

# Flexible and future-oriented: The innovative expansion levels of the EHC



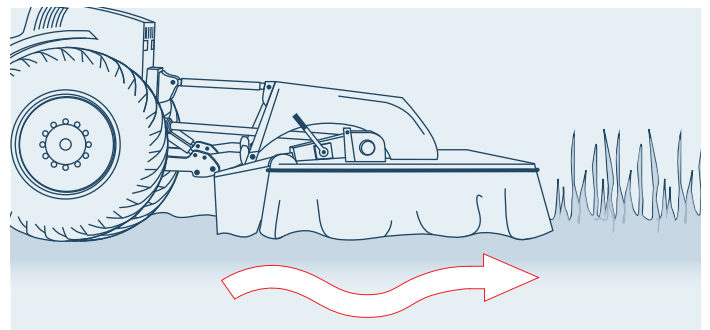
## Cleverly designed – AHC Automatic Hitch Control

The AHC software module automatically and dynamically regulates the ratio between position and tractive force. The EHC uses this to perfectly adjust to varying soil conditions. To achieve an optimal result only the required working depth has to be set. A manual override is still available.



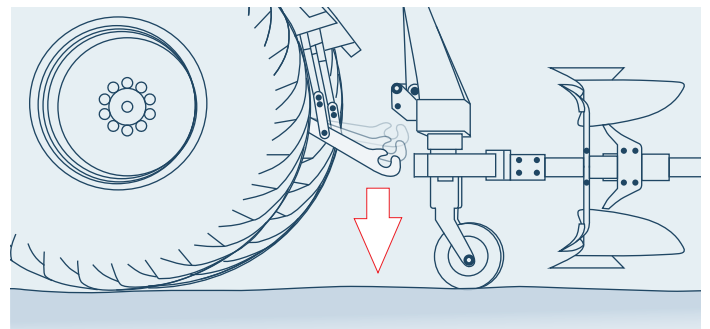
## Tracking the ground perfectly – PRC pressure relief control

With the PRC hydraulic pressure relief control the front hitch follows the ground contour even more precisely to ensure that both the soil and the implement are handled gently. The operator can make the setting conveniently from the cabin, for either manual or automatic tracking. Furthermore, PRC simplifies attachment of implements like a mower, since the usual relief springs are no longer needed. PRC needs no pressure sensors or accumulator, thereby saving space and costs.



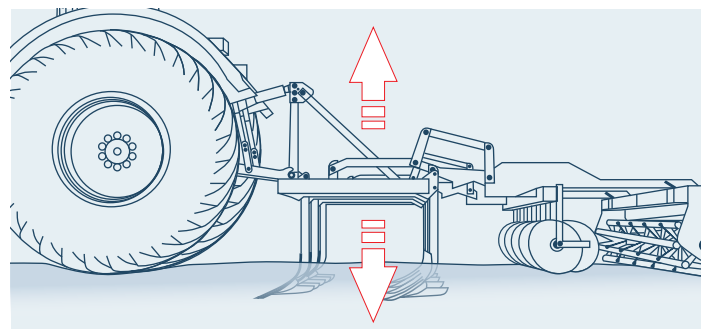
## Lowering fast and gently – HLS hitch lowering support

Simple to integrate, simple to use: HLS provides pressure to the hitch to lower it actively and thereby significantly faster. The advantages are realized especially when the hitch has no load and when ambient temperatures are low. The defined pressure also means attachments can be unhitched more easily – especially useful when catch hooks become jammed.



## Double works better – EHC-da

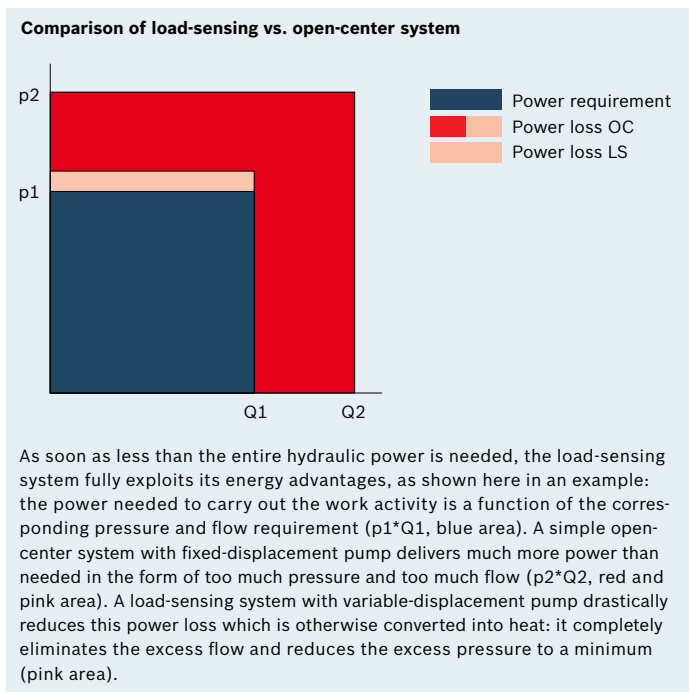
Gentle working of the soil, increased efficiency, and ease of use characterize the double-acting version of the EHC. Active, regulated compression allows the EHC-da to reach the desired working depth faster and optimizes depth control – even in hard soils and changing ground conditions. The EHC-da also makes hitch lowering and uncoupling faster and more convenient.



# Load-sensing: Efficiency for working hydraulics



Saving energy means lowering operating costs and reducing emissions. The need for this keeps growing, due mainly to rising fuel prices and stricter emissions regulations. In the upper power classes load-sensing technology for the working hydraulics is already state-of-the-art – as are the A10 pumps from Rexroth. A reliable variable-displacement pump is the heart of any LS system and therefore the key to greater energy efficiency.



## A standards setter from the outset

The market-leading A10VO, A10VNO, and A10CNO axial piston variable-displacement pumps are considered innovators and now benchmarks for load-sensing systems in tractors. As a technology leader it is our goal to continue driving efficiency standards higher – for example with the advancement of the A10CNO. The charge pump integrated in its housing is now configured as a variable vane pump instead of a fixed-displacement pump. This allows the flow of the charge pump to be regulated as needed and adjusted to the amount of oil needed by the main pump. This new feature further improves the already outstanding energy efficiency of the A10CNO load-sensing pump.

## Clear benefits of the A10CNO with vane pump

- ▶ Charge pump for need-based regulation of flow independent of the main pump flow
- ▶ Improved energy efficiency compared with previous internal gear pump version
- ▶ Compact design consisting of variable-displacement and charge pump as well as pressure relief valves, filter port, filter bypass and filter differential pressure switch
- ▶ Improved efficiency
- ▶ Especially suitable for tight mounting conditions
- ▶ Short response times and favorable power/weight ratio
- ▶ Reduced installation costs

# A1VO variable pump: The compact fuel-saving wonder



Energy-saving load-sensing for the “big guys” and wasteful open-center for the “little guys” – the A1VO puts an end to that. This variable axial piston pump was especially designed for tractors in the lower power classes. Rexroth is the first manufacturer to offer a cost-effective alternative to fixed-displacement pumps, enabling the economical switch to a load-sensing system.

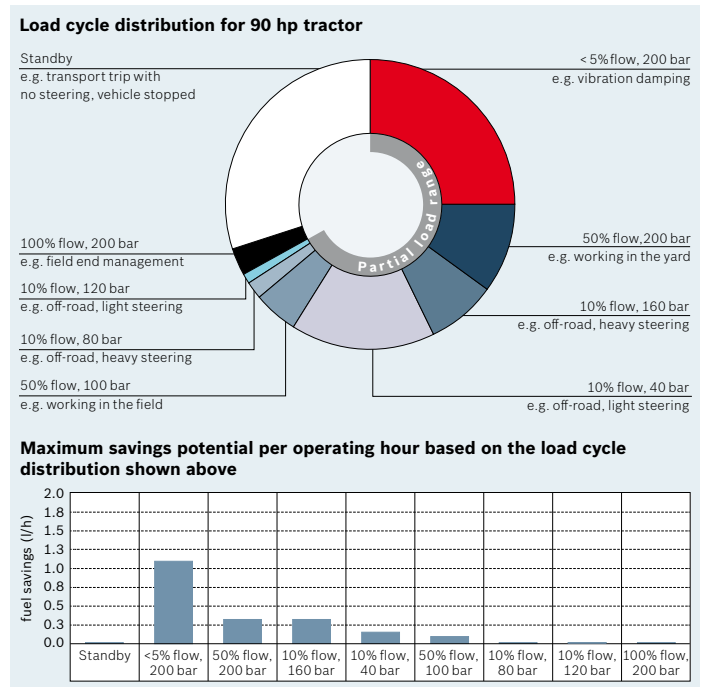
## Save up to 10,000 liters of fuel

The greatest savings potential of the A1VO lies in the partial load range. This includes any work where less than the full hydraulic power is required, such as vibration damping of the attachment, chassis, and cabin when traveling on-road and off-road, steering movement, or a variety of tasks on the field and in the yard. Accounting for a good two-thirds of the total operation time of a tractor, these activities vastly outweigh the time spent under full load or in standby, where the savings potential is inherently close to zero. Calculations based on the commonly used 90 hp diesel-powered tractor show fuel savings of between 10 percent and 15 percent per hour in mixed operation. Assuming a useful life of 6,000 hours for the tractor, this adds up to a fuel savings of up to 10,000 liters.

For more information please see RE 98222.

## Benefits of the A1VO at a glance

- ▶ Significant fuel savings of up to 15% compared with a fixed pump
- ▶ Optimized efficiency with no loss in performance yet reduced consumption
- ▶ Compact design thanks to controller integrated into the port plate
- ▶ Increased life expectancy compared with fixed-displacement system
- ▶ Interchangeable through-drive adapter (universal through-drive) for flexibility in combining pumps
- ▶ Maximum flow of 105 l/min thanks to high self-priming speeds



# Modern transmission drives: More efficiency and comfort on field and road



Pressing the clutch and operating the shift lever is tiresome on a tractor. But it's not only the lack of comfort that makes this technology out of date. Automatic and continuously variable transmissions (CVT) are trending in tractor applications. In addition to making work easier by eliminating manual shifting, CVTs also provide better work results and greater productivity. Modern travel drives increase the overall efficiency of the tractor and provide an important key to meeting emissions regulations.



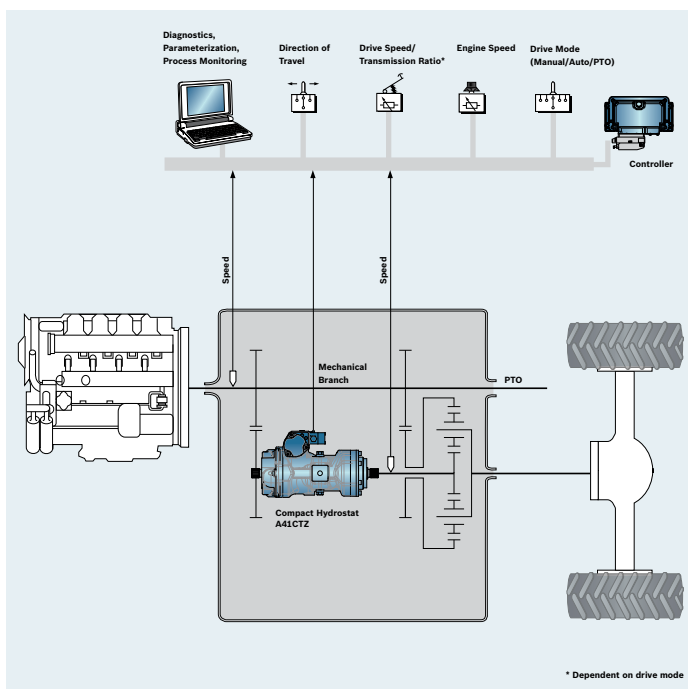
### Dream combination: A41CT

The hydrostatic compact units integrated into a CVT are a decisive factor in improving its overall efficiency. The Rexroth A41CT compact unit features very high efficiency, high power density, and uniquely compact construction. This makes the A41CT an important means for machine builders in meeting the pending TIER 4/STAGE 4 emissions directives. The improvements are based essentially on the first-ever combination of a swashplate variable and bent axis fixed-displacement drive. The two design principles combine ideally in the compact unit, with each of their respective virtues contributing to greater efficiency. Whereas traditional compact units consist of swashplate/swashplate combinations, the bent axis drive in the A41CT provides greater start-up efficiency, less breakaway torque, as well as fewer discontinuities when changing speeds to ensure smoother and more comfortable drive response.

### Hydraulics in the transmission – the right way!

#### Power shuttle function:

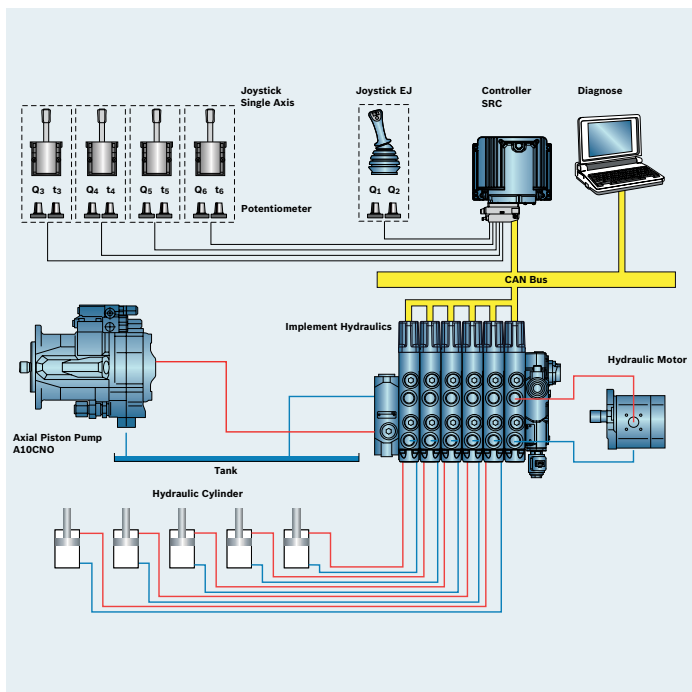
In addition to hydraulic solutions for CVT, Rexroth helps manufacturers also in the control and automating of manual gearboxes and load-shift transmissions – known as power shift and power shuttle. Proven components from the Rexroth catalog, such as cartridge valves or controllers as well as proven, reliable custom software, make for the perfect framework for developing the best combination of hydraulics and mechanics in partnership with our customers.



# Electronics and hydraulics from Rexroth: Space for your ideas



Electrohydraulic and electronic control offer many ways to make operation of a tractor simpler and more comfortable while providing new functions and optimizing and automating work activities. There are no limits to the ideas coming from manufacturers – at least not for Rexroth! On the contrary: from a single automotive-quality controller to a complete electrohydraulic package, from standard software to an individually programmed, application-specific solution – we offer our hardware and software products and our partnering consulting expertise to encourage the creativity of our customers so they can achieve the best possible results.

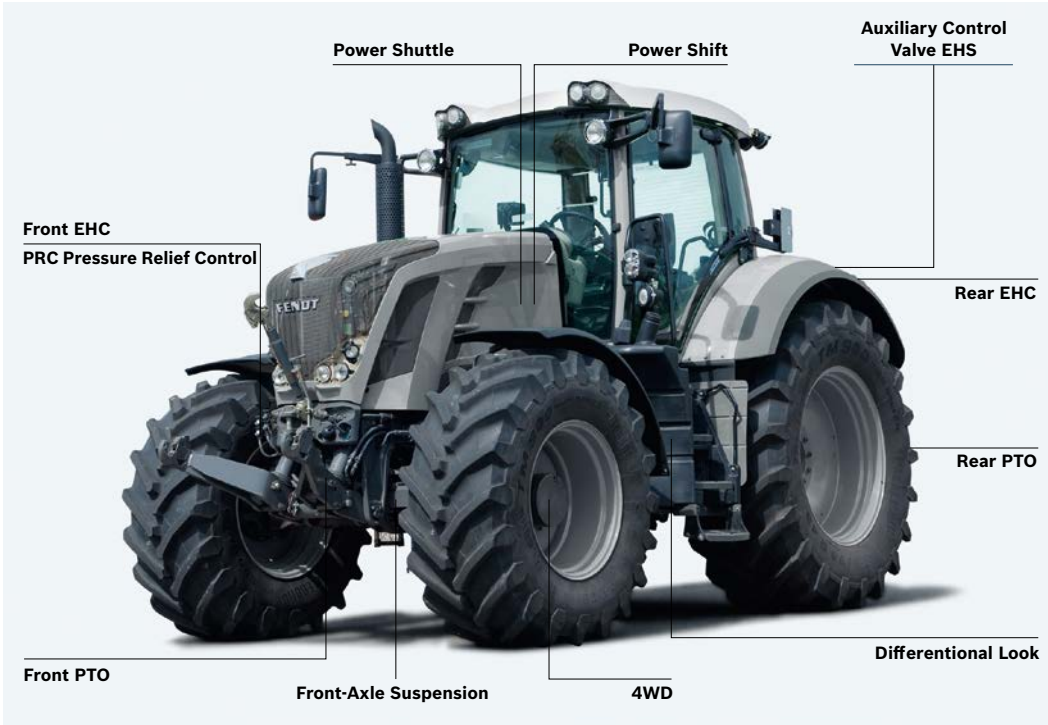


## Simple switch to electrohydraulics

There is hardly a manufacturer who can ignore the trend towards electrically driven directional valves. Along with increased flexibility in cabin design and easier operation for the driver, automation is one of the key advantages of electrohydraulics. To avoid falling behind, the challenge is to come up with sufficient capacity and know-how for the hardware and especially the software development. The TVC tractor valve control from Rexroth reduces this effort to a minimum. As a complete software package including controller, the TVC takes over reliable control of up to six electrohydraulic valves over the CAN bus and can be used in tractors with both fixed and variable pumps. This easily installed plug and play solution allows additional functions to be integrated, including for the transmission controller or EHC.

## Smart Coupling makes it simple

Our patented Smart Coupling enables rapid and convenient coupling or uncoupling of the drive shaft to/from the power take-off shaft (PTO) – simply, cleanly, and in less time. Simple operation of the PTO always brings the shaft to the right position for coupling. Tension prior to uncoupling is released – without damage from auxiliary aids. Simply “Smart”!



**Custom software solutions from Rexroth**  
 Building on our function modules, we offer customers individualized total solutions for hydraulic controllers. Our goal is to understand and implement every customer wish.

Function	Performance					
	Small		Medium		Large	
	Low	High	Low	High	Low	High
EHC, Rear	•	•	•	•	•	•
EHC, Front				(•)		•
Working Hydraulics EHS		•		•	(•)	•
4WD		•		•	•	•
Front Loader		(•)	(•)	•	•	•
PTO, Rear		•	•	•	•	•
PTO, Front				•		•
Power Shift			•		•	
Power Shuttle		•		•		•
Front-Axle Suspension		•	(•)	•	•	•
<b>SRC Controller</b>						
SRC-EHC/30	■					
SRC 4-5/30	■		■			
SRC 14-10/30	■		■		■	
SRC 9-34/30				■		■
SRC 36-20/30				■		■

**The right hardware for your requirements**

The high-performance SRC series controllers are engineered based on automotive standards and manufactured in the ultra-modern production facilities of our parent company Bosch. By matching the SRC with other Rexroth hydraulic components, function reliability and efficiency are increased. The SRC covers all the demands made on the controller architecture of modern tractors. A TriCore processor is the heart of every controller, providing all the processing power you need. A differentiated series of models cover the full spectrum, from controlling specific functions such as the EHC to overall vehicle management. It's your choice!



# Modern service from Rexroth: More than just dotting the i's

We're there wherever our customers are: worldwide! And what applies to the product and system development is also a given for our service: deep expertise in mobile hydraulics and mobile electronics as well as comprehensive understanding of tractor applications as a whole.

Using our own logistics systems we ensure high availability of our original spare parts and guarantee reliable and expert repair or refurbishing of hydraulic and electronic components. We also offer start-up assistance or technical consulting for series production vehicles, including troubleshooting, EHC parameterizing, or anything related to the overall hydraulic system. The most modern measuring and diagnostic tools, high-performance test equipment, and our own test tracks are available to us, so that any necessary testing can be performed under real conditions.



Original spare parts from Rexroth



Our own test tracks



Tractor Development Center in Schwieberdingen, near Stuttgart, Germany

Innovative Rexroth hydraulics  
increase efficiency, productivity,  
and comfort of my tractor } **Exactly**



- ✓ Fuel savings
- ✓ Increased productivity
- ✓ Legal requirements met
- ✓ Increased operator comfort
- ✓ Optimized hydraulics
- ✓ Competitive advantages
- ✓ Expert consulting
- ✓ Maximized reliability

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