More efficiency and operating comfort on- and off-road
New A41CT hydrostatic compact unit combines advantages of swashplate and bent axis in power-split gearboxes

- Higher efficiency
- Higher power density
- More compact design

The first-ever combination of swashplate variable and bent axis constant displacement rotary groups ensures greater efficiency, higher power density and a more compact design for the new A41CT hydrostatic compact unit from Rexroth for modern power-split gearboxes.

With their new A41CT hydrostatic compact unit Rexroth has succeeded in combining two different axial piston designs for the first time: the variable displacement rotary group is still configured as a swashplate type, and the fixed displacement rotary group as a bent axis. The various characteristics of the two design principles complement each other ideally. The advantages: significantly improved efficiency, higher power density and more compact construction – an important feature for OEMs in meeting the future emissions directives of TIER 4 and STAGE 4. The A41CT has already found success in series production equipment from various transmission manufacturers.

Hydrostatic compact units, consisting of one variable and one constant displacement rotary group in the same housing, form the hydraulic core of modern continuously variable transmissions (CVT). They are the decisive factor in improving the overall efficiency of CVTs. In traditional compact units the rotary groups are designed as a swashplate-swashplate combination. With the new A41CT Rexroth has for the first time combined a swashplate variable displacement rotary group and a bent axis fixed displacement rotary group into a single compact unit. This melds the positive features of the two different axial piston designs. The advantages include especially a significantly improved power density and a more compact form factor.
Federico Mejia, Product Manager at Rexroth in Elchingen, explains: “In the bent axis design sealed pistons are used which reduce leakage within the rotary group, which in turn reduces power loss. This improves the volumetric efficiency.” Due to the large swivel angle of 40 degrees in the bent axis unit, the hydraulic-mechanical efficiency increases as well, as Mejia explains further. “We also have less friction here, since the pistons do not have to transfer shearing-forces as in the swashplate design.” This then reduces the cooling requirement.

Compact construction

Another advantage lies in the significantly more compact construction of the A41CT compared with traditional systems. “Due to its construction the bent axis rotary group used here has a higher speed capacity than a swashplate rotary group,” notes Product Manager Mejia. “This means we can design the unit smaller and yet transmit the same power.” This leaves room for example for the ever more complex exhaust gas treatment equipment.

Among the features of the bent axis principle which proves useful in the A41CT is the greater start-up efficiency compared with swashplate rotary groups, less breakaway torque and fewer irregularities when switching rotation direction. These result in smoother, more comfortable driving for the operator.

Rexroth at Agritechnica 2011: Hall 09 – Stand E17

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