



## Modular central hydraulics: SKF uses CytroBox in combination

**The largest CytroBox network to date supplies the production at the SKF plant in Lüchow with pressure as needed. The innovative concept with intelligent compact units set up in series and supplementary ABMAXX modules improves the energy balance with optimized productivity and maintenance.**

SKF is a major player in machine and vehicle construction. The world's leading supplier of bearings, seals and other innovative solutions for industrial customers employs more than 40,000 people in around 130 countries. Around 8.5 million tapered roller bearings, truck hub units and other storage units are produced annually at the Lüchow plant in Germany, and this in an energy-efficient manner. In line with the company's values of cooperation, curiosity, courage and care, SKF strives for production that is as lean and sustainable as possible. This can be seen, among other things, in systems for the use of photovoltaics, biogas and process heat or for the preparation of hydraulic oil.

### COMPREHENSIVE MODERNIZATION OF CENTRAL HYDRAULICS

One of the latest flagship projects in the field of energy efficiency is the modernization and standardization of the central hydraulic supply for 10 grinding and assembly lines. The aim is a needs-based pressure supply with almost 100% availability through redundancy, monitoring and predictive maintenance.

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**Frank Puchowski, Project & Program Manager at SKF Plant Lüchow, explains the background:**

“Since the high availability of our old hydraulic system was no longer profitable, we decided on a fundamental renewal. If we had only replaced the pumps, a new CE test would have been necessary for the existing control system. Continuing to operate the existing pumps with a new control system would have meant also a great deal of adjustment work. That’s why we have made a clear cut and obtained various offers“.

## THE MOTTO: MODULAR, SLIM AND SMART

The most innovative solution came from Bosch Rexroth: Why not replace the technically outdated pressure supply with a slim combination of intelligent compact units? A total of nine CytroBox units connected in series together with additional modules from the large-scale ABMAXX range supply the hydrostatics of the grinding machines and - at a lower pressure level - the actuators of the working hydraulics such as lifting units, Presses and transport equipment and thus enable a new level of energy efficiency, flexibility and transparency.



**„THANKS TO THE CYTROBOX NETWORK, WE CAN FOLLOW RAPIDLY CHANGING VOLUME FLOWS AT STABLE PRESSURE, IN A MORE DEMAND-ORIENTED AND ENERGY-EFFICIENT MANNER.“**

## MODULAR SOLUTION BEST IMPLEMENTED

From SKF’s point of view, the groundbreaking concept of standardized units with integrated sensors was not only very effective, but also best implemented. In just two weeks, the old plant in the basement had to be dismantled, the new building blocks introduced through the narrow access, including piping and control installed and brought into operation trouble-free with the required availability. In addition, the good experience with the support from Hamburg and the accurate calculation of the future energy savings for Bosch Rexroth also spoke.

## 9 CYTROBOX UNITS IN MASTER-SLAVE OPERATION

Of the nine CytroBox units operating in master-slave mode, five supply the hydrostatic drive of the grinding machines and four supply the working hydraulics. Thanks to the speed-controlled screw pumps in the space-saving compact units, the pressure control for hydrostatics with fewer accumulators than before could be mapped and the pressure level lowered from 85 to 78 bar. The working hydraulics now operate at a significantly lower pressure of 45 bar, which was not possible with the old solution.

In order to be able to supply both working groups from the hydraulic cellar, Bosch Rexroth supplemented the CytroBox system with two - tanks and a filter and cooling unit from the ABMAXX range of large power units.



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PHOTO: BOSCH REXROTH

SKF

## 8,000 LITRES OF HYDRAULIC OIL SAVED

The ABMAXX filter and cooling unit also serves as a boost unit for active, automatic tank filling of the CytroBox units via a switching valve. The two additional tanks are necessary, among other things, so that around 2,000 litres of oil can flow back into the plant from the numerous consumers and return lines when the plant is stationary. Thanks to the speed-controlled demand supply, the previously required oil quantity could be reduced by 40 percent from 20,000 to 12,000 liters. The distribution of the oil quantity to two 6,000-litre tanks is due to the narrow access to the hydraulic cellar.

## FAST INSTALLATION AND COMMISSIONING

One of the decisive factors for compliance with the tight project plan was that the CytroBox had already been delivered tested and could be put into operation almost plug-and-play. After 14 days, the modular central hydraulics were productive. This was preceded by around nine months of planning, with the implementation phase being worked out and determined in two-weekly team meetings for the hour.

## FLEXIBILITY FOR FLUCTUATING REQUIREMENTS

An important part of the availability concept is a redundant CytroBox per workgroup, which can be activated quickly if necessary or used for other tasks due to the identical design. This n+1 redundancy gives the modular central supply a completely new level of flexibility, as we can easily remove, replace and repair individual boxes,” explains Frank Puchowski.

## ENERGY EFFICIENCY SIGNIFICANTLY IMPROVED

The CytroBox system increases the energy efficiency of the hydraulics by three to five percent, whereby the intelligent control automatically switches off unnecessary devices, among other things. Together with other measures such as optimising the flow rate, lowering the pressure level and eliminating storage units, the SKF plant in Lüchow achieves a total energy saving of 24 percent.

## QUIET OPERATION, EASY MAINTENANCE

Compared to the previous central hydraulics, the noise emissions are also significantly lower. The flow-optimized inner workings and the demand-oriented power provision up to standby significantly contribute less decibels to the background noise of the surrounding systems. Another advantage of the proven modular solution is the significantly simplified maintenance: The encapsulated pump units can be safely separated from the composite electrically and hydraulically.

## SENSORS AND DATA SERVICES FOR PREDICTIVE MAINTENANCE

Thanks to the integrated sensors, SKF is able to continuously monitor all relevant parameters of the CytroBox compound. The monitoring mainly includes active power, pressures, flow, oil temperature and tank levels as well as the water content of the fluid. “If there is a drop in water, we can take targeted countermeasures,” explains Puchowski, which is important because of the reduced oil volume. Bosch Rexroth regularly carries out data analyses for predictive maintenance as part of the maintenance contract.

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## MODULAR SERVO HYDRAULICS CONVINCED ALL ALONG THE LINE

For Frank Puchowski, the CytroBox network is a pioneering supply concept that optimally meets the desired requirements for reliability, flexibility, operability and energy efficiency. In view of the good results, the acceptance of digitally controlled servo hydraulics in the factory has also increased. "We definitely made the right decision," says Puchowski. Energy consumption has fallen significantly, availability is close to 100%, and future-proofing has been restored. Through condition monitoring, we can even identify further energy saving potentials."

The cooperation has also left an extremely positive impression: The conversion to the modular CytroBox network is one of the most successful energy efficiency projects in the plant, which are not least due to the intensive preparation", Frank Puchowski sums up." With a different concept, our ambitious schedule would have been much more difficult, if not impossible.



### Contact person:

Thorsten Müller  
Sales Industrial Hydraulics Europe Middle  
Bosch Rexroth AG

[thorsten.mueller6@boschrexroth.de](mailto:thorsten.mueller6@boschrexroth.de)

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