

Liebherr Pactronic® Hybrid Power Booster



LIEBHERR

Pactronic® – Power by Accumulator and Electronics

The Liebherr Pactronic® is a revolutionary new hydraulic hybrid drive system. It is characterized by an energy storage device. A hydraulic accumulator supplements the fluid pump in delivering power to the system. It serves as a pressure storage reservoir incorporating a gas in conjunction with a hydraulic fluid. Energy is stored in this compressed gas to be released upon demand.

The Liebherr Pactronic® is also an impressive power booster. Hoisting as well as lowering speeds are increased substantially – without the need to go for a bigger diesel engine with more output. Thus the crane's efficiency reaches new levels with higher turnover figures.

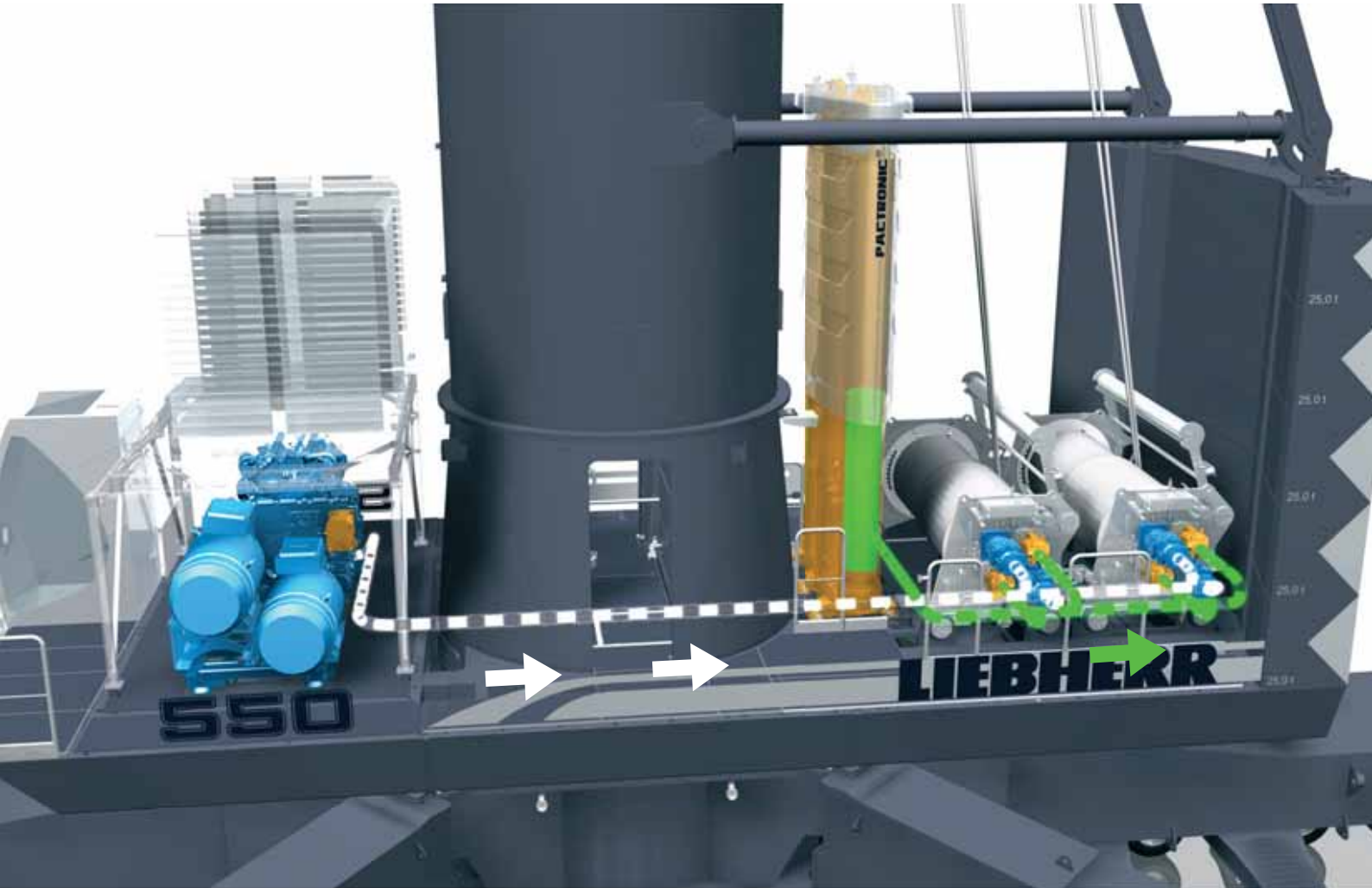
In addition, the crane's fuel consumption is significantly reduced. This is achieved by fully utilizing the reverse energy and surplus power within the system.

Key Advantages of the Accumulator:

- proven energy storage technology
- designed service life is equal to the crane
- virtually maintenance free (just visible inspection every 10 years)
- fast charging and discharging
- performance not affected by ambient temperature (no cooling, conditioning or isolation needed)
- 100% recyclable







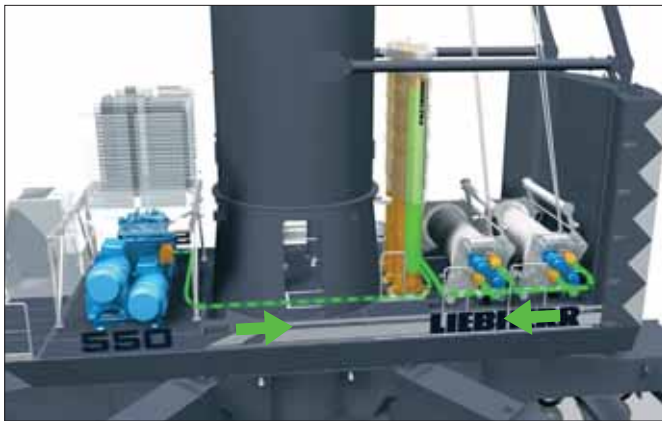
Pactronic® - Mode of Operation



Hydrostatic power transmission

Conventional Drive System

The conventional, hydrostatic hoist system of a Liebherr Mobile Harbour Crane is driven by a hydraulic motor, a pump, the splitter gear box and the prime mover (diesel motor or electric motor).



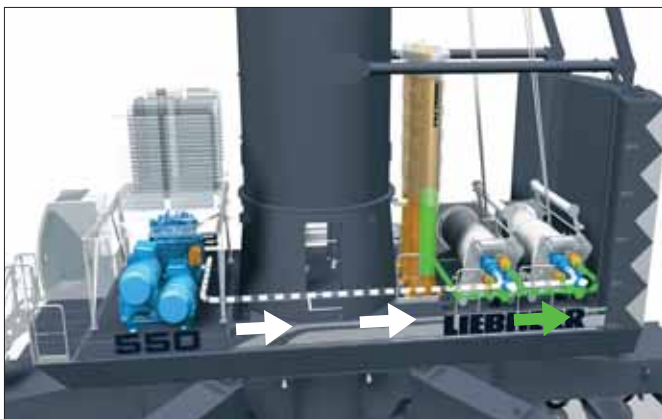
Charging of the accumulator

Pactronic® - Lowering Mode

With Pactronic® a secondary energy source is added to the drive system.

Charging of the accumulator is done by regenerating the reverse power while lowering the load.

In addition, the surplus power of the primary energy source is also used for charging.



Discharging of the accumulator

Pactronic® - Hoisting Mode

The stored energy of the accumulator is transferred back to the system when the crane requires peak power during hoisting. Consequently, the total hoisting power is the sum of the conventional hydrostatic power and the secondary energy, provided by the accumulator.

30% Less Fuel Consumption*

Sustainable technologies have always been high on Liebherr's agenda. Production and products are constantly optimised to help reduce CO2 emissions and pollutants. Offering a unique combination of extremely low fuel consumption and supreme performance, Pactronic® represents an essential milestone in Liebherr's strategy on the way to genuine ultra-efficient, low-emission cargo handling. Pactronic® stands for pioneering, economical and environmentally friendly technology, innovative energy recovery and increased performance with hybrid power.

Key Advantages of the Pactronic®:

- Substantially decreased fuel consumption
- Further reduced exhaust emissions
- Less noise exposure
- CO2-Reduction: -30%



**Fuel consumption (litre/ton) can vary depending on operation mode between 25% and 35%.*

30% More Turnover*

The new Pactronic® - hybrid drive system addresses two critical issues: reducing fuel consumption and increasing handling performance. When an application is started that requires the additional power, the Pactronic® can transition back to system and power up the hoisting capabilities of the crane. Pactronic® stands for a highly efficient, power and turnover booster for Mobile Harbour Crane operators around the world.

Key Advantages of the Pactronic®:

- Increased hoisting power (+100%)
- Increased lowering power (+100%)
- Higher turnover with identical prime mover



*Turnover (tonnes/hour) can vary depending on operation mode between 25% and 35%.

Liebherr-Werk Nenzing GmbH



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