Hybrid Power Booster

Liebherr Pactronic®



LIEBHERR

Power by Accumulator and Electronics

The Liebherr Pactronic® is a revolutionary 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 and emissions. Thus the crane's efficiency reaches new levels with higher turnover figures.

In addition, Pactronic® achieves greater performance while reducing fuel consumption at the same time. This is achieved by fully utilizing the reverse energy and surplus power within the system. The sustainable hybrid drive therefore reduces the emission of CO_2 and other harmful substances. With Pactronic®, Liebherr smooths the path towards goods handling with high efficiency and low emissions.

Key Advantages:

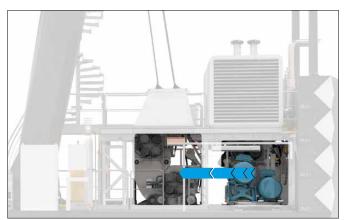
- Proven energy storage technology
- Has the same service life as the crane
- Maintenance free Visual inspection every 10 years sufficient
- · Fast charging and discharging
- Performance not affected by ambient temperature (no cooling, conditioning or isolation needed)
- 100% recyclable





Mode of Operation

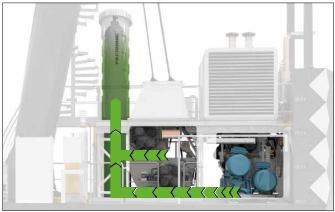




Hydrostatic power transmission

Conventional Drive System

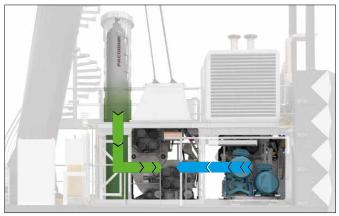
The conventional, hydrostatic hoist system of a Liebherr mobile harbour crane is driven by a hydraulic motor, a pump, the splitter gear box and the prime mover (diesel motor or electric motor).



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*



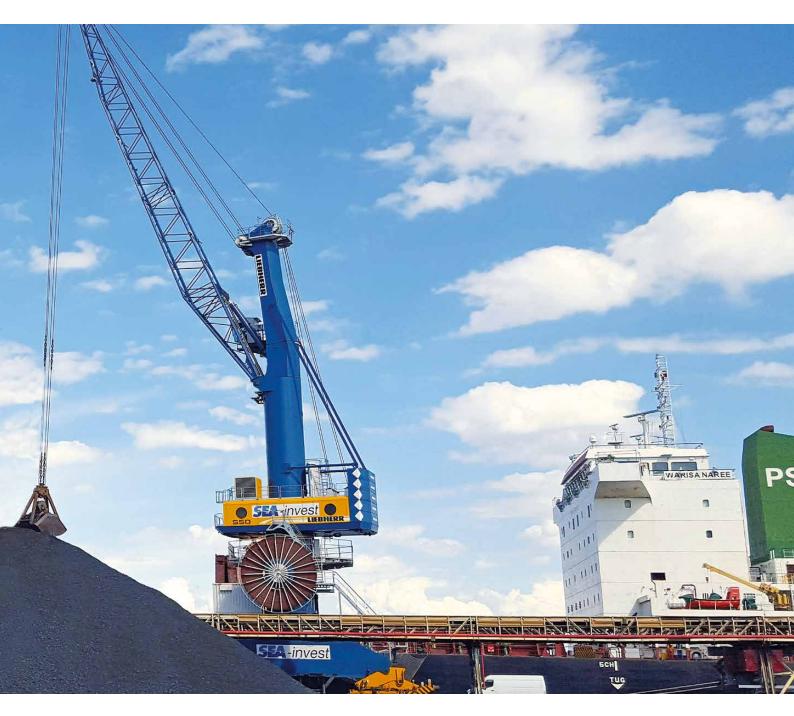
Sustainable technologies have always been high on Liebherr's agenda. Production and products are constantly optimised to help reduce CO2 emissions and pollutants. Offering a unique combination of extremely low fuel consumption and supreme performance, Pactronic® represents state-of-the-art drive technology. It is 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.

* Fuel consumption (litre/ton) can vary depending on mode of operation.

Key Advantages:

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

30% More Turnover*



The Pactronic® hybrid drive system addresses two critical issues: reducing fuel consumption and increasing handling performance. When an application is started that requires additional power, the Pactronic® can transition back stored energy to the 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:

- Increased hoisting power (+100%)
- Increased lowering power (+100%)
- Higher turnover with identical prime mover
- Handling performance depending on the application +30%

^{*} Turnover (tonnes/hour) can vary depending on mode of operation.

Pactronic®-LHM - 10541073 - 03/2017 - Subject to change without notice.

The Liebherr Group of Companies



Wide Product Range

The Liebherr Group is one of the largest construction equipment manufacturers in the world. Liebherr's high-value products and services enjoy a high reputation in many other fields. The wide range includes domestic appliances, aerospace and transportation systems, machine tools and maritime cranes.

Exceptional Customer Benefit

Every product line provides a complete range of models in many different versions. With both their technical excellence and acknowledged quality, Liebherr products offer a maximum of customer benefits in practical applications.

State-of-the-art Technology

To provide consistent, top quality products, Liebherr attaches great importance to each product area, its components and core technologies. Important modules and components are developed and manufactured in-house, for instance the entire drive and control technology for construction equipment.

Worldwide and Independent

Hans Liebherr founded the Liebherr family company in 1949. Since that time, the enterprise has steadily grown to a group of more than 130 companies with about 42,000 employees located on all continents. The corporate headquarters of the Group is Liebherr-International AG in Bulle, Switzerland. The Liebherr family is the sole owner of the company.

www.liebherr.com