

## Linden Comansa improves the productivity of its LC1100, LC2100 and LCL Series



As a result of the permanent efforts to improve and optimize our products, Linden Comansa has developed **Effi-Plus**, a new hoist drive system which may increase productivity of hoist operations up to 29%. The new system increases hoist and lowering speeds with light loads up to 70%, so the hoist cycle time is drastically shortened. Effi-Plus has been applied to the 24, 37, 50 and 65kW drives of the LC1100, LC2100 and LCL (luffing-jib) Series. It is being delivered since January 2011 and without affecting the price of any of the models.

The significant efficiency improvement of the new drive system developed by Linden Comansa, is based upon the application of cutting-edge control and motor design technology. This re-engineering work applied to the control and optimization of the system has allowed increasing the maximum hoist speed of the hook while keeping the current optimized and well-proven drive configuration (electric motor-brake, gearbox, drum, frequency inverter, brake resistor).

Comparison between *Effi-Plus* and the previous system:

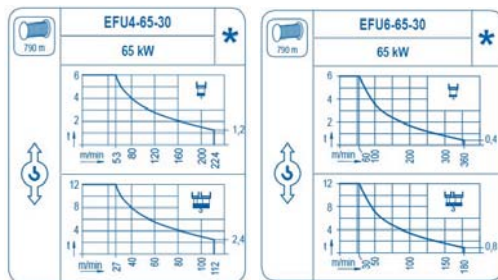
Series	Power (kW)	Max. Load (t)	Maximum Speed Increase (%)	Estimated Productivity (*) Increase (%)	Drum Capacity Increase (%)
<b>LC2100</b> (Flattops Tower Cranes 6 Models)	37	12	25%	14%	0%
	50	12	44%	18%	45%
<b>LCL</b> (Luffing Tower Cranes)	50	18	42%	17%	45%
	65	12	61%	23%	0%
	65	18	57%	22%	27%
	65	24	73%	27%	0%

(\*) E. Productivity increase has been calculated assuming that the average working load is 25% of the maximum load.

Load vs. speed graphs of a 65kW range drive, before and after *Effi-Plus*:

PREVIOUS SYSTEM

EFFI PLUS SYSTEM



## The exclusive advantages of Effi-Plus are:

- Increase of hoist speed and jobsite productivity up to maximum levels.
- Power and, therefore, energy consumption of the crane remains the same.
- The high performance has been achieved by developing specifically designed intelligent control techniques and not by means of complex configurations that may bring maintenance problems. The high reliability of the system remains the same.
- Since the configuration of the system is similar to the previous one, the user who knows the preceding system will not notice any differences and will not need specific training in the new system.
- *Effi-Plus* includes an exclusive control algorithm that optimizes acceleration and deceleration time and space while keeping smoothness under every circumstance. It ensures the best control of the hook even at the very high speeds that can be reached.
- The drum capacity has been increased in some of the mechanisms so the crane can now reach higher heights.
- When *Effi-Plus* is combined with the automated reeving change function, the crane operator can change, in a couple of minutes and on his own, the crane speed-load chart by selecting the appropriate reeving mode. The automated reeving change system allows him to adapt the crane load-speed features to the site working needs. As the system is fully automated, he can do it from the cabin seat and no manual operation or third party assistance is needed.

*Effi-Plus* has the following advantages when compared to other solutions:



- The system does not use gearboxes with electrically or manually operated clutches, so that costly problems and difficult maintenance are eliminated.
- The maximum speed of the electric motor is kept to low values and therefore maintenance problems are less likely to happen when compared to other systems that operate on higher motor speed ranges. Motor and gearbox life expectancy is also extended. The use of low motor speeds allow to use a simple electromagnetic brake appended to the motor instead of more complex brake system.
- The gearbox is out of the drum allowing better control and inspection, lubrication and maintenance in comparison to more complex systems.

*Effi-Plus* includes all the characteristics of the Linden Comansa hoist systems with frequency variation:

- Use of the most advanced and robust technologies for electric motor control (Vector Field Oriented Control) for a soft and precise control of the hoist, reducing the energy consumption in addition.
- Algorithm for continuous load under hook estimation that optimizes speed for each load level.
- Redundant external overspeed monitoring and safety system.
- Microspeed for precision positioning allowing speeds of down to a few millimeters per second.
- Load suspension at speed zero (function of floating load).
- Symmetrical behavior of hoist and lowering speed for each load that offers the crane operator an ideal, coordinated and trouble-free control of movements.

