

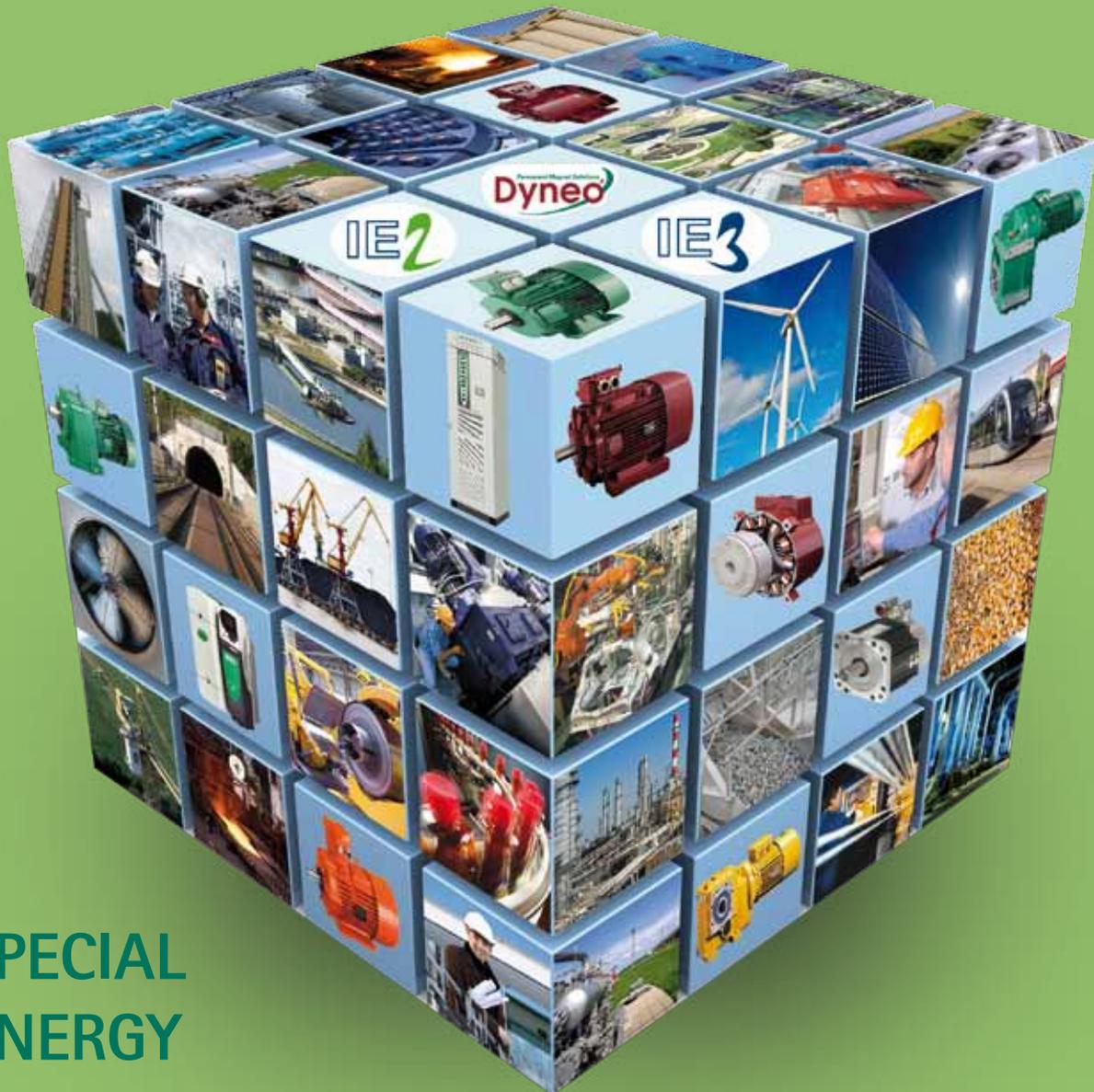
LS news

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26

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THE EUROPEAN MAGAZINE OF LEROY-SOMER



SPECIAL ENERGY SAVING

- > The new generation of LS2 motors
- > Variable speed drives for high-performance applications
- > Permanent magnet synchronous solutions
- > Optimising the complete system



Leroy-Somer and energy savings

Global warming measurements from meteorological stations all over the world demonstrate a slow but undeniable rise in average temperatures. The likely consequences of this warming are not encouraging and certain signs of this have already appeared: heatwaves, desertification, floods, storms, thawing glaciers, etc.

The scientific community has become aware of the need to take steps to restrict CO2 emissions into the atmosphere. It is now up to governments, business and the public to shoulder their responsibilities.

Europe have embarked on an ambitious project to reduce greenhouse gas emissions by 20% between 1990 and 2020. It involves both reducing energy consumption by 20% and achieving the target of 20% renewable energy production by 2020.

Moreover, numerous experts reckon that the supply of natural resources, in the form of fossil fuels, has reached a maximum threshold. Access to cheap energy is undoubtedly a thing of the past and the cost of energy is only likely to increase in the coming decades.

Finally, governments are putting mechanisms in place to encourage companies to invest in less energy-intensive systems or to promote generation of renewable energy .

➤ **EDITOR IN CHIEF:**

Philippe Faye
Leroy-Somer
Bld Marcellin Leroy
F-16015 Angoulême

➤ **CO-ORDINATION AND LAYOUT:**

Im'act

➤ **EDITORIAL COMMITTEE:**

A. Bondoux, E. Dadda, Ph. Faye, Dr. R. Lamprecht,
C. Pegorier, Ph. Piotelat, O. Powis, G. Simatos,
G. T. Sørensen, V. Viccaro, T.D.L Walters.

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➤ **UNITED KINGDOM :**

LEROY-SOMER LTD
8, The Square Stockley Park
UB11 1FW UXBRIDGE, UNITED KINGDOM
Tél. : (+44) 20 86 10 60 25
E-mail: motorsales.uksouth@leroysoomer.com

In the light of this, companies need to innovate and take up new challenges in order to stay in the game: reducing their energy consumption, optimising their technologies and reducing their ecological footprint!

The report «Electricity Consumption and Efficiency Trends in the European Union», published by the European Commission's Joint Research Centre (JRC) on 30 November 2009, shows that, in the European Union's industrial sector, electric motors are by far the heaviest users of electricity with 59% of the total, i.e. around 680 TWh/yr out of a total consumption by the sector in 2007 which has risen to 1149.9 TWh. The ecodesign regulations could lead to savings of as much as 135 TWh per year (a reduction in consumption of almost 20%).

Energy savings are currently a major concern, not only for manufacturers but also for the commercial sector,

and electric motors represent one of the largest potential sources of energy efficiency. Moreover, over 10 years, the cost of electricity bills represents 95% of the total operating cost, whereas the costs of acquiring and servicing the motor only represent 5%.

Leroy-Somer therefore offers its customers a full choice of solutions: new IE2 high-efficiency motors and IE3 premium motors, variable speed asynchronous solutions and also Dyneo® super premium synchronous permanent magnet motors.

With 65% of products less than 5 years old and 8% of staff working in Research & Development, Leroy-Somer is the champion of innovation and energy efficiency.

Measurement	Estimated annual savings in 2020 [TWh]
Domestic lighting (ecodesign)	39
Office lighting and street lighting (ecodesign)	38
Fridges and freezers (ecodesign and labelling)	6
Washing machines (ecodesign and labelling)	2
Dishwashers (ecodesign and labelling)	2
TVs (ecodesign and labelling)	43
Standby mode (ecodesign and labelling)	35
Simple set-top boxes (ecodesign)	6
External power supplies (ecodesign)	9
Electric motors (ecodesign)	135
Circulating pumps (ecodesign)	25
Total annual savings in 2020 [TWh]	340

Estimated total annual savings in 2020 thanks to the ecodesign and energy labelling regulations (Source: Electricity Consumption and Efficiency Trends in the European Union, JRC, 2009).



The new generation of LS2 motors

After several years of Research & Development, Leroy-Somer has brought to market a new generation of LS2 high-efficiency motors. This new IE2 motor not only complies with the requirements of the ErP European directive, it offers users and manufacturers significant new advantages.

High efficiency

Motor efficiency is the ratio between the output power (needed to drive a machine) and the power absorbed (the power actually consumed). The difference between the two is made up of the losses. 85% efficiency therefore means there are 15% losses. Motor efficiency can vary from 70% on small motors up to 96% for the most efficient motors.

The new LS2 motors are the result of in-depth studies conducted jointly with leading European universities which aim to significantly cut motor losses, whether by adding material (copper, sheet steel, etc.), or by using more high-performance materials.

Efficiency classes and measurement

Standard IEC 60034-1 defines the operating characteristics of rotating machinery

and standard IEC 60034-30 sets out the new efficiency classes for induction motors: IE1 (standard efficiency), IE2 (high efficiency), IE3 (Premium). Efficiency levels are measured in accordance with standard IEC 60034-2-1 which differs from standard IEC 60034-2 where the additional losses were calculated at a fixed rate of 0.5% of the power absorbed. The additional losses are now calculated accurately.

Leroy-Somer uses cutting-edge measuring tools to calculate the losses and define the exact efficiency according to the load levels: use of a torque meter, thermal and air-flow validation of motors, etc.

Ecodesign of motors

From July 2005, Europe has decided to regulate the design and manufacture of energy-using products in adopting the EuP Directive, replaced in November 2009 by the ErP Directive. This aims to compel manufacturers to take account of energy use throughout the product's life and to find energy-saving solutions.

On the basis of this framework Directive, the European Commission adopted, in July 2009, regulation 640/2009 which describes the requirements in terms of energy efficiency of electric motors and has timetabled the efficiency levels to be adhered to for electric motors sold on the European market:

- IE2 class from 16 June 2011
- IE3 class (or IE2 + drive) from 1st January 2015 for power ratings from 7.5 to 375 kW
- IE3 class (or IE2 + drive) from 1st January 2017 for power ratings from 0.75 to 375 kW



LS2 motors for Someflu anticorrosive centrifugal pumps (France)

In the context of bringing the Seine Aval wastewater treatment plant at Maisons Laffitte (France), run by OTV Epurateur, into conformity with the European Directive concerning urban wastewater, Someflu supplied 12 pumps installed on a gas scrubber for deodorising. Six pumps run 24 hours a day with a fixed flow rate, operating point 250 m³/hr at 15 metres with a sound level of 63 dB at 1 metre.

Someflu pumps are mainly designed to pump corrosive, clear, slightly contaminated and highly contaminated chemical products.

To drive the pumps, Leroy-Somer supplied 1000 rpm 22 kW LS2 motors with 90% efficiency, giving the power pump assembly overall efficiency of more than 70%. These motors also comply with the noise standards that have been decreed.



The LS2 motor, more than an IE2 motor

The LS2 motor has completely new build characteristics which offer maximum benefit to both users and integrators. On top of significant energy savings, Leroy-Somer has further increased the life of its motors through the technical decisions it has taken.

Energy savings

Developments made to LS2 motors have allowed us to reduce losses by 15%. The efficiency levels have been certified by a notified body. LS2 motors have been designed from the outset to operate at variable speed, in anticipation of the ErP directive which has set a deadline of 1st January 2015.

Maximised life

The reduction in temperature rise results in a doubling of winding life and consequently improves the thermal reserve, allowing operation in non-standard conditions (altitude, ambient temperature, overloads, etc).

The use of a specially-designed grease for the electric motor bearings and increased heat dissipation due to a new endshield design also contribute to prolonged motor life.

Easier installation and maintenance

The standard dimensions conform strictly to IEC standards to ensure the motors are fully interchangeable. The terminal box has been enlarged to make it easier to connect to the mains supply. The bearings are permanently greased for frame sizes up to 225 mm, leading to reduced maintenance costs.

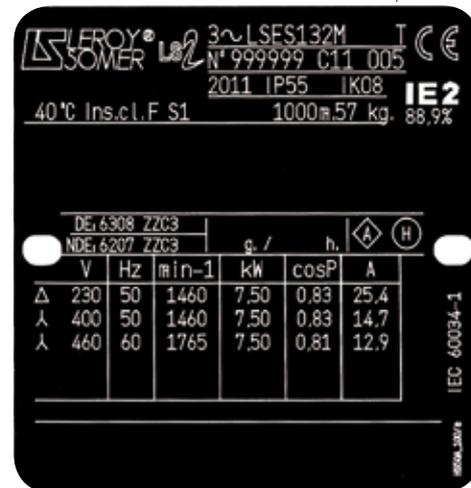
The new nameplate is extremely easy to read and the information stated on it is very clear.

Availability of motors with options on short delivery

Leroy-Somer guarantees very short delivery times for motors affected by the Directive and also for the numerous configurations with options such as special flanges and terminal boxes, auxiliary terminal boxes, customised fan covers or integrated drive, etc.

The LS3 motor range

For even better energy savings, Leroy-Somer offers a variety of drive solutions. In asynchronous technology, IE3 high-efficiency motors, which can be combined with variable speed drives if necessary, are now available. In permanent magnet synchronous technology, the Dyneo® range of variable speed drives can achieve even higher efficiency levels.



New LS2 motors, a complete range

	LSES series	FLSES series	PLSES series
Power	0.75 to 200 kW	0.75 to 375 kW	30 to 375 kW
Number of poles	2P - 4P - 6P	2P - 4P - 6P	2P - 4P
Protection index	IP55	IP55	IP23





Ecodesign of LS2 motors

Leroy-Somer has taken a rigorous approach and demonstrated its strong commitment to ecodesign in its products by drawing up a Product Environmental Plan.

This environmental profile sets out how much CO2 a motor currently consumes. It specifies, amongst other things, the energy consumed during the whole life cycle, from extraction of the raw materials to end of life, including the manufacturing processes, all transportation and product use.

Here is an example of an environmental profile for a typical product, the LSES 132 M, an IE2 electric motor, 7.5 kW, 4 poles, 400 V 50 Hz. The calculations of motor use are based on annual operation of 4000 hours at rated load and a 15-year service life. The efficiency of the 7.5 kW motor at 100% load is 88.9%. At end of life, 98% of the electric motor components are recycled.

Comparing this modelling with an Eff2 motor shows clearly how much better the new range of LS2 motors are in terms of

performance, respect for the environment and energy savings (see table). By way of comparison, the 1565 kg of CO2 saved with the new LSES motor is equivalent to 65 round trips from London to Paris on Eurostar and to the quantity of CO2 absorbed by 1 tree over 10 years (source: Coeur et Forêt).

Impact indicator	IE2 LSES	Eff2 LS	Difference as a %
Non-renewable natural resource depletion (kg Sb eq)	319,47	329,81	-3%
Acidification (kg SO2 eq)	278,06	287,14	-3%
Eutrophication (kg PO4 --- eq)	19,99	20,48	-2%
Climate change (kg CO2 eq)	48023,06	49588,61	-3%
Depletion of the ozone layer (kg)	0,0022	0,0023	-3%
Photochemical oxidation (kg C2H4 eq)	10,48	10,82	-3%



Petersime and egg incubation (Belgium)

Petersime makes high-performance industrial incubators for hatching chicks from fertilized eggs. Since 1995, the company has paid particular attention to optimising the 21-day incubation process.

With the launch of the range of S-Line incubators, Petersime has switched from an open rack to an «all in all out» concept that maintains the heat better thanks, amongst other things, to a computerised system that monitors various process parameters .

After implementing new technologies and the use of new sensors, Petersime obtained results varying between 96 and 97% of chicks hatched. This is 4 to 5% more than the previous range, generating more income for the producers.

Petersime is active in a very competitive market where energy consumption is calculated per hatched egg. The company has collaborated for many years with Leroy-Somer, who supply them with 1.1 and 2.2 kW LS2 high-efficiency motors, helping Petersime maintain a competitive edge in its market.



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Leroy-Somer, energy expert and leader in drive systems, is offering the most innovative high performance eco-tech solutions:

IE2 high efficiency and **IE3 premium efficiency** motors asynchronous and **Dyneo**® super premium permanent magnet synchronous variable speed drive systems.

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Variable speed drives for high-performance applications

An induction motor turns at a given speed according to the number of poles, the frequency and the mains supply voltage. The drive, made up of power components and an integrated control system, will vary the motor shaft speed of rotation.

Energy savings

By using a Leroy-Somer drive with intrinsic efficiency of as much as 98%, the motor speed is adapted to the application's actual needs. The drive acts directly on the motor power and can therefore decrease pressure losses and reduce energy consumption.

The energy consumption will vary according to the type of application and profile of the driven load. A distinction is usually made between load at constant torque for conveyor belts, load at linear torque for screw compressors, and load at variable torque for pumps and fans.

The payback period for the acquisition of a motor-drive unit can prove to be very quick. For example, for centrifugal applications such as pumps and fans, for which the power varies as the cube of the speed ratios, a reduction of 50% of the speed of rotation leads to an energy saving of about 85%!

In the case of a fan rated at 75 kW, controlled by a Unidrive SP drive and with an average load factor of 50%, the payback period after using variable speed will be 4 months (see boxed text).

Control system and speed regulation

In addition to contributing significant energy savings, the drives are particularly efficient at managing certain specific movements and facilitate exchange of data, for example for monitoring production. The various phases of

motor operation (starting, acceleration, regulation, deceleration and stopping) are controlled using algorithms for servo-control of the frequency and control of the current.

This control can be in open loop mode with the motor speed defined by a reference input (voltage, current, etc). Alternatively this control is in closed loop mode and the speed reference is corrected continuously according to an actual measurement of the speed taken at the motor shaft using an external sensor.

Variable speed does of course lead to improved management of start/stop cycles as well as acceleration and deceleration. This «softer» operation can reduce fatigue in the transmission's mechanical components, prolong their life and hence increase the intervals between maintenance visits.

Varmeca - Improving efficiency at Thames Water (England)

The need: In the context of waste water treatment, the sludge thickening system at the Thames Water plant in Swindon (UK) suffered numerous disruptions leading to frequent downtime. According to the German pump manufacturer Seepex, the faults originated from the mechanical drive in the pump's drive system being used at too high a speed.

The proposed solution: Seepex proposed replacing this belt and pulley system with a Varmeca 30 variable speed drive along with a new gearbox. Seepex installed an automated ultrasound system that can vary the speed of the pump according to how thick the sludge is.

Key points: As Trevor Hockley of Seepex explains, «the new system increases pump efficiency by eliminating poor mechanical efficiency, while preserving volumetric capacity. We predict a reduction of 10% in energy costs after eliminating the belt and decreasing the motor speed, since it now runs at the speed required by the flow of thickened sludge.»



Energy saving, a complete range of controllers and drives

Return on investment in variable speed

Example with a fan:

Power 75 kW
Fan operation: 8040 hrs/year
Average load factor: 50%

Results: €

Annual saving on consumption: 180,871 kWh
- Monetary saving: €€ 12,661 *
- Capital investment for drive: €€ 4,500
- Return on investment: 4 months



Flow variation with dampers

5 | 2 | 5 | 6 | 9 | 0 | kWh

3 | 4 | 4 | 8 | 1 | 9 | kWh

Flow variation with variable speed

*On the basis of €0.07kWh



Whether in a cabinet, built-in, or close to the motor, Leroy-Somer controllers and drives offer a wide variety of solutions to suit different installations.

Digistart D3 :

Electronic controller, used to manage transient phases in induction motors.

23 to 1600 A

Integrated bypass up to 1000 A.



Digidrive SK :

Versatile low-cost range with overrating for applications with low overload.

230 or 400 V - 0.25 to 132 kW



Unidrive SP :

Universal drive, used to control all AC motor technologies (asynchronous motors, servomotors, synchronous magnet motors, etc).

230 or 400 V - 0.37 to 1900 kW



Proxidrive :

IP66 drive, standalone, mounted without a cabinet, for installation close to machines, washable with a high-pressure cleaner.

230 or 400 V - 0.37 to 7.5 kW



Powerdrive :

High-power drive with a modular concept, allows optimised construction by integrating only those functions required by the application.

400 V or 690 V - 45 to 2800 kW



Varmeca :

IP66 drive, built into the motor, with integrated protection and local commands.

230 V or 400V - 0.25 to 11 kW



Permanent magnet synchronous solutions, innovation and efficiency

Dyneo® combines the whole range of permanent magnet technologies with those of variable speed. These solutions achieve unrivalled efficiency over all speed ranges and generate extremely quick returns on investment. Very compact, they are easily integrated in all systems, with exceptional performance despite having the smallest dimensions on the market.

Construction

Unlike the AC induction motor rotor, the Dyneo® motor magnetic flux is not caused by the stator but is directly created from a set of permanent magnets inserted in the rotor.

Energy savings

In the case of the induction motor, the rotor speed of rotation is less than the stator frequency. With the permanent magnet motor, the magnetic flux remains synchronous

with the frequency induced by the stator. Whereas the induction motor rotor losses represent close to 1/3 of the total losses, the Dyneo® motor rotor losses become negligible.

At rated speed, motors in the Dyneo® range have noticeably better efficiency than high-efficiency induction motors.

This efficiency gap becomes even more significant when operating at less than rated speed, which is by definition the case in variable speed applications!

The payback time compared to a conventional solution is usually very quick.

Torque and speed performance

By permanently maintaining the stator position at 90° of the magnetic flux, the Dyneo® solution guarantees optimal torque over the whole speed range, without derating or forced ventilation and can achieve speeds of around 5500 rpm, demonstrably higher than traditional technologies. The Dyneo® solution is particularly effective for applications requiring strong torque at high speeds.



Industrial refrigeration - significant reduction in electricity bills (Ireland)

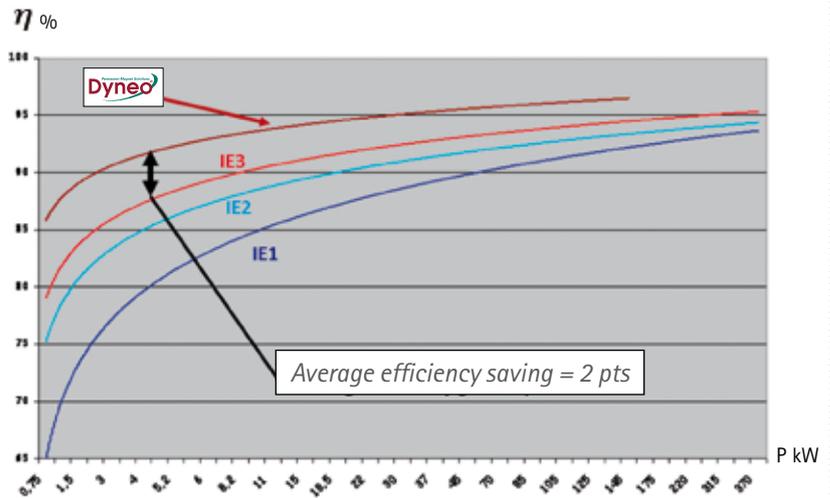
A large food production factory, located in the county of Cork, processes around 112 tons of meat a day. During the refrigeration process, a certain percentage of this meat is lost through evaporation.

NH3, a company specialising in industrial refrigeration, has developed a system that guarantees a low meat weight loss and thereby even improves the quality of the end product.

For this food producer, NH3 installed two Mycom compressors equipped with Dyneo® permanent magnet motors in conjunction with Powerdrive variable speed drives which together constitute the heart of the 2400 kW system. This system works with ammonia, which does not deplete the ozone layer and significantly reduces the factory's CO2 emissions. For Johnathan Ball, NH3's general manager, «the drive system associated with variable speed proposed by Leroy-Somer offers considerably improved efficiency compared with standard motors. It is the best solution to obtain the energy efficiency required by the factory».

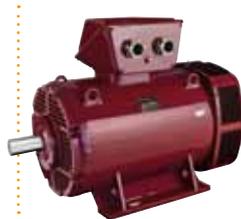
Joe Kraemer, contract manager at NH3, is equally satisfied with the contribution made by Dyneo® technology: «It was an ambitious project and a number of innovations were necessary. It's the first time we have used Dyneo® permanent magnet motors with variable speed control on the compressor Mycom and it's working really well».

Motors in the Dyneo® range are designed to turn more quickly than induction motors, which allows the motor speed to be adapted to the speed of the machine to be driven, by eliminating transmission devices such as gearboxes and increasing the performance of the machine to be driven, while increasing its speed.



The graph compares the efficiency of 1500 rpm machines supplied by a variable speed drive, running at full speed and at rated torque.

The Dyneo® motor series



LSRPM

0.75 to 300 kW –
375 to 5500 rpm

The LSRPM series of motors has been developed using an IP55 IEC mechanism with aluminium frame. Strict compliance with IEC standards make it simple to mount and integrate in a wide variety of machines. The first applications targeted are those dealing with fluid transportation, in other words centrifugal applications such as fans, compressors or pumps but also machines for processes such as conveying, and processing equipment for grinding, crushing or extrusion, etc.

The weight and dimensions of the LSRPM motor are significantly less than a conventional induction motor with the

same power rating.

For example, a 170 kW AC motor at 4500 min⁻¹ has a frame size of 315 mm, whereas the LSRPM motor with the same speed and power will have a frame size of 250 mm.

PLSRPM

300 to 600 kW –
1500 to 3600 rpm

In addition to the LSRPM range, the new PLSRPM series of motors has been developed using an IP23 IEC mechanism. Just like the LSRPM, the strict compliance with IEC standards make it simple to mount and integrate. The range of available power comes in addition to the Dyneo® IP55 version and ranges from 300

to 600 kW with its areas of application still being fluid transportation, in other words centrifugal applications such as fans, compressors or pumps.

HPM

30 to 70 kW

The HPM is a stator/rotor subassembly designed for manufacturers who wish to simplify, or even eliminate, mechanical transmissions in order to increase the installation's overall efficiency. The HPM can be mounted, for example, in place of a pulley (overhanging mounting on the machine shaft, compressor screw, etc).

PM geared motors

250 to 23,000 N.m

Leroy-Somer offers high-efficiency geared motor series, the result of combining new-generation 3000 range gearboxes with LSRPM permanent magnet synchronous motors.

In addition to the energy savings offered by the Dyneo® technology, the helical teeth gear technology can be used to obtain mechanical efficiency of more than 95 %. This facilitates integration close to the drive axle and therefore eliminates the intermediate devices (pinion, chain, belt pulley), resulting in additional savings of 15 to 20% in the operating mechanism's efficiency.

Promens optimises one of its extrusion lines (Denmark)

The replacement of a mechanical drive, belt and pulleys with a permanent magnet motor has led to a reduction in the extrusion line's operating costs.



With its 47 production sites in Europe, North America, Asia and Africa, the Promens group is one of the biggest manufacturers of plastic materials worldwide. The group mainly produces a huge range of packaging and containers for the food processing, cosmetics, chemical and pharmaceutical industries. The companies in the Promens group use various production methods, such as injection and blow moulding, thermoforming and rotomoulding.

Promens Medical Packaging in Langeskov on the island of Fionie is the only company in the group to specialise in sterile perfusion bags and plastic bottles for intravenous use, products which impose stringent requirements in terms of hygiene and production.

In total 24 automated blow moulding lines run day and night at Langeskov to produce sterile perfusion bags and plastic packaging. The plastics are produced by a series of extrusion lines which have already been in service for several years.

«The majority of our extrusion lines work with the original variable speed electric motors, a somewhat outdated technology. Partly because the old motors use more electricity, and also because servicing

and maintenance have become very expensive», according to Morten Schytte, maintenance manager at Promens Medical Packaging A/S.

Therefore, when Promens had to renovate one of its extrusion lines which needed a mechanical drive, the choice was made to use an 11 kW LSRPM solution with an electronic variable speed drive.

This solution was chosen because it would allow energy savings of 40% or more, and

because the costs of upgrading and maintenance could be halved.

The LSRPM solution is particularly profitable at low load, for it is then that the LSRPM motor works at maximum efficiency. During the production phase, consumption fell from 3 kW to less than 1 kW.

Up to now, Promens of Langeskov has only changed the motor on one extrusion line and they envisage replacing the other electric motors when they need overhauling.





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Optimising the complete system

On the hunt for additional energy savings

As stated by CEMEP (European Committee of Manufacturers of Electrical Machines), improving the efficiency of fixed-speed motors (high-efficiency motors) can achieve 10% of an application's overall energy-saving potential whereas with variable speed, more than 30% of the total potential can be achieved! The remaining 60% potential savings rely on a global analysis of the machine and drive system.

On the basis of this statement, Leroy-Somer is offering its OEM customers a collaborative, structured approach, the «Systemic approach» which aims to analyse the whole machine as well as the relationships between the various components. It encourages recourse to innovative solutions and gives the customer a competitive edge in terms of performance, lower production costs and improved efficiency.

Leroy-Somer, a key player in mechatronics

The very term bears witness to the continuous evolution of Leroy-Somer's business. In the beginning, motor manufacturers talked about

motor power and shaft extensions. In the early 1990s, the emergence of power electronics combined with the ruggedness of the induction motor transformed Leroy-Somer's product offer by opening up new opportunities for the use of variable speed. It also encouraged the appearance of opportunities not only concerning the motor environment (control system, regulation, communication, etc) but also involving the intrinsic motor structure, such as permanent magnet synchronous technology. These days, Leroy-Somer's technicians and engineers are experts in mechatronics.

Mechatronics simplifies optimum integration of various drive technologies by combining them with mechanical, electronic and automated system solutions, and also communication solutions.

By simplifying decentralised management of control systems and communication between machines, mechatronics offers greater flexibility on production lines and increases their productivity.

Expertise in technologies

Leroy-Somer's technology offering is a complete, innovative offering, encompassing asynchronous and synchronous permanent magnet technologies, and even brushless servomotors. It satisfies the specific requirements of each customer's business.

Asynchronous technology is thus particularly effective for motion control, torque control and drive speed control where the aim is to convey solid or liquid materials.

Dyneo® permanent magnet synchronous technology satisfies the requirements for continuous duty, space and weight saving as well as a reduction in energy consumption. The applications targeted are, for example, ventilation, pumping, compression, conveying, grinding, etc.

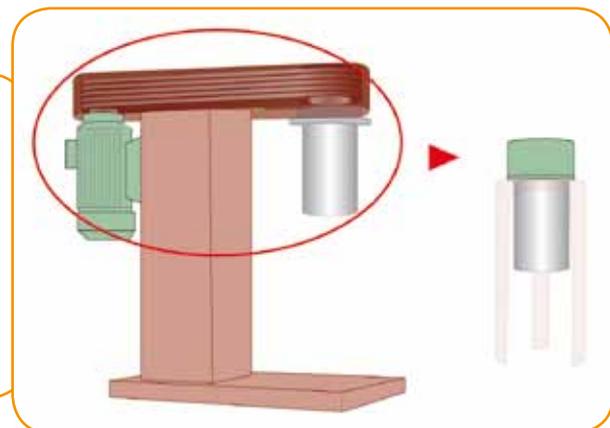
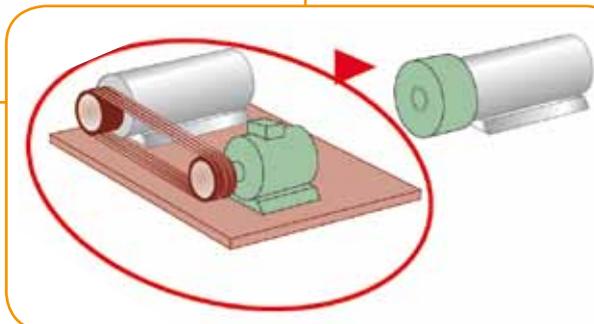
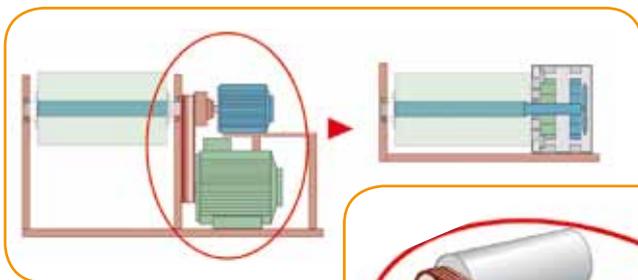
Finally, servo technology corresponds to applications with strong dynamics and significant transients. It satisfies needs for accuracy, space and weight saving. It is more aimed at applications such as transfer systems, digital lock axis control, position control, etc.

Expertise in activity sectors

Faced with rapid changes in Leroy-Somer's core businesses: variable speed, new drive mechanism technologies, new communication methods, energy efficiency, the company provides bespoke training for all its sales engineers.

Leroy-Somer's specialists are completely au fait with their customers' businesses, for example refrigeration, handling, compression, pumping, ventilation, metallurgy, packaging, food processing, etc. These experts have the skills to totally optimise a machine or a process by choosing the best-performing drive system for the given application.

SYSTEMIC
APPROACH



Modernising a Cameron rotary press for CPI Brodard & Taupin (France)



Harry Potter, Da Vinci Code, Twilight, etc - a host of literary best-sellers that have come off the press at CPI Brodard Et Taupin based in the Sarthe department in France. To respond to the explosion in sales of certain best-sellers and fulfil their print runs in the allotted time, the printing house is bringing itself up to date and modernising the second Cameron printing press by once again calling on the services of Leroy-Somer.

The need

To manage a variety of small-volume orders or conversely printing one-off print runs in record

time. To increase operating rates by reducing «range» changeover times. To adjust needs for raw materials and make setup phases more reliable when changing a book format.

The proposed solution

The Leroy-Somer solution (Unimotor FM, Unidrive SP and SM Synchronisation solutions) allowed 5 axes to be digitally locked in position on the running paper web. Exchanges with the control system and supervision system were via the CANopen fieldbus. This offer allowed us to meet the demands of the application, i.e. to control the axes as quickly as possible and with maximum accuracy. The maximum machine speed is 500 m/min with a maximum production capacity of 250 books/min.

Key points:

- Guaranteed performance thanks to a 100% Leroy-Somer mechatronic solution: drive mechanisms, electrical cabinet and communicating digital lock solution.
- A single supplier for an optimal drive system.

Opinion of Mr Delaunay, Maintenance and New Work Manager at Brodard & Taupin:

«The project was created following a multitude of format changes on our Cameron processes. Since setup times and control of our raw materials had become a priority, we looked at technological improvement solutions replacing in particular all the gearboxes with synchronised drive mechanisms. On this project we therefore needed to redefine the operating mechanism in part of the machine and to determine the data necessary for sizing motors. Due to the complexity of the operating mechanism and the high levels of performance called for, we wished on the one hand to have a partnership with the motor manufacturer and on the other hand, a non-proprietary system which would allow us to make modifications ourselves. The Leroy-Somer

solution was chosen because of the safety it offered, being based on a tried and tested standard, and the assurance of technical support from the project design stage through to commissioning. The follow-up and involvement of Leroy-Somer's staff ensured the project's success.»

A complete offer of servo drive systems

Leroy-Somer global servo solution meets the needs of the demanding industrial processes.

Applications with transient cycles

Unimotor hd is the new range of servomotors which, in conjunction with the Digitax ST drive range, constitutes the solution for dynamic drive systems with significant transients. Ultra-compact and powerful, it is ideal for applications which require very high torque during fast acceleration and deceleration.

The ideal combination of Unimotor hd and Digitax ST cover a torque range from 0.72 to 18.8 N.m, with maximum torque capacity up to 300% for strong dynamics.

Applications with continuous cycles

The Unimotor fm range, controlled by the universal drive Unidrive SP, is ideal for continuous movements. It delivers torque of 0.75 to 136 N.m. The rotor has been specially designed to offer excellent shaft rigidity, a very high radial and axial load capacity and the possibility of offering a choice of several shaft diameters.

The Dynabloc range of servo gearboxes completes the servo offer. It includes output torque up to 5000 Nm and reduction ratios of 1.25 to 1000.



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Reducing CO₂ emissions and conserving the environment, cutting electricity consumption and boosting the competitiveness of industry through **innovation**.

Leroy-Somer, energy expert and leader in drive systems, is offering the most innovative high performance eco-tech solutions:

IE2 high efficiency and **IE3 premium efficiency** motors asynchronous and **Dyned®** super premium permanent magnet synchronous variable speed drive systems.

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