LS news

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VARIABLE SPEED SPECIAL

Europe is changing to variable speed

Today, 30% of the electricity consumption in Europe is used by systems driven by an electric motor. When it is known that variable speed could enable the energy consumption of these systems to be reduced by 20 to 50%, it can be understood why Europe is encouraging implementation of this new technology. Item with Antonia Mochan, spokesperson for the European Commission for Science and Research.

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Where is the use for variable speed in Europe?
Antonia Mochan: "Today, in Europe, around one motor out of ten uses variable speed technology – the scope for progress is still great!"

Which are the sectors where the potential savings are greatest?
"The applications that benefit most from variable speed are lifts, conveyor belts, pumps, compressors, fans, and the like. All sectors that use this type of application can benefit from it."

Can a figure be put on the energy savings achievable in Europe using variable speed?
"Motorised systems account for 69% of the electricity consumption of European industry. Depending on the machines and processes, a variable speed motor can reduce energy consumption by 20 to 50%. On the European scale, it is estimated that widespread use of variable speed could enable consumption to be reduced by 50 billion kWh per year, that is, the equivalent of the electricity consumption of the entire Czech Republic!"

What is being done in Europe to encourage companies to change to variable speed?
"As part of the Intelligent Energy for Europe (IEE) programme, several initiatives are in hand to encourage industries to improve their energy efficiency. The European "Motor Challenge" programme is one of these. It was

launched by the European Commission in February 2003, to assist companies who so wish to improve the energy efficiency of their drive systems, in particular through changing to variable speed.
A company that undertakes on a voluntary basis to participate in the Motor Challenge programme is asked to draw up an action plan in which it determines the measures it intends to take to reduce its energy consumption.

The Motor Challenge programme is in the process of being extended to the new member states and the candidate countries, such as Bulgaria, the Czech Republic, Romania, Poland and Hungary, through the project called "4EM" for Energy Efficient Electric Motor Systems.

Are there any European measures that specifically concern variable speed?
"There is no specific European policy on the subject. But national initiatives have already been set up in Italy, France and the United Kingdom, to financially encourage the change to this technology. The results are encouraging, and the experts are optimistic for the consequences."

What is the future of variable speed in Europe?
"Variable speed can generate substantial energy savings, and represents an important way of achieving the target of 20% reduction in energy consumption in Europe by the year 2020. The countries that are encouraging the use of this technology have already reaped appreciable results. Elsewhere, it remains to be realised that the investment represented by the change to variable speed is quickly made profitable – it starts with the first kWh saved..."

The action plan for energy efficiency

At the end of 2006, the European Commission adopted a new action plan aimed at reducing the energy consumption in Europe by 20% by the year 2020, compared with the level of consumption in 1990. This "Action plan for energy efficiency", deployed from 2007 to 2012, should, by the year 2020, reduce CO2 emissions by around 780 million tonnes per year, and costs by more than 100 billion euros per year. Its aim is to help the European Union reduce its dependency on energy exporting countries, limit pollution and contribute to the worldwide effort against global warming.

Intelligent Energy for Europe

For a number of years, Europe has been investing in the development of renewable and low carbon content energies, through a programme called "Intelligent Energy for Europe" (IEE). After a first edition in 2003-2006, the programme was renewed for the period 2007-2013 (IEE II). Its aim is to financially support projects and actions focusing on energy efficiency and rational energy use, new and renewable energies, and energy in transport. IEE II in particular supports projects aimed at removing "non-technological" obstacles to a more responsible energy behaviour, in particular through actions for raising awareness and training, and transfers of skills and best practices.

The relentless rise in power of variable speed

Through the experience acquired over several decades, Leroy-Somer has become the indispensable specialist in variable speed, first by developing the LSK ranges of DC motors and then anticipating the advances related to the rapid expansion of power electronics with the LSMV motors, among others. Today, Leroy-Somer is once again in the forefront of progress, offering new ranges of permanent magnet synchronous motors.

The '80s. The requirements specific to each business sector evolve. The markets become segmented. To guarantee the performance of driven machines, Leroy-Somer offers new specific ranges capable of operating in the most severe environments (humidity, corrosion, high temperatures) or in explosive atmospheres (ATEX ranges).

But this type of environment requires the use of totally enclosed motors – for example an open drip proof motor on the bridge of a ship would quickly deteriorate when exposed to heavy seas! And this restriction, amongst others, limits the development of variable speed using traditional DC technologies.

Advances in induction motors

At the end of the '80s, advances in power electronics combined with the robustness of the IP 55 induction motor, a mass-produced enclosed motor, opens new horizons. It is during this period that Leroy-Somer sets up an Industrial Electronics Division (DEI), specialising in the production of high-performance variable speed drives and starters. So it is that the DIGISTART starters and UMV3301 drives come into being. Varmeca will be the first integrated drive coming from this new division and it will quickly become very successful.

Leroy-Somer's capacity for innovation leads to the design of the first range of AC motors entirely dedicated to variable speed. Its name: LSMV. Designed right from the start to be used in conjunction with a drive, the LSMV motor in particular guarantees use at constant torque over an extended speed range, and full compatibility with Leroy-Somer drives. With a mechanical construction identical to that of a fixed speed motor of the same power, it is fully interchangeable. It requires no de-rating, and operates without forced ventilation.

Magnet revolution

The '90s. The industrial development of certain components opens the door to the development of new technologies, such as permanent magnet motors.

To understand the progress represented by permanent magnet motors, let's return for a moment to the AC motor. By using electric current to produce an electromagnetic field rotating at a speed proportional to the frequency of the supply voltage, the AC motor leads to temperature rises that are sometimes large, with consequent losses, i.e. a relatively high power consumption.

By modifying the frequency of the AC motor, variable speed drives modify the speed of the rotating field of the stator, and therefore the speed of rotation of the motor shaft. In addition, by integrating control and programming functions into the drive, it becomes possible to provide control for increasingly complex industrial processes.

In the new motors developed by Leroy-Somer, the magnetic flux is created by a series of permanent magnets inserted directly onto the rotor. The use of permanent magnets minimises rotor losses, the temperature rise is consequently smaller, creating a significant improvement in the overall efficiency of the machine. This type of motor works as a matter of course with a variable speed drive.

For a long time, the cost of the magnets was the main brake to the development of this type of motor. However, over the last 15 years, the quality of magnets has improved and their production cost has fallen, with the result that, today, the production of motors with magnets is becoming a competitive alternative to traditional motors. The Neodyme magnet, for example, compared with the previous generations (ferrites), has undeniable technical advantages, such as much greater magnetic power and better stability in extreme temperatures.

In creating the HPM (Hybrid Permanent Magnet) motor around ten years ago, Leroy-Somer was the first manufacturer to form an alliance with machine manufacturers, world leaders in their sector, in order to bring high-power industrial applications to further the development of permanent magnet motors. Today, the LSRPM (Radial Permanent Magnet), one of LEROY-SOMER's DYNEO solutions, makes synchronous magnet technology accessible to the whole market.

The advantages of variable speed

Energy savings

Reducing the speed of a motor to adapt it to the actual requirements of an application generally proves highly profitable. So, for centrifugal applications such as pumps or fans, where the power drawn varies as the cube of the speed ratios, a 50% reduction in the speed of rotation results in an energy saving of approximately 85%.

Improving the efficiency of fixed speed motors, i.e. reducing losses, makes it possible to achieve 10% of the total savings potential for an application, whereas variable speed makes it possible to achieve over 30% of the total potential!!! The remaining 60% potential savings are rarely investigated. The adaptation of a machine to variable speed is however a unique opportunity to re-engineer the drive system with a view to optimising the motorisation or application assembly, in order to make considerable energy savings and very often reduce the production cost of the machine. The methodology used by LEROY-SOMER fits into a specific approach called "Systemic Approach" (see text in box).

Improvement in productivity

The introduction of variable speed within an industrial process very often makes it possible to update the process itself. So, while the supply of running water at constant rate and pressure requires large tanks enabling the variations in demand over the same day to be managed, a process based on speed variation enables continuous adjustment of supply to demand, rates to the volumes to be treated, and elimination of the use of tanks and the related costs. In this case, variable speed enables the overall productivity of a site to be improved while reducing the costs of the installation.

Saving Potentials of Motor Driven Applications

Europe	Energy Saving potential	Leroy-Somer solution
Energy Efficiency Motors	10 %	Eff.1 Motors
Electronic variable speed control	30 %	Variable speed : - Asynchronous motors LSMV - Permanent magnet motors LSRPM or HPM
Mechanical systems optimization	60 %	Customer process Systemic Approach

The Systemic Approach

For whom is the Systemic Approach (SA) intended?
The Systemic Approach is intended for machine manufacturers, open to a redesign of their machine.

What is a Systemic Approach?
It is a structured approach enabling a Leroy-Somer customer to specify their true requirement, look for different technical solutions that satisfy it, and choose the best technical and economic solution. As opposed to a product offer, the SA takes the whole of the customer's system into account.

Why a Systemic Approach?
The SA encourages innovative solutions that most often give the customer a competitive advantage in terms of performance, cost and/or energy savings.

Flexibility

Speed variation naturally facilitates better control of run/stop cycles as well as accelerations and decelerations. This more flexible working reduces fatigue of mechanical transmission components, increases their service life and therefore enables the frequency of maintenance operations to be reduced.

Extended functionalities

Advances in industrial electronics mean that, besides their primary function, the drives can provide a series of new functionalities that open the way to regulation of processes:

- System control: ability to modify drive and application parameters using PLCs and a fieldbus
- Interfaces giving user-friendly access to the parameters and operating data make commissioning easy
- Supervision: the drives continuously supervise the process they are controlling and can take action in the event of a fault or irregularity (trip, self-diagnosis, etc.)
- Movement management: the drives prove particularly efficient for managing certain specific movements, such as positioning, axis synchronisation or lift control for example.

Simplification of installations

The combination of industrial electronics and speed variation allows a great diversity of responses to be offered, depending on installation type. Each solution is designed to make best use of the advantages of decentralisation whilst providing a reduction in the overall cost of the installation: integration of control at motor level or close to the application, simplification of wiring and/or elimination of control cubicles, elimination of coupling devices, etc.

Leroy-Somer and speed regulation

Today, flux vector control makes it possible to satisfy all requirements. The technological choice between open loop and closed loop will be made according to the constraints of the application and the degree of accuracy required.

Depending on requirements, Leroy-Somer offers various ranges of frequency inverters:

Open loop vector control only:

Digidrive SK: Versatile, economical range with overrating for applications with a small overload.

Open or closed loop vector control:

- Unidrive SP: Universal drive, can be used to control all AC motor technologies (induction, servomotors, permanent magnet synchronous motors, etc.).
- Proxidrive: IP66 drive, self-contained, mounted without an enclosure, for installation with machines, washable with a high pressure cleaner.
- Powerdrive: High power drive of modular design, allows an optimised construction by integrating only the functions necessary for the application.
- Varmeca: Sealed drive, built into the motor, with integrated protective devices and local controls.

U/F or Flux Vector control ?

The various operating phases of a motor (starting, acceleration, regulation, deceleration or stopping) are controlled using the control system integrated in the frequency inverter and independent of the power circuit. Further more, this control can be achieved in Open loop. In this case, the speed of the motor is defined by an input reference (voltage, current, etc.) without taking the actual speed of the motor into account. In the case of Closed loop control, the reference for the speed is continuously corrected according to an actual measurement of the speed taken from the motor shaft using an encoder.

Digidrive SK

Unidrive SP

Proxidrive

Powerdrive

Varmeca

The control system is generally based on two distinct principles: U/F control or Flux Vector control.

U/F control open loop

To provide speed variation of a motor at constant torque, U/F control varies voltage and frequency proportionally. This control is easy to implement and exhibits good overall performance but has regions of instability including a region of slippage of the motor under load at low speed (< 10 Hz).

In addition, as the frequency is increased and reaches the base frequency of the motor, the voltage supplied to the motor reaches the mains supply voltage. It is possible to continue to increase the frequency but the motor then operates at constant power and the torque decreases with the speed.

U/F control open loop

For applications needing accurate control at low speed, it is possible to use a closed loop system requiring implementation of a more sophisticated and therefore more expensive, solutions.

Open loop flux vector control

Due to the increased calculation capacity and execution speeds of new microprocessors the flux vector control guarantees constant flux irrespective of the speed demanded.

Advantages of open loop:
- Very good control of transient speeds (acceleration and deceleration phases)
- Better stability of motor speeds
- During the starting phase, the drive software automatically adapts the U/F ratio continuously in a predefined manner and so eliminates the motor slip region. Using this technology we can obtain an accurate control of the rated torque from 1 Hz.

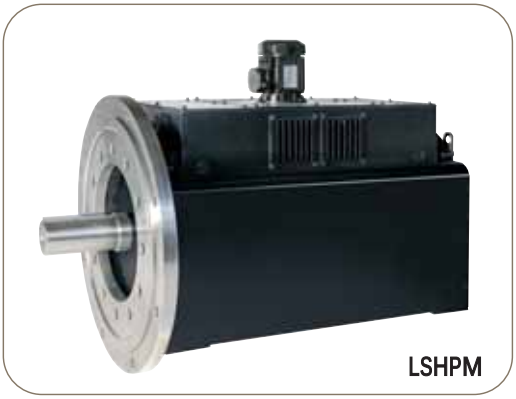
For certain applications control at low speed is essential, the flux vector control eliminates the need to use closed loop U/F control and therefore reduces the cost of the installation.

Closed loop flux vector control

Some applications require control of the speed with absolute accuracy, for example, a gantry crane with a vertical movement where it is required to hold a load stationary using the motor torque. This is not possible in open loop.

Advantages of closed loop:
- Control of the speed from zero to the rated speed with absolute precision depending on the accuracy of the encoder
- Control and regulation of transient torques in motors and generators
- Better dynamic response. Even with induction motors, extremely short acceleration and deceleration times are obtained, compared with use in open loop
- Possibility of automatic position or synchronisation control using digital cards that may or may not be integrated in the drive.

Dyneo solutions
A concentrated technology package for a new generation of motors



LSHPM

To meet the expectations of OEM customers or end users, drive system solutions must be both highly efficient with a quick return on investment and also modular with a high power to volume ratio..

Whether it is a question of developing new machines or modernising existing processes, synchronous magnet technologies satisfy these requirements in full. This has led Leroy-Somer to develop a new generation of motors currently consisting of two specific ranges, having different technical characteristics and mechanical adaptations. Grouped under the generic name “Dyneo”, they bring together the most modern technologies together with a very high level of efficiency and exceptional compactness.

Mass-produced and predefined in a catalogue, the LSRPM series makes synchronous magnet technology accessible to the great majority. It is a series that will be progressively expanded to solutions suited to difficult environments (explosive, corrosive, etc.). In parallel, Leroy-Somer is developing the LSHPM series, synchronous hybrid permanent magnet motors, square in shape, and easily interchangeable with DC motors. LSHPM solutions are already being produced in the form of stator/rotor assemblies aimed at advanced motor-machine integration.

In the coming years, Leroy-Somer anticipates that over half its product range will consist of variable speed products, almost 30% of which will come from these new synchronous permanent magnet technologies.

The new series of LSRPM motors

Designed on an IEC, IP 55 standard, with an aluminium housing, the LSRPM series opens the way to a wide range of applications with permanent magnet motor technology. Compliance with IEC standards makes it easier to install and integrate into the most diverse machines.

The first applications targeted are of course those related to fluid transport, i.e. centrifugal applications such as ventilation, compressors or pumps but also machines for processes such as conveying and transformation equipment used in grinding, crushing, extrusion, etc.

LSRPM 225

Advantages of the LSRPM motor

Efficiency

In Leroy-Somer's various markets, machine efficiency is an essential priority. Through its innovative design which substantially reduces losses at the rotor, this motor, designed to work with Leroy-Somer drives, is highly economical in terms of energy. Compared with traditional solutions, its efficiency remains very high over the entire speed range, including low speeds.

Performance

A major advantage of the LSRPM motor, used in conjunction with the drive, is that it guarantees a constant torque over the entire speed range, which is also more extensive than in traditional solutions, since the LSRPM can run at speeds considerably higher than 3000 rpm. This characteristic is of interest when the speed of the driven machine can be increased to improve its performance.

Integration into machines

Compactness: For the same power, the LSRPM motor is distinctly more compact than a traditional motor. Its reduced size makes it easier to integrate into customers' machines, the size of these also being smaller.

Reduced weight: The design of this motor with an aluminium housing makes it possible to obtain very high power/weight ratios. For example, for a power of 250 kW at 3000 rpm, induction motors with a cast iron housing are traditionally found, the weight of these being markedly greater than 1 tonne, whereas the weight of the LSRPM motor at an equivalent power is less than 400 kg!!!

Simplified mounting: The reduction in size and weight, as well as the potential increase in speed, opens new prospects for mounting and for various applications, enables the elimination of certain transmission devices (belts, coupling accessories, gears).

Reduced maintenance

As a result of the low losses at the rotor, the operating temperature of the bearings decreases and the lubrication intervals are significantly extended.

Permanent Magnet Solutions
Dyneo®

Technical characteristics of the range of LSRPM motors

- Radial permanent magnet (LSRPM) rotor technology
- IP 55 synchronous motor
- Aluminium alloy housing, in accordance with IEC 60034
- Power: 0.75 to 400 kW
- Torque: 1 to 1400 Nm
- Speed ranges: 1 to 5,500 rpm
- Frame size: 90 to 315 mm
- Designed to function with Leroy-Somer drives

Straddle Carrier: Electrical Innovation

Goods handling is to the global economy what the cardiovascular system is to the human body. The entire global economy could not survive without the continuous organized flow of goods from primary production centres to the final points of sale. Every year more than 9 million TEUs are handled worldwide (TEU stands for Twenty-Foot Equivalent Unit, the standard measure of volume for ISO containers).

Application

In intermodal terminals, containers are carried from the dock to the stacking depot and vice-versa by a Straddle Carrier. This mobile bridge crane, which is more than 10 m high and 5 m wide, is operated by a driver from a control cab situated at the top. It can move at over 30 km\h and is used to hoist, lower, transport and stock the containers.
Previous Straddle Carriers were powered by hydraulic or hybrid electric-hydraulic systems, which were used to control the spreader for hooking and hoisting containers, and to move the vehicle. There is a growing demand by leading intermodal terminal operators for quieter machines, with lower maintenance costs and low energy consumption. Hydraulic systems cannot meet these demands, which can only be satisfied by managing all Straddle Carrier functions electrically.

Problems solved

- Low noise levels
- Low energy consumption
- Low maintenance costs

These were the objectives that guided the design and development by CVS Ferrari in partnership with Leroy Somer of the revolutionary electric Straddle Carrier. The new CVS Straddle Carrier, fully equipped with electric drive systems to control motion and hoisting, is set to transform the world container handling market.

A new innovative machine:
- Full CAN BUS integrated management
- Internationally patented system for high energy efficiency
- Leroy Somer HPM© Hybrid Permanent Magnet electric motors

integrated in the wheels
- Leroy Somer HPM© Hybrid Permanent Magnet electric motors for hoisting
- Leroy Somer Powerdrive© variable speed drive control system
- Capability to store 1 container over 2 or over 3
- 40 or 50 tons under the spreader

All the objectives of the project, developed in partnership by CVS Ferrari and Leroy Somer, have been achieved, thanks to the perfect mechanical and system integration of the high-efficiency electric power generation system, the 4 electric drive motors, 2 electric hoisting motors, control drives, controller electronics and high-speed communication network: low noise levels, low energy consumption and low maintenance costs.

The drive system consists of 4 HPM electric motors perfectly integrated in the wheel hubs. Two HPM electric motors integrated in the winch drums control all hoisting functions. An electric power generator based on HPM technology is connected to the combustion engine to guarantee high-efficiency electric power generation.

Products

Powerdrive

All HPM electric motors are managed by the Leroy Somer Powerdrive: the modular concept based on a new generation of high-power variable speed drives.
Powerdrive covers a versatile range of up to 900 kW, integrating only those functions required by the application.
Powerdrive consists of a combination of rectifier, inverter and cooling modules, associated with electronic control boards. These modules are assembled on a chassis in stainless steel cabinets specifically designed to fit the dimensions of the CVS Straddle Carrier.
The combination of modules and the choice of liquid cooling mode make it possible to create optimised configurations for the specific application: 6-pulse, multi-output 6-pulse, 12-pulse, regenerative or DC bus solutions are available.
The add-on fieldbus modules can be used to adapt the drive to all control/monitoring systems: Profibus, Canopen, DeviceNet, Modbus, Interbus, Ethernet, etc.

POWERED BY LEROY SOMER

HPM®

HPM® stands for Hybrid Permanent Magnet. It is a Synchronous Variable Speed Motor designed and patented by Leroy Somer. It consists of a stator with a single-tooth winding and a rotor with radially inserted magnets.
The HPM® motor is a significant technological step forward that allows a variable speed solution to be fitted directly to the application mechanics. With more than 10,000 units manufactured to date, the HPM® solution ensures increased efficiency, extraordinary compactness and well-proven reliability.

CVS Ferrari

CVS Ferrari offers the widest range of products in the yard container handling equipment field together with the latest innovations and the most advanced technology. CVS Ferrari combines traditional Italian expertise in the field of mechanical design and innovation with the most modern technology, to create a high quality product of outstanding reliability.

Powerdrive Inverter in stainless steel Cabinet

HPM motor integrated in the wheel hub

HPM motor integrated in the winch drum

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Long-table bending press, hydraulics fitted with a Varmeca motor-drive

For a number of years the Premel company (formerly Premel-Arnaldi Elettromeccanica SA) has been established in Tessin, the Italian-speaking part of Switzerland. Today the company has 33 employees and specialises in various business sectors:

- Production of energy-generation installations: hydroelectric plants and standby generators
- Design, manufacture and operation of automated industrial installations
- Electromechanical workshop
- Manufacture of machines for sheet metal transformation: long-table bending presses

Manufacture of machines for sheet metal transformation

For over 10 years, Premel has been manufacturing BIMA brand long-table bending presses.
Premel designed the mechanism, the electrical control, the hydraulics fitted with a Leroy-Somer Varmeca motor-drive and an automation software system. The length of the machines can be up to 12 m. The maximum thickness of the sheet metal to be bent for steel sheets is 3 mm.

Varmeca, perfect integration

With the use of the Varmeca integrated drive, the existing bank of servo-valves is removed from the bending press hydraulic unit. The electricity costs are reduced accordingly and the service life of the installation is extended. The hydraulics are now marked by fault-free operation and impressive power. The high pressure pump with proportioning control operates only when a shaft is moving.

Hydraulic unit intended for driving sheet metal transformation machines (long-table bending presses) fitted with a motor with integrated frequency inverter, of the Leroy-Somer Varmeca type. All functions, acceleration, braking and the various speed movements are controlled by the Varmeca frequency inverter mounted on the pump motor.

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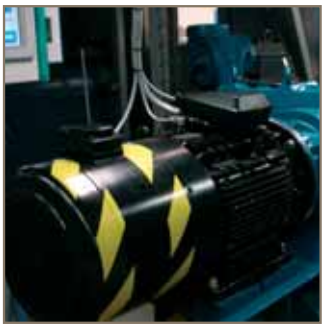
BAXTER: An AC solution for replacing DC motors

Baxter, a world leader in products and services in the health sector, is a company with over 1850 employees in Belgium spread over 3 sites. The main production unit is located in Lessines and manufactures, among other things, bags and tubes used for patients in hospital.

Excellent collaboration between Leroy-Somer and Baxter

For a long time Leroy-Somer Belgium has supplied numerous DC geared motors and variable speed drives necessary for extruders, calendering machines, winders, etc. installed on the site.



For many years, the service subsidiary ACEC located in Leuw-St-Pierre has maintained the machines under an annual contract
DC motors require considerable and fairly expensive maintenance. Each year during the summer, the DC machines are shut down for an overhaul: servicing includes changing the carbon brushes and skimming the commutators, among other things.

As part of a campaign for improving and modernising the machines, Leroy-Somer Belgium offered Baxter a technical solution for reducing maintenance, increasing machine availability and reducing energy consumption.

Replacing the DC motors with an AC solution

As part of the renovation, Leroy-Somer proposed an AC solution for a system of three extruders producing a tube with three casings of different materials in a single operation,. The machines were previously equipped with DC variable speed drives and geared motors.

The new drive consists of three LSMV induction motors controlled by Unidrive SP closed loop frequency inverters.
The LSMV motors have been fitted with an encoder and forced ventilation allowing low speeds to be maintained continuously without excessive temperature rise.

Less maintenance, gain in efficiency

This solution reduces the maintenance to its lowest level: no more need of annual dismantling and re-assembly of the machines to carry out the servicing operations with the major advantage of eliminating the annual summer shutdown. The financial gain is twofold; on the one hand a considerable reduction in direct servicing costs and on the other hand a significant increase in production line productivity through a higher rate of use of the machine.

This DC to AC conversion has also made it possible to reduce energy consumption. First estimates already indicate a saving greater than 7% because of the higher efficiency of the LSMV motors used (specially designed for speed variation) and the associated frequency inverters that are of markedly higher performance than the old DC drive train. The next step in energy improvement could consist of implementing an energy recovery system by connecting the DC buses of each drive used on machines requiring braking.

Baxter
Lessines

The Leroy-Somer variable speed hoisting solution

Leroy-Somer's variable speed hoisting solution is a combination of FCPL VV brake motors, the SP LVG drive and the range of gearboxes. It can be used on the lifting hoists of travelling cranes and on building cranes.

This solution has the following advantages:

- A speed range greater than the traditional multi-speed motor solution
- Operation at constant power over a speed range of 1 to 4
- The same optimum performance as with the DC solution, but without the maintenance costs inherent in this technology
- Reduction of non-productive time through the increased speed and consequently, optimisation of production
- Management of safety devices from the drive
- Power optimisation
- Reduction of mechanical component stress due to a smoother operation (starting, acceleration, deceleration)
- Operational flexibility through the use of a variable speed drive
- Reduction of braking shocks due to the drive's deceleration ramp
- Management of load safety using a closed loop operation (encoder feedback)
- Reduction of electrical components and installed power through the use of the startup ramps

The main components of Leroy-Somer's offer are as follows:

FCPL brake motors: IP23 or IP55 induction motors up to 110 kW specially designed for the variable speed hoisting solution. The type of encoder fitted has been selected to meet the durability and strength requirements of the application.

UNI SP LVG drive: Closed loop vector drive for load hoisting management. The drive includes the function of optimising the maximum speed according to the weight of the load. It also manages the protective devices of the motor and safety system using the encoder. It can also manage certain safety devices of the machine.

Gearboxes: Brake motors and drives can be used in conjunction with the following range of gearboxes: right-angle OT (maximum capacity 10,000 Nm), in line CB (maximum capacity 16,000 Nm) and planetary PL (maximum capacity 70,000 Nm).

This solution is the result of over 50 years' experience in the hoisting field.

Silverson mixers and the Proxidrive

Silverson Machines has been a world leader in high shear mixing technology since its foundation in 1948. With an international customer base and distributors and agents in over 50 countries, Silverson offers unparalleled technical know-how and customer service.

The company produces a wide range of high shear mixers which are used throughout the process industry, particularly food, pharmaceuticals, cosmetics and chemicals. The product range consists of immersion or Batch mixers, external In-Line mixers and high shear powder/liquid mixing systems; Silverson mixers are available in sizes from laboratory scale units capable of handling

volumes as low as 1ml up to 100,000 litre industrial disintegrator systems.

The advantages of Silverson's mixers are speed, versatility and reliability; they can reduce mixing times by up to 90%, and simply by changing the rotor/stator workhead configuration a single machine can perform a number of different tasks, including blending, disintegrating, emulsifying, solubilising, suspending and reaction acceleration. The simple robust construction ensures minimised maintenance and downtime.

Silverson's standard mobile Batch mixers (between 1 and 7.5 kW) are normally supplied without switchgear, leaving it up to the client to undertake installation as required. Increasingly however, clients have specific requirements for their equipment.
Consequently non-standard or even complete custom-built mixing systems are more commonly supplied these days.

In response to this trend Silverson's R& D department has researched the options for provision of variable speed and other electrical requirements, finding Leroy Somer an ideal partner to supply these solutions.

In the past, inverters, and any other electrical components had to be mounted in a stainless steel control box, and due to the nature of the mixer's application, this had to be compatible with washdown hose-proof/weatherproof standards.

Leroy Somer's Proxidrive series offers a self-contained IP66 inverter which is easily integrated with Silverson's systems; it also offers additional features such as the PX secure kit, which allows inclusion of Emergency Stop and other safety features within the package.

Peter Matthews, Silverson's Technical Manager is also impressed with the build quality and reliability of the products; "Leroy Somer provides a compact and versatile solution which allows us to offer an enhanced service to our clients without the on-costs of individually designed and built cabinets and control systems," he comments " reliability is also much better than we experienced with other brands we used in the past."

Silverson has now expanded the use of Proxidrive units to some of their other product ranges, including In-Line mixers. These are used for recirculation of product or continuous, single pass processing. Where customers require mobile units – for example, in a pilot plant or test facility where the mixer may be moved from one vessel to another – the Proxidrive unit, coupled with emergency stop facility and other control functions offers the flexibility customers expect of this type of equipment.

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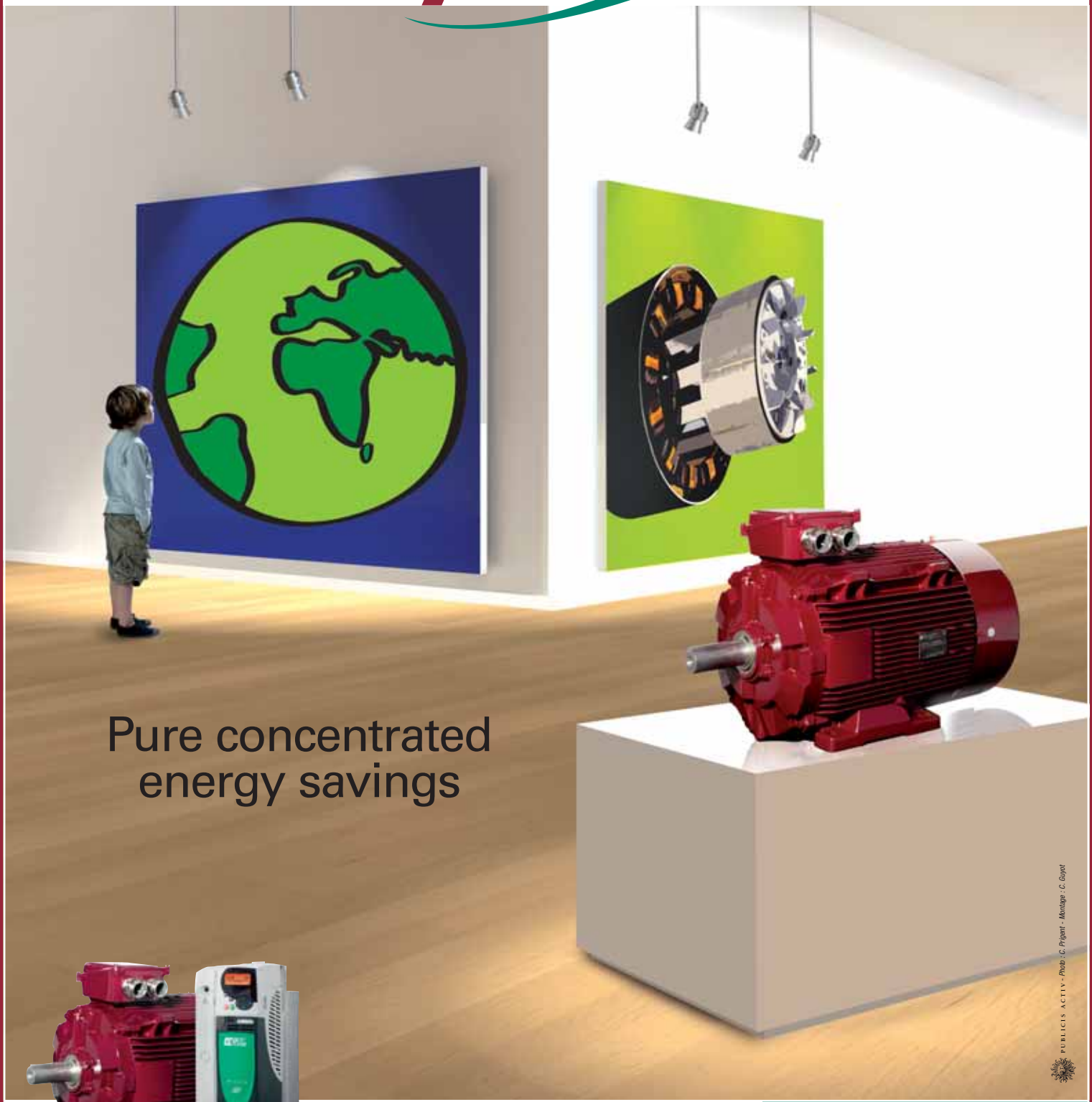

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