

# Dyneo® Solutions

Energy saving  
Process optimization  
Permanent magnet synchronous variable speed

# Dyneo<sup>®</sup> Solutions

## Pure efficiency

Emerson Industrial Automation's Dyneo<sup>®</sup> solutions combine permanent magnet motor technologies with variable speed technologies. Benefiting from more than 15 years' experience, these solutions offer not only tried-and-tested technology, a rapid return on investment, but also one of the most favorable overall costs of ownership on the market. Tests conducted by the Swedish Energy Agency ranked Dyneo<sup>®</sup> motor and drive assemblies best in the high efficiency category.

The latest developments now offer users simplicity of installation equivalent to that of an asynchronous motor, mainly thanks to sensorless control and interchangeability with standard IEC mechanisms.

### **The many advantages of Dyneo<sup>®</sup> solutions**

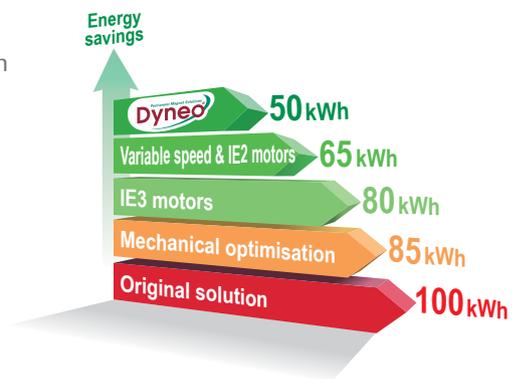
- Proven high efficiency, exceeding requirements equivalent to IE4 and NEMA Super Premium
- Rugged mechanism using the same components as asynchronous motors
- Unrivaled expertise with the largest industrial base installed worldwide
- Rapid return on investment and reduced overall cost of ownership
- *Express Availability* ensures an excellent response to the need for continuity of production



## Energy savings

The use of variable speed, and the optimization of mechanical systems, are the main means of achieving maximum savings. The adoption of Dyneo® motor-drive unit solutions optimizes energy consumption savings.

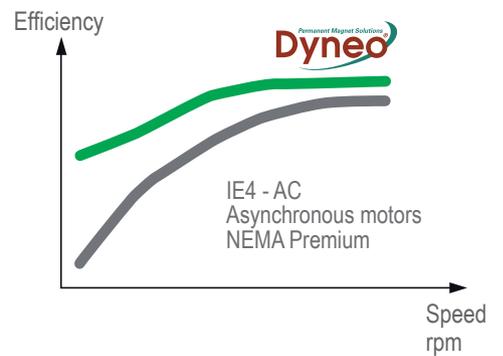
- Exceptional efficiency levels over the whole operating speed range, especially at speeds below the synchronous speed where efficiency is much higher than with asynchronous motors
- Energy savings, reduction in costs of use and installation
- Excellent return on investment compared to conventional asynchronous solutions



## Torque and speed performance

Dyneo® solutions guarantee optimum torque over the whole speed range, offering significantly better performance than conventional technologies.

- Adaptation of the motor speed to the speed of the driven machine
- Potential elimination of gearing
- Better performance of the driven machine by increasing its speed
- Low rotor temperature rise and better bearing performance
- Optimum torque guaranteed over a wide speed range



# Dyneo<sup>®</sup> Solutions

## The flexibility and simplicity of a tried-and-tested technology

### Sensorless control

The product of long experience in variable speed control and permanent magnet motors, Dyneo<sup>®</sup> solutions provide total sensorless control of the majority of process applications (pumps, compressors, fans, pressure boosters, centrifuges, separators).

The aim is to offer the user the benefit of the excellent performance of permanent magnet motors with a simplicity of mounting and installation equivalent to asynchronous motors.

### Advantages of sensorless mode

#### Less wiring saves time

- No connections
- Shorter commissioning time
- Simplicity of installation

#### Improved reliability

- No EMC interference caused by the need for an encoder and long cable lengths
- Lack of sensitivity to environmental constraints affecting the machine (vibrations, temperature, abrasive dust, etc.)
- Fewer connections

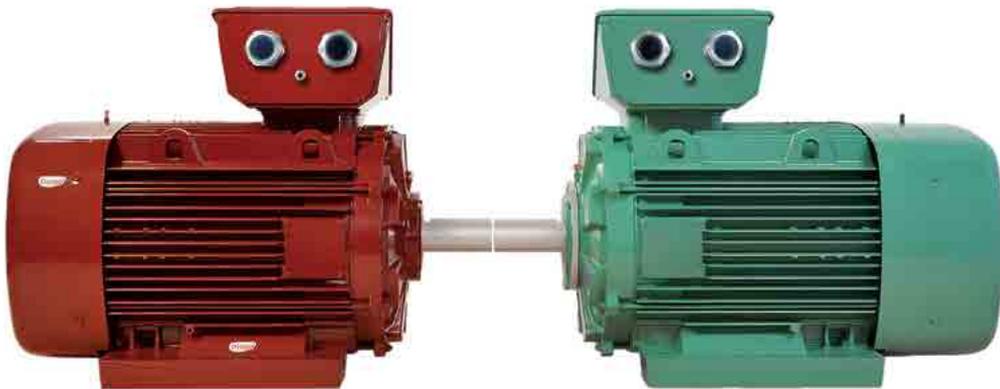
**LSRPM/PLSRPM permanent magnet motors are built using the same mechanical components as asynchronous motors, and offer reliability, a wealth of options, flexible adaptation and short delivery.**

**The range is available in two variants in order to meet the needs of customers, whether users or manufacturers:**

### Interchangeable range

The 1500 range is available with an standard IEC dimensions identical to asynchronous motors with the same power rating:

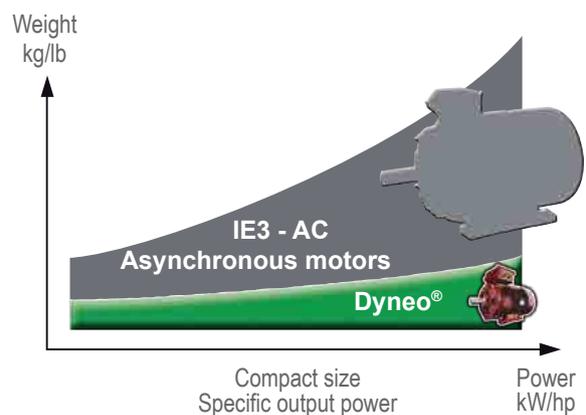
- Immediate interchangeability thanks to standard dimensions in terms of frame size, flange and shaft extension
- Immediate benefit of a premium energy-efficient solution, without modifying the existing installation



### Compact range

Permanent magnet technology also makes it possible to offer significantly lighter and smaller compact versions, that are particularly beneficial to OEMs.

- Ease of integration, smaller dimensions and optimization of the customer's machine
- Simplified lifting system, reduced transport costs

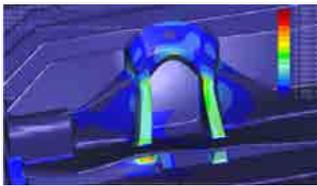


# Dyneo<sup>®</sup>

## The permanent magnet motor at the heart of the solution

### Rugged mechanism

- Solid design based on simulations and field tests
- Hardwearing cast iron end shields (included with aluminum motors)
- Stator fully machined on a mandrel for perfect concentricity with the motor's magnetic shaft
- Rigorous balancing for a reduced vibration level

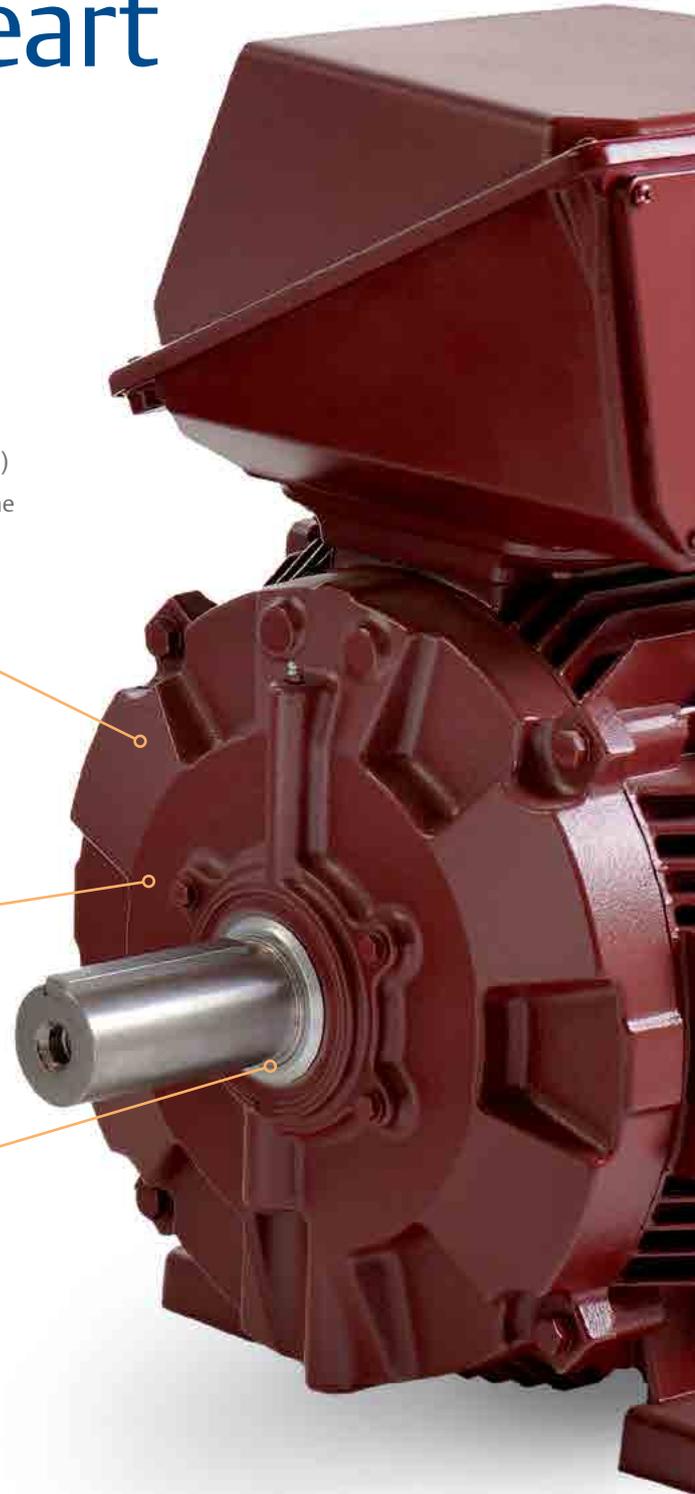


### Certified seal

- IP55 sealing system approved by an independent qualified laboratory
- Shaft seal with low energy losses

### Increased bearing life

- Bearings large enough to take heavy shaft loads on the shaft
- High-quality grease for a long service life and longer greasing intervals
- Low rotor temperature rise thanks to permanent magnet technology



## Electrical safety

- Large terminal box for easier access and safer connections

## Optimized characteristics

- Maximum energy efficiency thanks to exceptional motor efficiency
- Designed with characteristics that ensure optimum compatibility with Emerson Industrial Automation drives
- High-performance Sensorless mode ensures reliability and ease of installation

## Thermal protection

- PTC sensors included

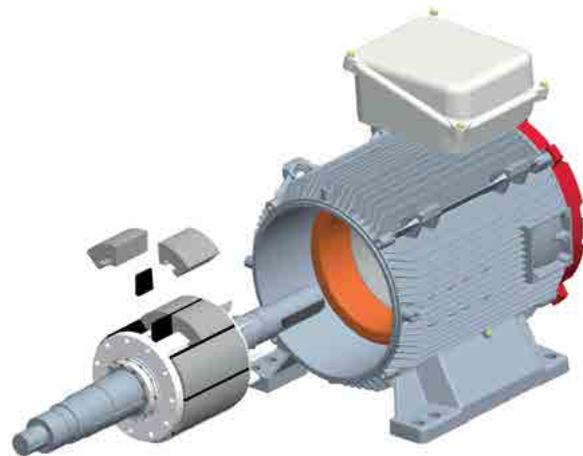
## Electrically robust

- Options dedicated to use with variable speed:
  - RIS (Reinforced Insulation System)
  - insulated bearings
- Impregnation with solvent-free varnish
- Designed with a 25 K thermal reserve

## Improved cooling

Complete optimization of the motor cooling system:

- To reduce losses
- To minimize noise



*Permanent magnets locked in the rotor assembly*

# Dyneo<sup>®</sup> Solutions

## The permanent magnet synchronous variable speed offer



### Motor-drive unit technology

Each motor-drive unit solution has been designed and tested on a test bench and qualified to guarantee the reliability, ruggedness and efficiency of the package

#### Permanent magnet motors



##### LSRPM

0.75 to 350 kW (1 to 470 hp)  
1,500 to 5,500 rpm

The LSRPM motor series has been developed on the basis of an IP55 IEC with design with an aluminum frame. Strict compliance with IEC standards simplifies their mounting and integration in a wide variety of machines.



##### PLSRPM

325 to 500 kW (435 to 670 hp)  
1,500 to 3,600 rpm

The PLSRPM motor series has been developed on the basis of an IP23 IEC design. Just like the LSRPM, strict compliance with IEC standards simplifies mounting and integration.



##### HPM

30 to 270 kW (40 to 360 hp)

HPM is a stator/rotor sub-assembly designed to be integrated by machine manufacturers so that they can simplify, or even eliminate, mechanical gearing and increase the overall installation efficiency while cutting costs.

## Geared motors

### 3000 range

250 to 23,000 N.m (184 to 16961.7 lb.ft)

Premium efficiency geared motor series are based on combining new-generation gearboxes from the 3000 range with permanent magnet synchronous motors.

In addition to the energy savings offered by Dyneo® technology, the helical tooth gear technology makes it possible to achieve mechanical efficiency in excess of 95%. It facilitates integration as close as possible to the transmission shaft, thus eliminating the need for any intermediate devices, such as a pinion, chain or belt pulley.



## Drives

### Unidrive M

IP20/NEMA 1 drives from 0.25 kW to 2.8 MW (0.33 to 4,200 hp) designed for cabinet or wall mounting to meet the needs of industrial and automation sectors.

Each model offers an increased number of functions, for the simplest through to the most complex applications. The Unidrive M can control both asynchronous motors and permanent magnet motors.

For the most demanding applications, the Unidrive M700 closed loop motor control algorithm offers an exceptional level of performance.



### Powerdrive MD2

Ready-to-use drives from 45 kW to 2.8 MW (60 to 4,200 hp) for process applications.

The Powerdrive MD2 range is suitable for high-power process applications. It includes compact, rugged, ready-to-use IP21 or IP54 products, in which all the functions required by the application are fitted, wired and tested.

The range is available in a free-standing cubicle and in a wall-mounting version up to 250 kW (335 hp).



### Powerdrive F300

IP20/NEMA 1 drives, to be integrated in a wall-mounting or floor-standing cabinet for ventilation, pumping and compression applications up to 2.8 MW (4,200 hp).

The Powerdrive F300 drives range offers an excellent level of flexibility and performance, as well as functions dedicated to ventilation, pumping and compression applications. This drive offers sensorless control of permanent magnet motors as well as the possibility of performing dedicated automation functions as standard (pumping for example).



Configuring the Dyneo® motor-drive unit is quick and easy due to the drives and motors being fully compatible.

# Dyneo<sup>®</sup> Solutions focused on applications



## Compression: refrigeration in the production of beer

Improvement of an installation consisting of four fixed-speed screw compressors by the addition of a variable speed screw compressor, equipped with a Dyneo<sup>®</sup> permanent magnet solution. This drive system demonstrates unrivaled efficiency, especially at partial load.

- Increase in the maximum speed
- Coefficient of performance increased from 3.6 to 4.1
- Substantial energy savings of as much as 600,000 kWh/yr



## Pumping: drinking water plant

Replacement of two asynchronous motors with a single 350 kW Dyneo<sup>®</sup> motor-drive unit.

- Energy consumption reduced by 10% per m<sup>3</sup> transferred. The pump also increased water flow by 15%
- Payback period: 14 months



## Grinding: animal nutrition

Replacement of a 250 kW asynchronous motor with a Dyneo<sup>®</sup> motor-drive unit. The grinding process represented 25% of the site's total electricity consumption.

- Energy savings on no-load operation (40% of time during pre-mixing)
- 28% energy savings



### Conveying: quarry

Modernization of a conveyor in a quarry with a Dyneo® variable speed geared motor:

- 160 kg/350 lb reduction in the payload
- Optimized cost of installation (cable sizes, transformer size, hoisting, etc.)
- Energy savings: 52,600 kWh/yr
- Payback period: 11 months



### Extrusion: rubber industry

Modernization of a rubber extrusion facility using a compact Dyneo® solution.

- Elimination of the machine off-center pulley and belt system
- Motor can withstand 50°C above ambient temperature
- Very compact design allowing the motor to be installed under the screw



### Ventilation: axial fan

Direct coupling of the motor which is not ventilated in the air flow (IC418). The LSRPM Dyneo® solution was chosen for air treatment towers due to its high specific output power and direct coupling to the impeller.

- Slow speeds by eliminating mechanical gearing (belt and pulleys or gearboxes)
- High efficiency over the entire speed range
- Optimized motor-drive assembly with sensorless control

# Services for motors and drives

## Local, continuous, customized support



- Audit and consultancy
- Standard installation audits by an industry leader
- Optimized energy savings and return on investment
- System adaptation and upgrading
- Installation and commissioning
- Full training
- Maintenance
- Installations and resources throughout the world



## An extensive global presence, which benefits all our customers

Thanks to our integrated organization, we benefit from a strong global presence which provides full customer support and local services, thanks to:

 5,500 employees



### More than 40 Automation Centers

Offer customers an excellent support service for any product, any automation solution or service request.



### 23 manufacturing sites

Produce complete ranges of high-quality products, optimized for the demands of specific industries.



### 8 engineering and design platforms

Develop market-leading products and sets of functions using the latest pioneering techniques.



### 3 regional dispatch centers

For quick delivery of our products

Our vast sales and services networks in Europe, Asia-Pacific, North America and South America are complemented by hundreds of carefully selected distributors and service partners, throughout the world.



Note that several countries have more than one of the facilities represented by the icons.

Services are optimized independently for each country. Please contact your local representative for more details of our offer in your country.

# Express Availability and support thanks to our various tools

## Express Availability

Dyneo® solutions benefit from our international logistics organization, resulting in very short lead times for numerous products and their combinations. *Express Availability* ensures an immediate response to customer needs, while allowing them to improve and guarantee their productivity:

- By upgrading quickly to a premium energy-efficient solution
- By ensuring continuity of production
- By minimizing the stock of spare parts on site

Numerous options are available on short delivery for LSRPM motors: stainless steel nameplate, tropicalization, encoder isolation, insulated bearing, etc.

Please consult the *Express Availability* offer on our website:  
<http://lrsm.co/dispofr>



### Express Availability - Synchronous motors

#### LSRPM Three-phase permanent magnet motors Very high efficiency

**AVAILABILITY TIMES EX WORKS (FRANCE), IN WORKING DAYS**  
Orders received, within the maximum quantity limit, by the factory on day D before 12:00 pm Central European Time, will have the following Availability.  
For products with options, availability will be that of the longest lead-time item i.e. the product or its options.  
If the order is received after 12:00 pm 1 working day on the mentioned availability will be added.  
The maximum quantity is per line of order. Above this maximum quantity, please consult your Sales Office.

D	D + 1	D + 2	D + 5	D + 10	Please consult
Mains supply 400 V Without option			Mains supply 400 V With options		
Rated	IM 1001	IM 3001 <sup>(1)</sup>	IM 2001 <sup>(2)</sup>	IM 3601 <sup>(2)</sup>	IM 2101 <sup>(2)</sup>
					Options



## Ease of selection and use

Quick and easy to use, the Energy Savings Advisor application, the Configurator and selection guides make it easy to choose Dyneo® solutions using customer data.

## Energy Savings Advisor:

### Work out your energy savings at the press of a button!

The Energy Savings Advisor mobile app is a simple, accurate, interactive application that allows you to estimate and quickly assess the value of energy savings that can be achieved with our high-efficiency motor and drive solutions.

It allows you to make comparisons with different customized scenario parameters and see a graphic overview of the potential savings for your applications.

You can then receive a complete report showing the breakdown of your simulation and the results obtained by e-mail.

If you wish to go further, send your simulation and your questions directly to our experts via the mobile app. One of them, the preferred contact for your region, will get in touch with you to study your requirement in detail.

Go to [www.emersonindustrial.com/esa](http://www.emersonindustrial.com/esa) or scan the QR code opposite to access the free application.



## Configurator

The Configurator is a powerful tool to help with selection of motors or geared motors used in conjunction with Leroy-Somer variable speed drives. By choosing our motors, geared motors and drives with this advanced tool, you will be sure of selecting the best combination of products for your applications.

<http://lrsm.co/config>



**EMERSON. CONSIDER IT SOLVED.™**

[www.emersonindustrial.com/automation](http://www.emersonindustrial.com/automation)



© Emerson 2015. The information in this brochure is provided for guidance only and is no way contractual. Emerson's continuous development policy means its accuracy cannot be guaranteed. Emerson reserves the right to modify the characteristics of its products without notice.

Control Techniques Limited. Registered office: The Gro, Newtown, Powys SY16 3BE. Company registered in England and Wales. Company registration no: 01236886.

Moteurs Leroy-Somer SAS. Registered office: Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France. Registered capital: €65,800,512, RCS Angoulême 338 567 258.