



Industrial Refrigeration

Highly flexible and reliable solutions that save energy
and increase your coefficient of performance

Control Techniques™
Leroy-Somer™


EMERSON™
Industrial Automation

Industrial Refrigeration

Key to a sustainable planet

For around 200 years, refrigeration technologies have progressively led to the provision of essential goods and services for humans, such as:

- Food preservation
- Medical processes
- District heating and cooling
- Energy and environment applications

There have been well-documented negative environmental impacts as a result, with harmful refrigerants depleting the ozone layer with links to global warming.

Recognized by global leaders and the signing of the Montreal and Kyoto protocols, significant progress has been made reducing the production of CFCs, HCFCs and HFCs by 90 % between 1988 and 2005.

However, with the world population expected to grow from 7 to 9 billion between now and 2050 and with longer life expectancy; consumption of all resources relating to refrigeration-related processes mean demand will increase hugely.

Already, energy consumption of refrigeration equipment represents 15 % of global electricity use (often over 20 % in developed countries). Most countries still produce electricity using fossil fuels and so this underlines the huge impact on global warming that the use of refrigeration equipment has.

Therefore, in order to sustain current human trends we need to:

- Improve the coefficient of performance (COP) of refrigeration equipment (i.e. reduce the electricity consumption per unit).
- Build more integrated and highly controlled systems of energy consumption in a whole building.
- Switch to new refrigerants that do not harm the ozone layer or emit CO₂.
- Increase global coverage of highly efficient refrigeration solutions that embrace best practices.

Emerson Industrial Automation provides the expertise, products, solutions and services to achieve this.



Emerson's customized industrial refrigeration solutions meet your exact needs

Companies running industrial refrigeration equipment around the world have many diverse requirements based on their product type, environment, specific processes and level of in-house expertise. Most share the need to maintain high quality produce, using carefully controlled and eco-friendly temperature regulation processes (often non-stop) where the pressure to reduce operational costs is paramount.

Emerson Industrial Automation offer innovative and high value industrial refrigeration solutions to specific customer needs rather than 'catalogue' offerings. Our market-leading energy-saving and performance solutions maintain product quality during the production, storage, transportation and distribution phases, and are used in a wide range of sectors such as food & beverage, plastic transformation, chemicals & pharmaceuticals and petroleum & gas.

Optimum efficiency solutions that increase your COP with quick payback

Our highly reliable and environmentally sound industrial refrigeration solutions significantly reduce energy bills and operation costs while providing improved coefficient of performance (COP). This can be achieved using high-efficiency Dyneo® synchronous permanent magnet motors and high performance variable speed drives, backed-up by our energy optimization services.

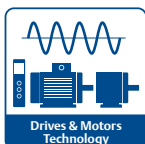
Extensive on-board product features often mean less external components are required in system architecture to get optimal temperature control, saving installation time and initial outlay. Carefully controlled environment or process temperatures benefit the quality of the produce. For example, in meat storage rooms we can reduce the effects of dehumidifying where air moisture is lost, resulting in less product shrinkage.

Our Automation Center network provides local support, leveraging from our vast global expertise to support you from simple product selection for retrofit applications to full system design and implementation. Furthermore, most industrial refrigeration solutions we provide offer a quick ROI (return of investment), often within 12 months.

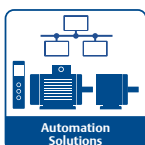


Wide range of products and support services

Emerson Industrial Automation has been involved in the industrial refrigeration sector for over 40 years. Our technological expertise and experience working with equipment manufacturers (compressors, condensers and evaporators), system installers and end users allow us to provide a range of products and services to meet and exceed all your needs:



Cutting edge drives and motors technology – providing reliable, high performance and energy efficient solutions for industrial refrigeration applications.



Scalable automation solutions – from simple drive and motor compressor or pump control up to a fully engineered industrial refrigeration system, backed by global industrial expertise and full support at a local level. We can manage the entire project or integrate with system designers or machine manufacturers, as required.



Customized local services – ensuring all elements of your system are supported, ranging from consultation, energy audits, installation, commissioning and maintenance, to specific training on your application, ensuring maximum performance throughout the lifetime of your application.



5,500
employees



40+
Automation
Centers



23
Manufacturing
sites



8
Engineering and
Design facilities



3
Regional
despatch hubs

Drives and motors for industrial refrigeration

Emerson Industrial Automation provides the broadest range of high quality drives and motors on the market, with leading performance and efficiency ratings. Along with our expertise in this field, we are the perfect partner for contractors and system designers in developing bespoke industrial refrigeration solutions that meet and exceed the needs of end users.

Drives and motors for compressors

0.75 to 500 kW



**Wall mount or free standing
variable speed drive**

Powerdrive MD2
IP21 - IP54

Sensorless ✓
Permanent Magnet
Motor Control

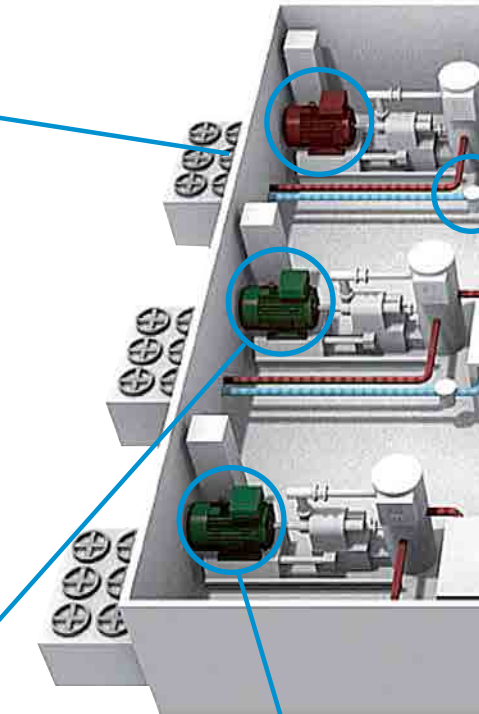


Permanent Magnet Solutions
Dyneo

**Synchronous
permanent magnet
motors**

Exceeding requirements
equivalent to IE4 and
NEMA Super Premium

LSRPM / IP55
PLSRPM / IP23



Soft-starters, drives and motors for compressors

150 to 1500 kW



**Free standing cabinet
variable speed drive**

Powerdrive MD2
IP21 - IP54



**Soft-starter with
integrated bypass**
Digistart D3



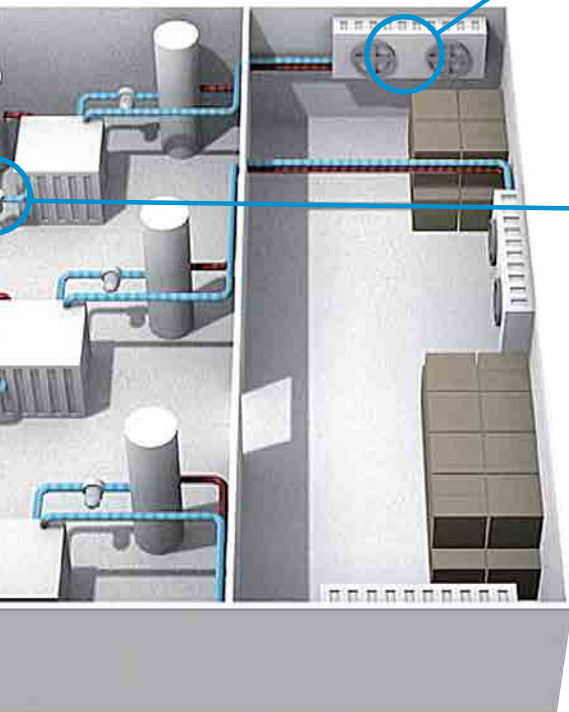
IE3

IMfinity®

**Premium Efficiency AC
liquid cooled induction
motors**

LC / IP55 - IP56





Motors for evaporators and condensers

0.09 to 7.5 kW - up to 70°C



Motors IC418 for axial fan
mounted on grid, cooled by
the air flow

HE 29 / IP55



PAD mounting motors
for axial fans

CM29 - CM34 / IP55

Drives and motors for pumps

0.75 to 85 kW



Variable speed drive
Powerdrive F300

Sensorless ✓
Permanent Magnet
Motor Control



Permanent Magnet Solutions
Dyneo

Synchronous permanent
magnet motors

LSRPM / IP55
PLSRPM / IP23

Drives and motors for cooling towers

up to 75 kW - up to 70°C



Variable speed drive
Powerdrive F300

IE2* IE3

IMfinity



PAD mounting motors (or foot
& flange) non ventilated in air
flow IC418

LSSES - FLSES / IP55

IE2* IE3 IE4

IMfinity

High & Premium
Efficiency AC induction
motors

PLSES / IP23
LSSES - FLSES / IP55



* Must be used with inverter in EU

Advanced technology for innovative and comprehensive refrigeration solutions

With Dyneo® permanent magnet technology for best in class part-load efficiency and IMfinity® premium efficiency motors, we offer comprehensive means to optimally control your system.

- Dyneo® is well suited for compressor applications where its maximum speed and high efficiency across the speed range allows the highest cooling power and the best efficiency in the smallest footprint.
- IMfinity® IE2/IE3/IE4 motors combine with variable speed or soft-start technology to provide high-efficiency induction solutions, often used in condenser and cooling tower applications thanks to their unique pad-mounting construction.

Our products integrate easily with other system components with on-board and optional features, such as PLC functionality, communications, additional I/O and intuitive HMIs.

Unrivalled reliability

Our technology is proven in hundreds of thousands of applications around the world, often in challenging conditions, and usually where the accuracy of control is critical. Customer surveys prove time-again that our products and solutions are renowned for their reliability. This is because:

- Extreme environmental testing is carried out on all our products to guarantee their robustness.
- Intelligent compressor, pump and fan control reduces system-ware, meaning less maintenance is required while ensuring longer lifetime of application hardware.
- Extensive integrated motor protection present in our systems.
- ATEX certified motors are available for use in sensitive areas.



Flexible support for developing excellence

Whether you are a machine manufacturer, system integrator or end user, we are able to provide support and a range of services to meet your industrial refrigeration needs. These range from consultation in developing bespoke refrigeration equipment and system design, or simply integrating our market-leading products into existing applications. We provide energy audits to identify areas where efficiency and performance can be maximized, along with a range of maintenance and service plans to maintain top levels of operation performance.

Thorough and specific training

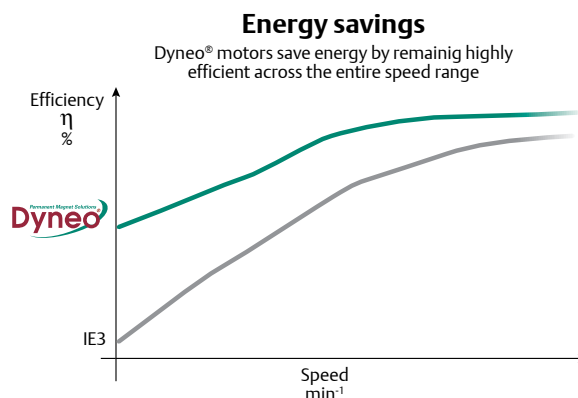
Comprehensive scheduled training courses on all of our products and solutions are available at local training centres. However, we are able to provide complete tailored training on all aspects of your refrigeration application at your site for all operation and maintenance staff if required. We also provide extensive and user-friendly technical documentation and support for any solutions we develop for you.

Maximize energy and cost savings while increasing performance

We appreciate that energy usage usually provides the biggest cost center for any refrigeration plant. Our efficient and cost-effective solutions can cut power-usage from 8 to 35 % in existing applications (typically 20 %), resulting in huge bill reduction year-on-year. When applied to compressor, pump and condenser applications, Dyneo® permanent magnet and variable speed solutions remain highly efficient across the entire speed range and at part load.

Thanks to non-stop accurate monitoring and precise temperature regulation relating to load requirements, including day/night and seasonal changes, the system remains at optimum levels at all times. Typical installations see large increases in COP (Coefficient of Performance) of around 15%, with the additional benefit lower life cycle costs due to less system-wear, with the return on investment often less than 12 months.

Industry sector	Part of total energy consumption used for refrigeration
Cold storage	85 %
Frozen food	60 %
Chilled-ready meats	50 %
Confectionery	40 %
Breweries	35 %
Liquid milk processing	25 %





Scalable performance of our wide-ranging solutions



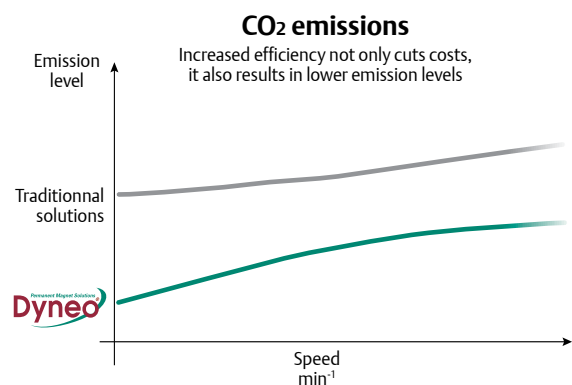
Easily meet global energy management standards and gain additional benefits

Our industry expertise in control and monitoring, coupled with our efficiency products will help you implement the ISO 50001 certification on your site. Furthermore, our Dyneo® permanent magnet and variable speed solutions have best-in-class annual performance, allowing your refrigeration system to reach optimum seasonal performance (ESEER in Europe and IPLV in the USA).

By meeting local efficiency levels, this can often lead to government-backed financial rewards such as tax rebates. These financial benefits, along with the kudos that certification provides, can increase your competitive advantage as you expand your business.

Reduced CO₂ emissions

We extensive experience of providing environmentally-friendly industrial refrigeration systems in-keeping with corporate responsibility programs. Our solutions can operate refrigeration systems that run on natural refrigerants like ammonia and CO₂ that have little or zero ozone depletion properties or greenhouse gasses, significantly reducing plant CO₂ emissions. This, coupled with our vast energy-efficient products, means our solutions are particularly ecologically sound.



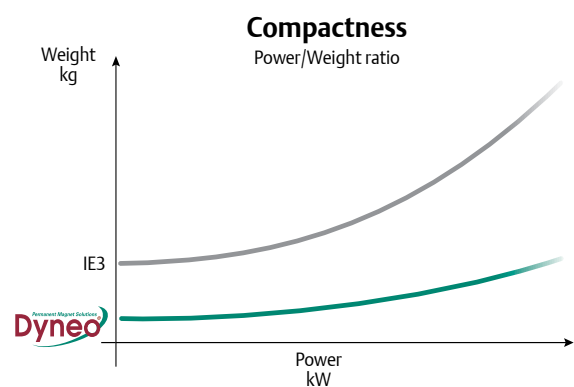


Quick reactivity to customer requirements with Express Shipment service

Our regional distribution centers mean stocks of drives, motors and options are available locally and are dispatched quickly as standard. This helps ensure continuity of production and minimized spares required onsite as well as saving transport costs. Our Express Shipment service means small numbers of drives and options can be available to ship in one working day in many areas to meet critical requirements.

Compact and easy-to-handle core products

The core components used in our Industrial Refrigeration solution are compact, with our drives among the smallest in class at every power rating and Dyneo® motors significantly smaller than conventional induction motors. This, along with reduced weight, enables easier handling on site while reducing the size of the overall application, with the benefit of lower transportation costs. Cabinet and wall mount drives are ready-to-use with easy connection to the existing equipment.



Extensive and customized local services with round-the-clock support

Along with comprehensive training, our global Automation Centers provide a range of local services tailored to meet your expanding productivity, performance and process safety needs. This includes:

- Analysis of current installations to detect areas for improving processes and reducing energy consumption
- Highly skilled system design to create innovative and energy saving solutions
- Dedicated all hours industrial refrigeration technical support
- Maintenance servicing to ensure maximum performance and trouble-free operation for the life-time of the system
- Guaranteed rapid response to emergency situations

Audit and consultation

Our auditing services are designed to analyse your existing industrial refrigeration application and processes to identify opportunities for improving performance, energy efficiency and the lifetime of equipment. This could result in retrofitting equipment or an entire system upgrade. We provide an evaluation of return on investment (ROI), helping to justify initial outlay.

Optimizing energy savings and payback

Once potential energy savings have been identified, we support you in calculating payback periods and in some countries help with obtaining the Energy Saving Certificates your business requires. We will also provide a high yield installation and maintenance schedule to ensure optimum performance is maintained through the lifetime of your equipment.

Retrofit and system upgrades

Where required, existing hardware is retrofitted quickly and easily, reducing downtime and investment. Alternatively we can produce high performance solutions to upgrade your production processes, improving productivity. A dedicated team takes care of the whole project implementation, along with training and maintenance schedules.



Installation and commissioning

Our objective is to ensure the reliability and safety of your equipment for optimum longevity:

- Our accredited personnel ensure systems are installed in compliance with local technical regulations and safety standards
- Our world class onsite commissioning ensures systems are set-up thoroughly and rapidly
- Extended system guarantees of up to 48 months are available

Maintenance

All our maintenance policies, whether emergency or scheduled, are designed to meet your specific requirements, minimizing disruption and downtime to your operation.

- Emergency services include 24/7 telephone and web support, onsite technical assistance, express round-the-clock delivery of products & spare parts and urgent repairs.
- For ongoing maintenance work, we can manage product replacements, retrofits and upgrades rapidly through our assembly centres
- Maintenance contracts are available to ensure the proper running of your equipment

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Leroy-Somer™

www.emersonindustrial.com/automation

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theautomationengineer.com (blog)



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