



Metals Applications

Industry leading Automation Solutions that maximize the performance and throughput of metal production while reducing energy consumption and operation costs

Emerson's innovative solutions designed to meet the demands of metal applications

The Metals industry includes a wide range of manufacturing processes, ranging from the heavy industrial production of iron and steel slabs to the delicate processing of aluminum tin foil. These applications involve many different processes (hot and cold), different technologies (continuous & batch) and metals such as ferrous (iron and steel) and non-ferrous (aluminum, copper, brass and zinc). As such the specific application needs of metals producers are very diverse, while their challenges are often very similar in very competitive markets. Typical pain points include:

- Inefficient and manual production processes
- Many have old unreliable equipment resulting in loss of production and downtime
- Pressure to create better quality products and greater quantities to meet increasing market demands
- High energy and maintenance costs of plants and equipment
- Lack of in-house resource and skills to automate and improve existing processes and machinery

Emerson Industrial Automation has been involved in this industry for many years, providing automation expertise and support in metals production across many specific requirements. Typical applications include control equipment and systems for:

- Degreasing lines
- Coating lines
- Bonding lines
- Slitters and cutting lines
- Cut-to-length machines
- Aluminum cold rolling mills
- Copper cold rolling mills
- Metal presses
- Wiredraw lines

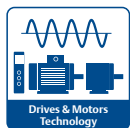
Our organization is dedicated to providing you with the products, Automation Solutions and a range of support services to optimize your metal production processes, with the aim of:

- Manufacturing consistently high quality finished metals
- Providing precision and repeatability in terms of performance, control and long term reliability from machinery
- Maximizing productivity and throughput
- Saving energy
- Reducing operation costs
- Providing the support and technology to exactly meet your production requirements
- Enhancing safety and providing environmentally sound solutions

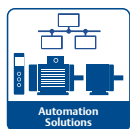


Emerson Industrial Automation's global solutions and services

With thousands of applications in the metals industry worldwide, we provide:



Cutting edge drives and motors technology – our market leading products provide the performance and functionality needed to produce effective control solutions for a wide variety of metals applications.



Scalable Automation Solutions – from simple drive and motor retrofits to full turnkey electrical solutions, we can meet and exceed the needs of metals producers by improving process control to enhance finish quality, plant productivity and yield.



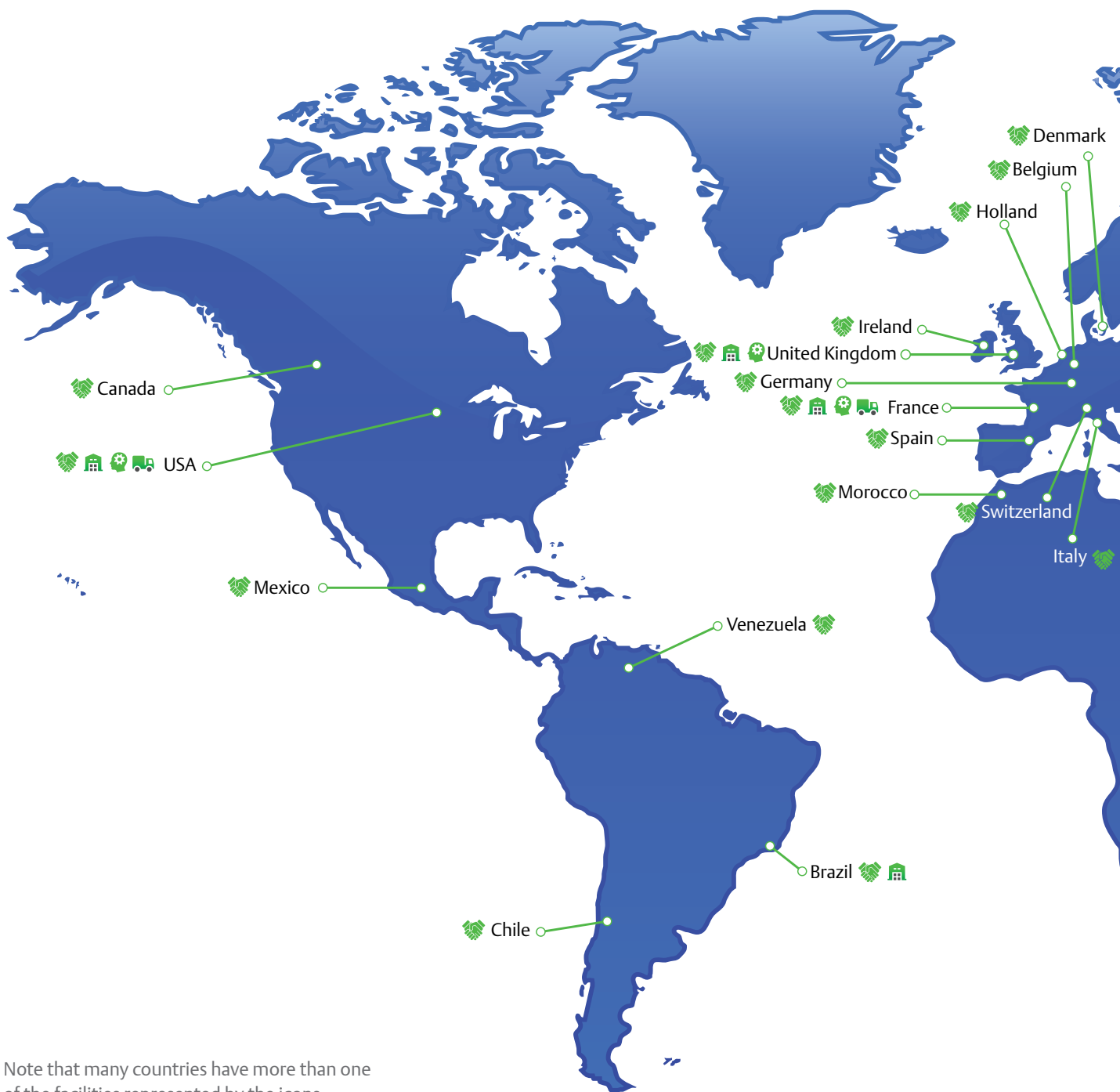
Customized local services – all elements of system requirements are supported by our qualified engineers through our worldwide Automation Center network, including design, installation, commissioning, optimization, after sales support and training.

Enabling optimum metal production long into the future

Through strong partnerships with manufacturers, we enable the development and upgrading of plant equipment and control systems to meet expanding production targets and quality levels demanded by the market. Also we are happy to partner with machine builders to develop innovative new equipment for use in metals plants where we can maximize the functionality of our core products in new designs.

We aim to continuously add value to our customers' businesses and react instantly to changing needs. We offer tailored maintenance and servicing packages to ensure trouble-free operation. Upgrades to hardware and software can be provided as technologies advance, and we provide add-on functionality as your needs expand.

Global facilities and resources



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

A strong union that benefits all our customers

Through our integrated organization, we have an enhanced global presence with 5,500 employees. Our combined local support & services provide:



5,500 employees



40+ Automation Centers

Providing excellent customer support for any product, automation solutions or service requirements



23 Manufacturing sites

Producing a comprehensive range of high quality products, optimized for industry-specific customer requirements



8 Engineering and Design facilities

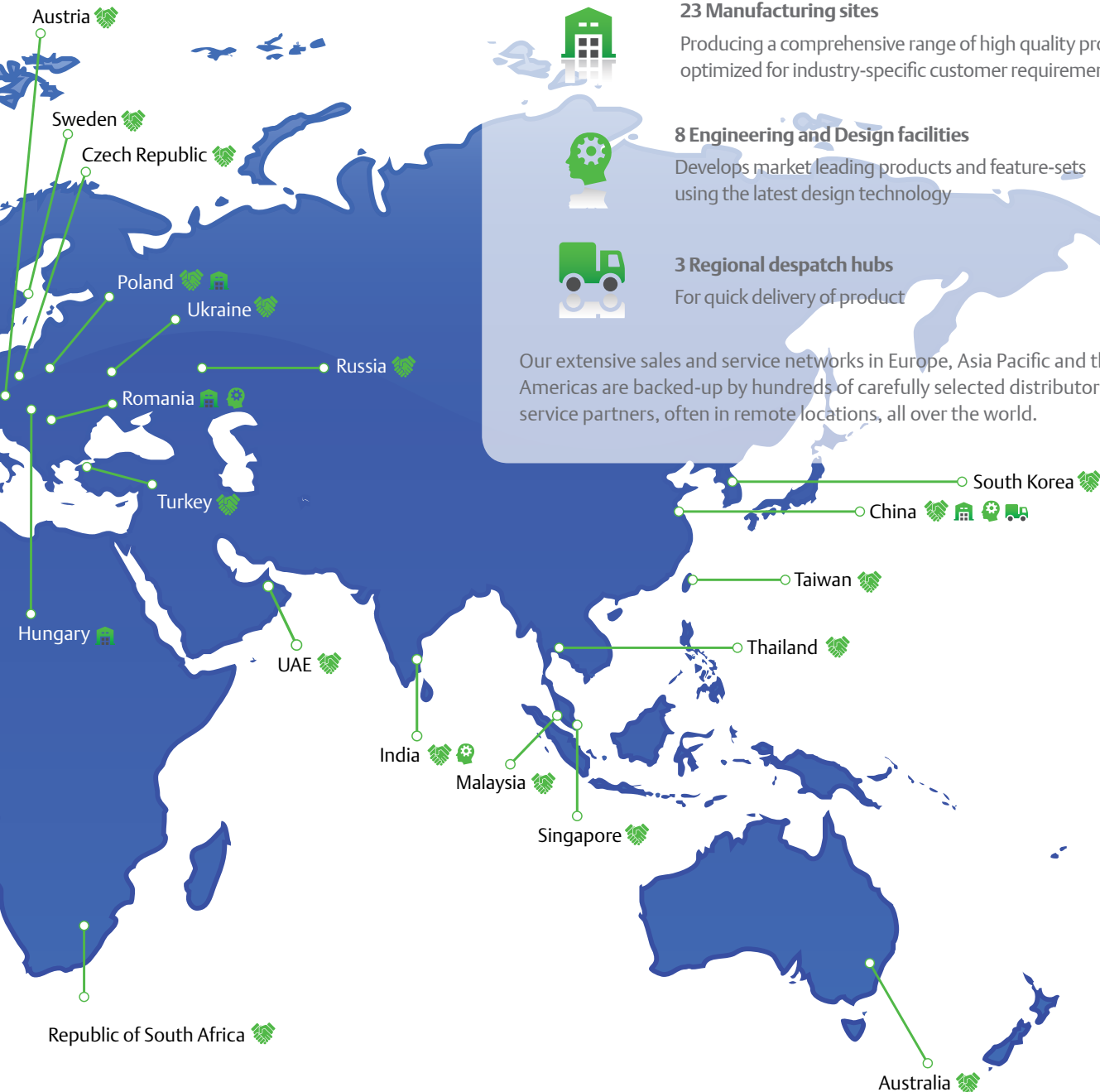
Develops market leading products and feature-sets using the latest design technology



3 Regional despatch hubs

For quick delivery of product

Our extensive sales and service networks in Europe, Asia Pacific and the Americas are backed-up by hundreds of carefully selected distributors and service partners, often in remote locations, all over the world.



Emerson Industrial Automation's Metals solutions

To read information about many of our successful metals industry projects, visit the Metals section of www.emersonindustrial.com/automation.

Scalable Automation Solutions

for the growing global demands of the metals industry

Making your business more profitable

Our global Automation Solutions team are dedicated to providing the expertise, project management skills and resources for producing scalable solutions to meet the exact needs of your application. Our worldwide Automation Center network is able to leverage this in-depth knowledge, allowing us to work with you at local level to:

- Reduce operation costs
- Minimize energy consumption
- Increase product throughput
- Enhance asset reliability
- Reduce scrap through efficient and reliable production
- Provide a quick return of investment

This can be done through modernization of existing equipment, with full and partial refurbishment, or designing totally new systems, scaled to your budget. Ultimately we want to meet and exceed your production targets and make your business more profitable.

Emerson - a proven partner for effective metals plant modernization

Through a close working relationship with you and in-depth auditing of existing equipment and processes we can quickly identify areas for improvement. Consultation can include:

- Audit of installed base
- Energy efficiency analysis
- Identification of system and process improvement possibilities and projected benefits
- Life cycle management

We can scale a solution to work with your budget. Many of our customers are looking to improve processes and efficiencies using operational expenses (OPEX) rather than large capital expenditure (CAPEX). Refurbishment, or even partial refurbishment, of plant equipment can be rolled out year-on-year. By primarily targeting the areas of greatest inefficiency, or critical elements where the largest impact can be made first, we guarantee maximum operational and financial benefits.



Turnkey electrical solutions

For new electric control systems or retrofit projects, we can provide fully engineered turnkey solutions. By working with a single supplier, we act as a one-stop shop for all your system and support requirements including specification, design, build and commissioning.

The project services that we can offer includes:

- Project management, including a single point of contact from an experienced industry leader
- Functional design specifications
- Detailed engineering design that incorporates:
 - Drives, motors and automation equipment that meets and improves customer's internal quality requirements
 - Integrated state-of-the-art safety controls
- Software application development, including:
 - Integration with PLC software
 - Customized HMI software
- Procurement of all system components
- Assembly of electrical control system, including:
 - Manufacturing of cubicles, control panels and operator desks
 - Installation of engineered system and cabling on site
- Factory Acceptance Test
- Site commissioning and start-up for:
 - Minimized shut-down time
 - Optimization of operations
- Detailed project documentation, as built
- Training



Key benefits of Emerson Automation Solutions

Dedicated project management and perfect execution, based on your exact needs

We are able to provide dedicated project management of system design, build and commissioning based on your exact specification, delivering on-time and on-budget. Our experience of many projects related to the metals industry means we can provide standardized and proven solutions, guaranteeing optimum performance and reliability but are flexible to customer-preferred or fixed components such as PLCs or HMIs. We are able to support you to whatever level you need throughout whole project, based on your in-house skill set. The project manager provides regular status updates and our engineers are on-hand to provide on-site assistance to ensure completion of tasks.

Energy saving features

We can provide full plant energy analysis to identify areas for load sharing and reducing energy waste using our AC and DC drive systems. Energy saving features include:

- DC drive systems that allow mechanical energy to be easily regenerated back to the line power supply
- Active Front End for returning braking energy to the power supply and minimizing harmonic distortion.
- Simple common DC bus configuration where braking energy is recycled within the drive system, reducing energy usage and eliminating external supply components.
- AC drives that run with a wide operating DC voltage input, from 24 V up to maximum Volts, providing optimum choice of auxiliary power supply for back-up purposes.
- Low losses, up to 98% efficient.
- Low power standby mode.
- Support of sensorless (open loop) control of compact high efficiency permanent magnet motors.





Procurement that guarantees quality and best cost

Our global procurement teams give us the capability of buying standard high quality components in bulk, or integrating with local supply chains to access low cost and near-by produced parts to minimize costs. Such components ensure easy integration with our drive control systems, while reducing overall system spend while meeting strict quality control and appropriate local regulation requirements.

Skilled panel-building to optimize system build

Our skilled engineers build and test fully integrated cabinets and control panels with all the necessary components (such as circuit breakers, transformers, drives, EMC filters, PLC and HMIs) to be integrated easily in to metals plants at the appropriate installation point in the project. This maximizes the speed of the system build, ensures quality and avoids issues in the subsequent commissioning phase. We utilize highly skilled teams to guarantee systems will meet local energy efficiency standards and safety requirements.

Tailored software development, customized to meet your exact requirements

Our in-house software development team are able to create specific software tailored to the exact needs of your application. This enables easy monitoring of the physical and operating conditions of the system on a real-time basis. It can be used to optimize the movements, speed/torque and tension control in actions such as cutting, winding or rolling, relieving the operator of delicate and repetitive tasks, while enabling intelligent distributed control to improve the accuracy and efficiency of operation.

Our software systems also help schedule maintenance, analyse system faults and provide machine production data assisting technician with diagnostics and ultimately reducing downtime. Remote control reduces system downtime and maintenance costs by reducing the need for expensive site visits.



Emerson customized services and support to ensure optimized operation for the lifetime of your system

To back our innovative solutions, our Automation Centers can provide the following local services, to ensure the continued optimized operation of your application, including:

- Full field servicing capability
- Extensive after sales support
- Inventory audit solutions to ensure only minimal spares are kept in stock
- Localized and application specific content for support documentation including wiring diagrams, certification files (CE & UL) and integration manuals

Customized local services and round the clock support

We also provide a range of expert local services tailored to meet our customers' expanding productivity, performance and process safety needs, while guaranteeing an exceptional response to emergency situations with round the clock support. Customized policies are defined locally and can include:

- 24/7 remote support
- Rapid response, with agreed timescales, to requests for onsite issues by skilled local support teams
- Full plant analysis to identify further areas for improvement



Customized onsite training

Scheduled training courses are available for your specific application and held onsite, or your designers, programmers and maintenance staff can attend regular courses offered at our local training centers. Typical training from industry experts can cover:

- Application operation
- Start-up and shutdown best practices
- Troubleshooting
- Periodic tuning of operating parameters and revision of system settings to improve production

Quick reactivity to customer requirements with Express Availability service

Our industrial organization and regional distribution centers mean that drives, motors and options are available locally and are dispatched quickly as standard. This helps ensure continuity of production and minimized spares required onsite.

Our Express Availability service, available in many regions, offers very short lead-times on many product combinations, including drives, motors, brakes, gears and options to meet critical requirements.

Typical hot applications for ferrous and non-ferrous metals

Continuous caster and hot rolling mills

Emerson Industrial Automation has managed, delivered and commissioned many different drive systems for steel, copper, aluminum and lead continuous caster and hot rolling mills. These critical applications are designed to increase throughput and strand speed at the same time as improving efficiency of operation, including exact temperature control throughout the process.

Typical systems provide improved load sharing using PID control onboard our drives or via a PLC, which enhance reliability and reduce stress on equipment. Consistent casting speed through improved control with rethread times shortened by improved processes see quality and productivity maximized. All these benefits help to ensure longer life of equipment along with reduced maintenance costs and downtime.

Innovative and high performance electromagnetic metal solutions

Innovation in our high performance metals control systems can produce huge increases in operating efficiency. We have experience in creating control systems for metal induction heaters where we have worked with machine manufacturers to reduce billet heating times significantly by doubling the heating efficiency, prior to extrusion. Precise heating control has been achieved by rotating the billet using powerful magnetic fields controlled by our drive solutions, to synchronize both motor speed and torque using precise encoder feedback. Pre-programmed profiles allow for exact, repeatable speed, time and temperature profiles to be set-up to enhance control, which have improved product quality. Additionally such smooth control extends the machines working life and reduces maintenance requirements.



Electromagnetic stirring (EMS) applications

Our drive systems are particularly adept at controlling the mixing of semi-molten steel through the accurate excitation of inductive coil pairs that are mounted on the outside of a ladle, or strand, of a continuous caster. This has the effect of making the steel react like the rotor of a motor and stirring itself. With the process enclosed, the quality of the steel produced is maximized due to exact temperature control and the reduction of impurities. We are experienced in developing specific software and engineering different customized system configurations for EMS applications.

Full electrical upgrades in hot metal applications

We are experienced in full electrical upgrades in hot metal applications, such as multi-strand continuous steel billet casting machines. Obsolescence of electrical components such as switchgear can cause major maintenance issues and downtime. Our modern AC and DC automation solutions provide greater accuracy, less wastage and better efficiency, integrating with existing SCADA systems. Multi-panel suites that can be designed, built, installed and commissioned by our engineers with software either developed by ourselves or by your own PLC engineers. HMIs can be included to provide status and diagnostic information of drives and line interlocking. Motors can be provided with forced cooling for accurate transportation and reliable operation in harsh environments where hot metals are transported by roller tables and conveyors to cooling beds. Our engineering and project management expertise, fast on-site assistance and local stock-holding are often cited as reasons for choosing Emerson Industrial Automation in such projects.

Typical cold metals applications

Cold rolling and cutting lines are common applications for our Automation Solutions team, where we have developed, delivered and commissioned many drive systems to increase accuracy of operation and throughput. For both new and retrofit projects, our solutions produce accurate control, allowing repeatable and precise machine performance. High speed communications with plant control system PLCs and other equipment contribute to the overall co-ordination of numerous continuous processes.



Cold rolling applications

Cold rolling mill applications, including aluminum foil production, are a particular area of expertise for us, where our solutions provide accurate control and monitoring of ferrous and non-ferrous metals as they are passed through rollers to reduce thickness or skinpass mills to increase surface hardness. Our high performance products and exact process control ensure high quality and accurate thickness dimensions, along with maximized productivity.



Slitting line applications

We have provided solutions for many slitting line applications globally, which promote high productivity and flexibility across a range of materials. Again accurate control and monitoring can ensure the cutting of metal sheets to exact and multiple dimensions when sheared into narrow strips.



Cold cutting applications

Flexibility is a key factor in our cut-to-length solutions. This is often provided with multiple pre-programmed cutting profiles using intelligent options onboard the drives, which provide quick change-over for different metal products or lengths. These are easily switched by operators through intuitive HMI touchscreen control. Uptime is further enhanced with built-in diagnostics to simplify onsite maintenance, along with overall reliability vastly improved smooth operation.



Forming lines

Our control systems are easily applied to forming lines, where metal sheets are passed through consecutive sets of rolls or stands in order to bend metals into specific cross-sections. Accurate control of lengths of metals through a series of mechanical processes, make roll forming ideal for producing parts with long lengths such as pipes.



Process lines

These can include painting/coating, pickling, galvanizing, zincing or annealing process lines, where a metal sheet is put through a specific treatment often at constant speed as part of a continuous operation when it is re-wound. Our systems are ideal for synchronizing multiple drives and motors to ensure accurate tension control, along with speed and position in many different processes-related applications.



Press machines

We also have experience in providing control systems for a number of diverse press machines, such as spindle presses and coin, radiator and high pass presses. This includes automation equipment and software, often using Active Front End technology and energy storage features for maximum energy efficiency, while producing quality products at quick press rates.



Auxiliary applications to support the metals industry

Improvements in aspiration systems in metals factories

We have experience in upgrading central fume aspiration systems in casting factories. After extensive analysis of an existing factory system, our Automation Solutions team have been able to improve performance, safety and the health of onsite personnel by upgrading the control system. This included reducing the vulnerability of key components by removing them from hot factory settings. Overall energy costs have been reduced by around 40 %, having a great increase on the factory's overall profitability, with the old system being able to be used as an emergency by-pass. As with many of our solutions, integration with the existing plant control PLC has been achieved, with ROI being calculated at less than 2 years. As well as reducing the plant's carbon footprint, this solution meets the European type 1 Energy Efficiency Standard.

Material handling and hoisting applications

With over 40 years of experience in factory crane applications, our high performance and efficient products allow us to develop compact and flexible solutions with the power and control required to move materials efficiently and safely. Tailored to the exact needs of your plant we can develop new control systems or refurbish existing equipment, maximizing the automation, speed and reliability of your cranes and hoisting equipment.


Emerson Industrial Automation, the partner of choice

All the solutions, services and application of expertise described in this brochure provide compelling evidence that we have the skill, experience and innovation to enhance the many different manufacturing automation and processes that exist with a modern plant environment. Emerson Industrial Automation is the partner of choice, and we are here to offer assistance to you no matter what the type of metal application or its scale.



Comprehensive drives and motors technology maximizes performance and energy savings in metals applications

Our comprehensive range of drive and motor technologies provide all the features and functionality required in a wide range of metals-related applications and process control. Highly reliable and flexible, our products are developed together to maximize easy integration, high precision performance and energy savings:

Drives and Controllers	AC and servo drives		DC drives	AC drives
	Unidrive M		Mentor MP	Powerdrive MD2 & F300
	<p>0.25 kW - 2.8 MW (0.33 - 4,200 hp); 100 V, 200 V, 400 V, 575 V, 690 V</p> <p>AC and servo drive family designed for automation systems, with scaled feature-sets to match specific application requirements and system connectivity needs. Features, such as onboard PLC programming, enable fast creation of more productive systems, with reduced development time and flexibility with metals solutions.</p> 		<p>25 - 7,400 A; 400 V, 575 V, 690 V</p> <p>DC drive with field controller that provides unparalleled flexibility, communication and programming capabilities in an industry where many long service DC motors continue to run. Retrofitting with Mentor MP maximizes motor performance, system reliability and digital interfacing with Ethernet and Fieldbus.</p> 	<p>1.1 kW - 2.8 MW (1.5 - 4,200 hp); 200 V, 400 V, 575 V, 690 V</p> <p>Flexible process & flow AC drive family that supports induction and PM motor technologies to optimize efficiency and is often used in secondary metals plant processes where fan, pumps and compressors are used, such as aspiration systems and blast furnace blowers.</p> 
Motors	Permanent Magnet motor	Asynchronous motor	DC motors	Servo motors
	<p>Dyneo® range</p> <p>0.75 - 550 kW (1 - 750 hp); 375 - 5,500 rpm</p> <p>Premium efficiency Permanent Magnet solutions combine with variable speed drive technologies.</p> <p>IP55 & IP23 and IE3 & IE4 derivative ranges.</p> 	<p>IMfinity®</p> <p>0.06 - 1,800 kW (0.8 - 2,500 hp)</p> <p>High and premium efficiency induction motors for fixed and variable speed. Non IE, IE2, IE3 derivative ranges.</p> 	<p>LSK and small DC</p> <p>0.1 - 750 kW (2.5 - 1,000 hp)</p> <p>Drip proof and enclosed DC motors that deliver constant torque at variable speed.</p> 	<p>Unimotor hd & fm</p> <p>0.72 - 136 Nm (6.4 lb.in - 100.3 lb.ft) (408 Nm / 300 lb.ft peak)</p> <p>Dynamic brushless AC servo motor ranges, designed for operation with our high performance drives, providing a high peak torque, low inertia automation solution often used in auxiliary metals applications.</p> 
Gears & Brakes	General purpose geared motors		General purpose brake motors	
	<p>30 - 23,000 Nm (22.1 - 16961.7 lb.ft)</p> <p>Range of helical, helical bevel and worm geared motor technologies to meet the various demands of industrial processes for standard or special environments.</p> 		<p>Braking torque up to 5,000 Nm (3,687.3 lb.ft)</p> <p>Motor power: 0.06 - 400 kW (0.8 - 550 hp)</p> <p>Brake motors for intermittent or continuous duty, dynamic braking or emergency stops.</p> 	



Easy-to-use and innovative system interfacing

Our latest generation products, HMIs and software tools, draw from extensive user research and human centered design principles. System integration, commissioning, optimization and monitoring is now even more intuitive, due to our use of:

- Industry standard communication protocols (e.g. Real-time Ethernet, EtherNet/IP and fieldbuses such as PROFIBUS, DeviceNet, CANopen and EtherCAT) and programming environments for seamless integration with existing metal plant operating systems and PLCs.
- Intuitive graphical software tools that enhance and simplify drive system commissioning and maintenance.
- Matched drive and motor mapping for automatic optimization.
- Popular SD cards in drives for quick and easy parameter and program storage.
- Remote control monitoring, enhancing machine up-time and performance.
- Onboard and optional intelligence and second processors offering the possibility of integrating distributed machine and motion control throughout our drive systems, often eliminating the need for external PLCs

Robust products to enhance reliability

Our drive and motor products have been designed and tested for leading robustness in harsh manufacturing environments, ensuring reliable operation. Features include:

- Conformally coated PCBs
- Current overload of between up to 200% is available for dynamic loads on AC drives
- Wide supply voltage tolerance
- Higher temperature operation with de-rating
- Intelligent 3 speed user-replaceable cooling fans with patented fan-fail detection circuit in our drives.

EMERSON. CONSIDER IT SOLVED.™

www.emersonindustrial.com/automation



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