



MOTION

Baked goods production

Boosting productivity,
safety and reliability

How to increase profitability without compromising quality

Changing consumer habits and tastes means bakeries not only need to produce identical, high volume products but also small batches of bespoke goods with shorter delivery times. Variable speed drives (VSDs)/variable frequency drives (VFDs), motors and PLCs now play an even greater role in adjusting production to meet these challenges.



Food and personnel safety



“I need to make my plant and personnel safety a priority.”

Tackle diverse safety demands...

- Employees must not be exposed to hazards: from operating mixers to risks associated with flour dust.

...using best-in-class technology

- Remote monitoring technology keeps personnel out of harms way.
- Advanced functions, like safe torque off, make sure operations come to a safe and efficient stop.
- Dust ignition certified motors and drives packages comply with demands of dusty and explosive environments.

“We must always meet food safety regulations.”

Conform to the latest safety standards...

- Processing equipment must meet strict hygiene standards to avoid any risk of contamination and eliminate food safety recalls.

...with solutions that build trust

- Compliance with high ingress protection standards can prevent product/motor failures in hygienic areas which are due to harsh washdowns/chemical is used.
- Solutions offer end-to-end traceability.



Energy efficiency



“We need to cut our energy bill and carbon footprint.”

Find the big energy consumers...

- Using ABB Ability™ Smart Sensors helps to spot energy saving opportunities among the many smaller powered general machinery and low voltage motors.
- Focusing on proving, baking and cooling can optimize energy consumption and lower costs by up to 60 percent.

... then unlock the saving potential

- Upgrading to high efficiency VSD/VFD-motor package reduces energy between 20 to 60 percent.
- IE4 and higher efficiency class motors are among the most efficient available, contributing to further energy reduction.
- Synchronous reluctance motor (SynRM) can reduce losses by up to 40 percent, bringing optimal efficiency and reliability.



Productivity improvement



“Our production must adapt quickly to meet evolving customer tastes.”

Keep production agile...

- Today, demand is for smaller and larger batches, with more variants and an ever-shorter time to market.
- Changing constant-speed equipment to provide varying production volumes takes time and money.
- Getting access to the right data and turning into useful information is difficult.

... with flexible motor-driven solutions

- Wide speed variation possible.
- Production increase often achieved without any extra investment.
- Safely interlink processes from production to logistics and warehousing, through fieldbus and in-built sensors.

“We need better intelligence on how production lines are performing.”

Locate the right information...

- Manually extracting plant data is time-consuming and inaccurate.

... through digital solutions

- Multiple inputs and outputs (I/Os) allow a variety of process information from the VSD/VFD to the motor control.
- Fieldbus technology enables process equipment to integrate with plant control systems, giving greater Intelligence and better control of production.

Operation and maintenance



“How can I control rising costs?”

Lower operational overheads...

- Operational costs must be controlled without comprising safety of plant, personnel or end product.

... through advanced maintenance regimes

- Soft starting avoids sudden shock loading, leading to less wear and tear to gears, belts and driven machine.
- ABB Ability™ Condition Monitoring services deliver accurate, real-time information about drive and motor events to ensure equipment is available, reliable and maintainable.
- ABB's global service network and preventive maintenance contracts relieve pressure on in-house teams and increase speed of response to critical issues.

“We need the most reliable products and systems to avoid unplanned shutdowns.”

Eliminate production risks ...

- Plant shutdowns are costly, from lost production time, spoiled goods and reputation damage.

... by utilizing smart functionality

- Temperature, load, under/overvoltage protection and warning features help anticipate breakdowns.
- A real-time clock allows timed tracing of faults, so you know what happened and when.
- Stainless steel motors last five times longer than standard motors in washdown environments.
- Robust motors feature best-in-class sealing system.
- Soft starters increase reliability in constant speed applications.

Controlling the details boosts productivity

Every stage of baked goods production can be fine-tuned to improve productivity, lower energy consumption and enhance safety.

1 DOUGH MIXING

Avoid damage to ingredients and ensure personnel safety.

Applications:

- Bowl or screw mixers
- Dosing pumps
- Belt or screw conveyors

Benefits

- Precise speed/ torque control brings consistent mixing and accurate dosing, leading to perfect product texture
- Built-in safe torque off protects personnel operating machinery

2 DOUGH FORMING

Precise product transfer reduces waste and improves quality.

Applications:

- Belt conveyors
- Rollers and extruders
- Stamping and cutting machines

Benefits

- Swift and repeatable movement between stamping, cutting and shaping leads to consistent quality products and less waste

3 DOUGH PROVING

Obtain perfect product texture with precision temperature control.

Applications:

- Belt conveyors
- Convection fans

Benefits

- Controlling air temperature, humidity and flow through fan control improves the texture, quality and consistency of products passing through the prover and oven

4 BAKING

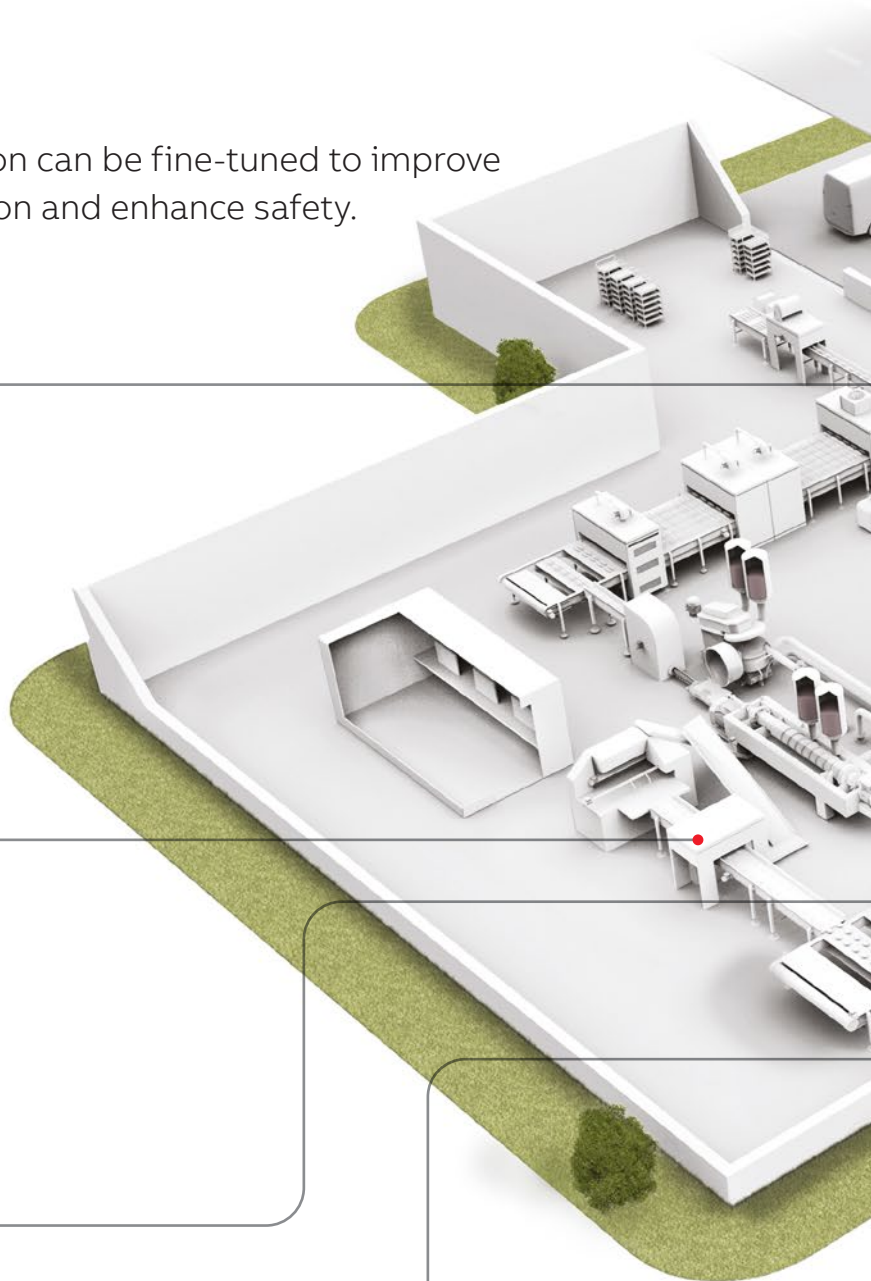
Gain control over the ovens – the biggest energy consumer.

Applications:

- Belt conveyors
- Convection fans

Benefits

- VSD/VFD fan control efficiently circulates air flow to regulate temperature and moisture, leading to shorter baking times. This results in less oven use and typically 20 to 60 percent energy saving.



6 PACKAGING

Products are rapidly transported using synchronized conveyors.

Applications:

- Belt and spiral conveyors
- Feeders
- Seaming and closing machines

Benefits

- Long spiral conveyors and speed-controlled belt conveyors in packaging areas have their speeds coordinated using VSDs/VFDs and motors. This creates a smooth, seamless transfer of products between stations.

5 FREEZING AND COOLING

Increase the energy efficiency of compressors and improve conveyor control.

Applications:

- Belt, screw and spiral conveyors
- Refrigeration compressors
- Water pumps
- Fans
- Cooling towers

Benefits

- Replacing throttle valve pump control with VSDs/VFDs and motors ensures correct compressor speed, saving up to 60 percent energy costs, while ensuring the correct cooling temperature
- Cooling towers benefit from longer uptime, lower maintenance costs and greater throughput
- Soft starters available for those machines with a high starting current, running constantly at full speed

Unlock the potential in your applications

Across all motor-driven applications the use of variable speed drives (VSDs)/variable frequency drives (VFDs) and high efficiency motors brings three consistent benefits: energy saving, improved productivity and greater safety.

Energy saving

A drive (VSD or VFD) saves between 20 to 60 percent in energy costs compared to a throttled control system. Depending on application power and speed range, users can choose between an induction motor or a synchronous reluctance motor (SynRM) to save the greatest amount of energy. Meanwhile, using VSDs/VFDs for compressor speed control delivers constant pressure, thereby saving energy and reducing pipework leaks.

Improved productivity







Directly controlling cooling water temperature through PID control yields product quality benefits as temperature spikes are avoided. Using direct drive motor technology with cooling towers, makes for easier maintenance as the gearbox and shafts are no longer required. Soft starters

result in up to 60 percent reduced stress and improved reliability. For conveyors, robust motors and VSDs/VFDs brings lower maintenance and increased process uptime.

Better food safety and personnel safety

Paint free motors avoid paint flakes contaminating ingredients. Stainless steel washdown motors and gearboxes and Ultra Klean bearings, meet stringent hygiene standards and conform to IP69 ingress protection. VSD/VFD safe torque off removes risks to staff working with high torque machines. ABB Ability™ Smart Sensors for motors and general machinery enable remote monitoring of performance, thereby removing the need for personnel to interface with potentially live machinery.

Application-specific benefits

	Feature	Benefit
	Chiller compressor <ul style="list-style-type: none"> Built-in harmonic mitigation Fewer and smoother starts Highly efficient motor and drive package 	<ul style="list-style-type: none"> Clean power network avoids Utility penalties Reduces maintenance costs Saves energy and money
	Cooling towers <ul style="list-style-type: none"> Eliminate gearbox, cooling system, driveshaft, couplings and bearings 	<ul style="list-style-type: none"> Reduces maintenance costs Improves reliability Lowers system noise
	Conveyors <ul style="list-style-type: none"> High precision control and repeatability Soft starts via VSD/VFD Reliable hygienic design in stainless motors 	<ul style="list-style-type: none"> Move baked goods uniformly and synchronize with other conveyors e.g. for the oven ensuring goods arrive in tact and on time Reduces operational costs by eliminating high peak starting loads Avoids drivetrain damage Improves food safety and process reliability Minimizes maintenance, cleaning and equipment replacement
	Mixers <ul style="list-style-type: none"> Variable speed offers variety of mixing options together with efficient motors Precise speed and torque control 	<ul style="list-style-type: none"> Increases range of baked goods Improves health and safety Thorough mixing leads to correct dough texture
	Pumps <ul style="list-style-type: none"> Dedicated software detects foam build up inside pipes 	<ul style="list-style-type: none"> Avoids cavitation, leading to improved end-product quality
	Fans, provers, ovens <ul style="list-style-type: none"> Replaces mechanical damper Precise oven fan temperature 	<ul style="list-style-type: none"> Improves performance and loading Avoids motor oversizing Reduces baking times

01



02



01 Programmable drives: Program your dough recipe's speed and torque requirements to safeguard ingredients for a consistent dough texture.

02 Maximize process uptime: Drives play a major role in enhancing the performance of the forming, rolling, stamping, seeding and setting stages.

03 Precise speed control: Each conveyor speed can be adjusted separately and synchronized to each other to make the conveying process seamless.

03



Features and functions that benefit bakeries

Drives, motors, PLCs and softstarters all play a vital part in keeping your production moving. Choosing the right product with the correct features is essential in ensuring an optimized production.



Variable speed drives/ variable frequency drives

Energy efficiency

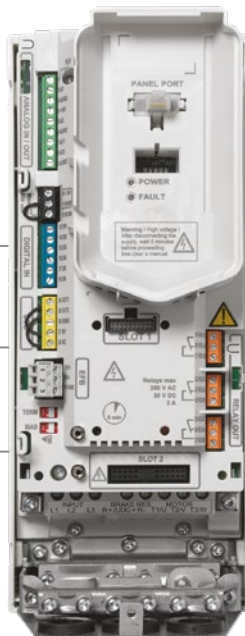
- Monitors indicate cost of energy in local currency, kWh and CO₂ emissions that help control operating costs

Reduced noise

- Reduce motor noise of a machine by adaptive switching frequency control thereby protecting staff health and safety

Low harmonics

- Built-in active supply unit and integrated low harmonic line filter eliminates supply disturbances that could trip production



Fieldbus compatible

- Information as diverse as oven temperature to dough recipe in mixers can be fed to the VSD/VFD to adjust motor speed and torque. Through fieldbus comms, the VSD/VFD can talk with plant monitoring systems to provide detailed insight into productivity performance and quality control.

Functional safety

- Safe torque off (SIL3) brings applications, like mixers, to a safe stop

Repeatability

- Conveyor speed can be constantly adjusted to ensure a consistent and repeatable flow of baked goods at each step of the process



Softstarters

Built-in bypass

- Reduce system complexity and size, saving time and money during installation
- Reduce heat generation from internal losses by activating bypass at full speed

Harsh environment use

- Ensure uninterrupted production in dusty or wet environments with IP66 keypad and coated electronics

Flexible communication

- Operate in local and remote mode by accessing all major communication protocols and built-in Modbus-RTU





Motors



Dry zone

- Easy to clean and install

Dust ignition protection

- Aluminum/cast-iron for explosive dust areas

Higher efficiency

- IE3, IE4 and IE5 efficiency class motors offering the lowest total cost of ownership

Hot temperatures

- Cast iron/aluminium, coated with a multilayer epoxy surface treatment to operate up to 90 °C with 100 percent humidity

Washdown/Hygienic area

- Hygienic design ensures food safety and reliability – stainless steel encapsulated motors withstand high pressure cleaning



+



Drive and motor packages

High efficiency motor and drive (SynRM/ EC Titanium)

- Save energy across all applications with IE5 ultra-premium efficiency motors and drive packages

Globally certified drives and motors packages

- Protect plant and people and conform to global regulations using tested and certified motors and drives for potentially explosive atmospheres



Programmable logic controllers (PLCs)

- Comprehensive range of scalable PLCs, I/Os and robust HMI control panels delivering performance, quality and reliability
- One integrated engineering tool for programming, simulation and commissioning for PLCs, safety, drives, control panels and network
- Flexible choice of network and fieldbuses to integrate I/O's, drives, HMI, Scada and 3rd party devices fulfilling the needs of tomorrow
- IIoT gateway functionality onboard the PLCs and control panels offer secure connection to cloud



From the factory floor to the cloud and beyond

ABB Ability™ Condition Monitoring for powertrains optimizes the performance and efficiency of electric motor-driven rotating equipment. It enables better decision making by providing real-time access to data on all parameters for drives, motors and general machinery.

1 Intelligent powertrain

The powertrain is equipped with sensors and cloud connectivity and can consist of motors, drives and general machinery.

2 Turning data into valuable insights

Data gathered through VSDs/VFDs' built-in sensors and loggers together with that collected from ABB Ability™ Smart Sensors fitted to motors and general machinery, can be collected, stored and further accessed via the cloud. The ability to gather and analyze this data insights paired with service expertise can reveal information on the status and condition of your equipment, so that service activities can be scheduled more effectively.



Accessing data for analytics

Detailed information can be extracted into a company's portal and systems. Information on many aspects of the bakery process is available, including the ability to know exactly when and how production equipment was cleaned. Detailed dashboards give full transparency so that you can take actions that lead to less downtime, extended equipment lifetime, lower costs, safer operations and increased profitability.



Gain a digital advantage

While the data is always at your disposal, ABB service experts can work with you to provide help on how you analyze the data and define the steps for improving your operations.

Ensuring that the right person is exposed to the right information at the right time brings:

- Appropriate response to production challenges, lowering operating costs and product waste.
- Greater insight into various aspects of the bakery process, thereby improving quality and reducing variations, errors and waste.
- Maximum material traceability helps fulfil regulatory compliance.
- Lower risk of production failure and change the maintenance from reactive to predictive.

Maintenance Manager



Energy Manager



Production Manager



Safety Manager



Our service expertise, your advantage

ABB Motion Services helps customers around the globe by maximizing uptime, extending product life cycle, and enhancing the performance and energy efficiency of electrical motion solutions. We enable innovation and success through digitalization by securely connecting and monitoring our customers' motors and drives, increasing operational uptime, and improving efficiency. We make the difference for our customers and partners every day by keeping their operations running profitably, safely and reliably.

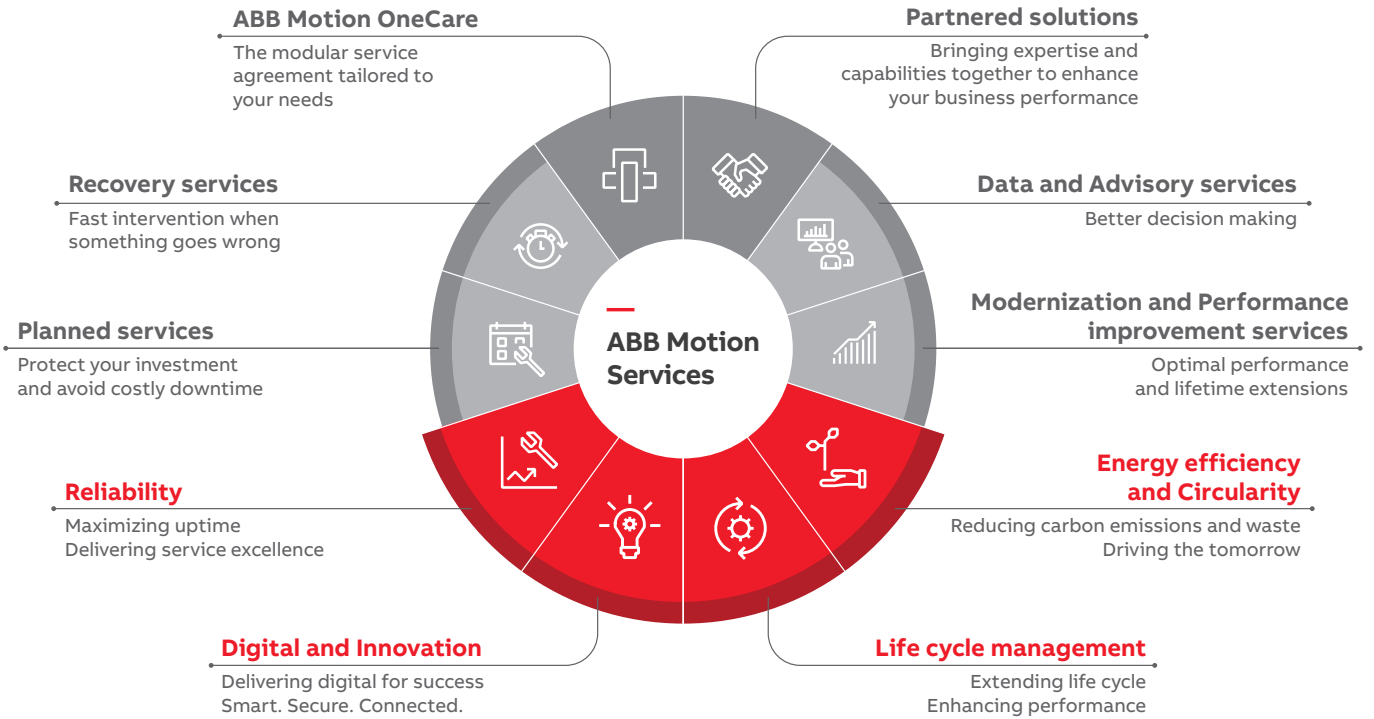
With a service offering tailored to your needs, ABB Motion Services maximizes the uptime and extends the life cycle of your electrical motion solutions, while optimizing their performance and maximizing your energy efficiency gains throughout the entire lifetime of your applications. We help to keep your applications turning profitably, safely, and reliably.

Digitalization enables new smart and secured ways to prevent unexpected downtime while optimizing the operation and maintenance of your assets. We securely connect and monitor your motors, drives or your entire powertrain to our easy to use cloud service solutions. Connecting your applications also gives you access to our in-depth service domain expertise.

We quickly respond to your service needs. Together with our partners, local field service experts, and service workshop networks, we provide and install original spare parts to help resolve any issues and minimize the impact of unexpected disruptions.

Our tailored to your needs service offerings and digital solutions will enable you to unlock new possibilities. Not only are we your premier supplier of motion equipment, we are your trusted partner and advisor offering support throughout the entire life cycle of your assets. We ensure your operations run profitably, safely and reliably and continue to drive real world results, now and in the future. Our service teams work with you, delivering the expertise needed to keep your world turning while saving energy every day.





OUR EXPERTISE
YOUR ADVANTAGE

With you, wherever you are in the world

Partnering with ABB, gives you access to some of the world's most innovative technology, expertise and solutions.

Global reach

ABB operates in over 100 countries with its own manufacturing, logistics and sales operations together with a wide network of local channel partners that can quickly respond to your needs. Stock availability is good, with short delivery times for many products backed by 24-hour spare parts delivery.

In addition, we work closely with bakery producers to develop custom products, services and solutions to help standardize processes across multiple sites and streamline your supply chain.

We have several global R&D centers with thousands of technologists and considerable investments annually on innovation.

End-to-end product portfolio

Alongside its variable speed drives (VSDs)/ variable frequency drives (VFDs), motors and soft starters, ABB's automation offering includes a wide range of scalable PLCs, a selection of HMIs, instrumentation and robotics. With functional safety options, from built-in safe torque off in drives to safety PLCs, you can readily implement safety requirements.



ABB's offering includes:

- End-to-end **power and automation solutions**, from power distribution, raw material receipt, to process and machine control, to end of line packaging
- **Power protection and power quality solutions** to safeguard equipment and processes
- Industry leading **robotic automation solutions** that improve your speed-to-market, flexibility and help make packaging a differentiator
- A complete range of **protection, connection and wire management solutions** that

withstand harsh environments and extreme temperature swings, and provide the reliability needed for continuous operations

Streamline sourcing

ABB's end-to-end product and services portfolio streamlines your sourcing and purchasing activities and standardizes production across multiple sites, saving you money on spare part inventories while reducing maintenance costs.





For more information, please contact
your local ABB representative or visit

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