



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) and motors 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



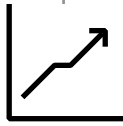
“We need to cut our energy bill and carbon footprint.”

Find the big energy consumers...

- Using ABB Ability™ Smart Sensors helps to spot energy saving opportunities among the many smaller powered pumps 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-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 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 and mechanical power transmission products 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

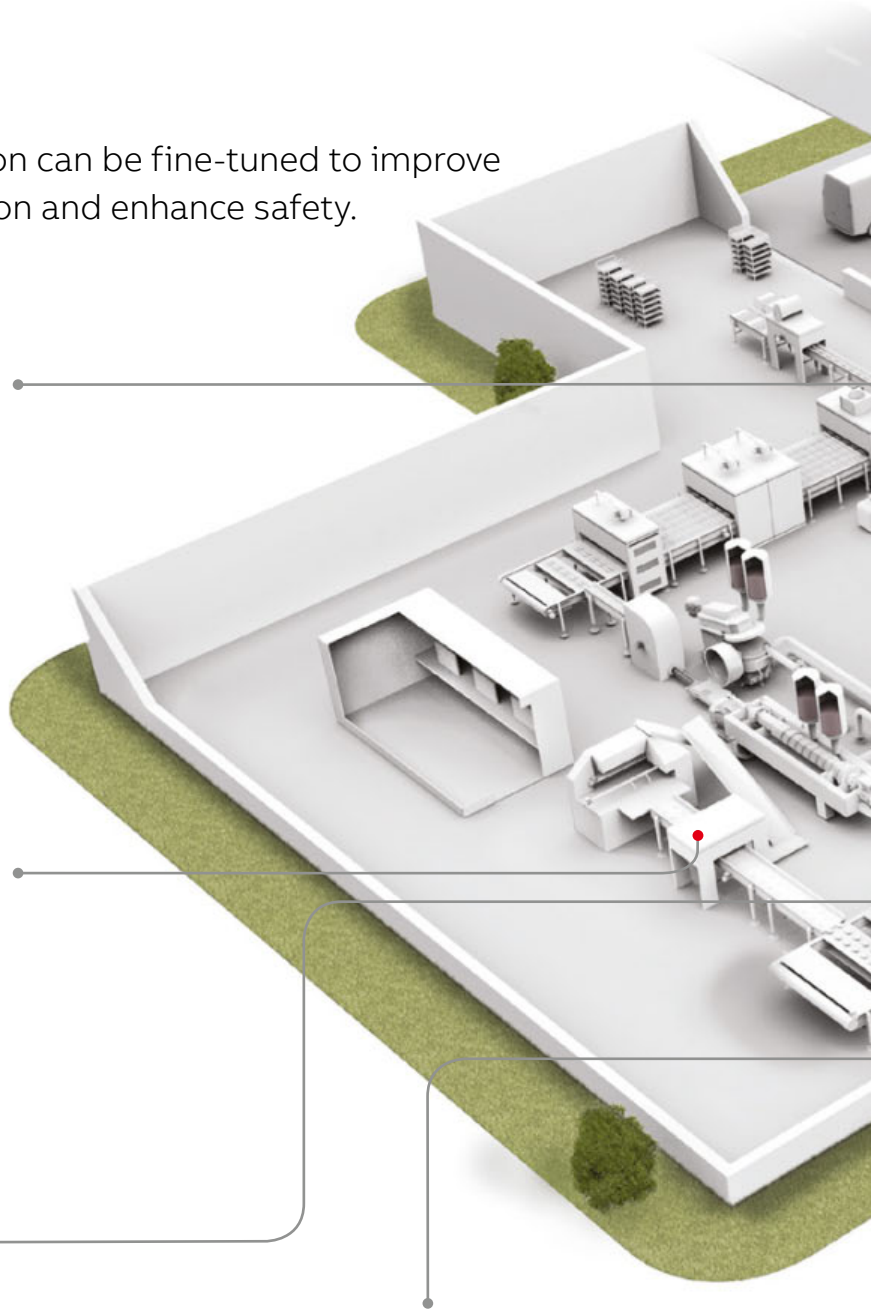
Gain control over the ovens - the biggest energy consumer

Applications:

- Belt conveyors
- Convection fans

Benefits

- VSD 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 and motors. This creates a smooth, seamless transfer of products between stations.

5 FREEZING AND COOLING

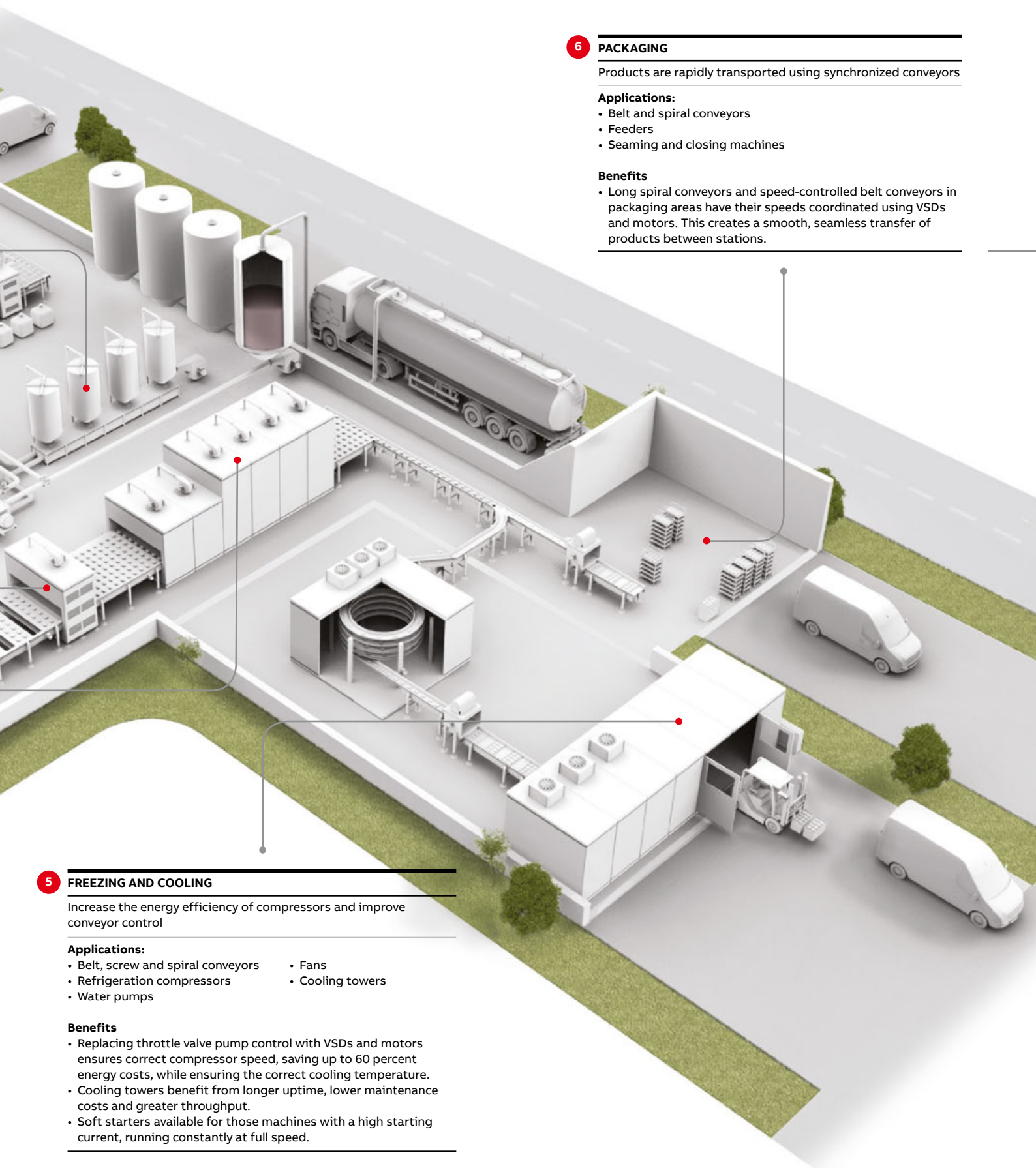
Increase the energy efficiency of compressors and improve conveyor control

Applications:

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

Benefits

- Replacing throttle valve pump control with VSDs 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 and high efficiency motors brings three consistent benefits: energy saving, improved productivity and greater safety.

Energy saving

A variable speed drive (VSD) 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 for compressor speed control delivers constant pressure, thereby saving energy and reducing pipework leaks.

Improved productivity




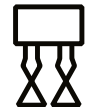


Directly controlling cooling water temperature through PID control yields product quality benefits as temperature spikes are avoided. Using direct drive motor technology with cooling towers, makes for easier maintenance as the

gearbox, bearings couplings and shafts are no longer required. Soft starters result in up to 60 percent reduced stress and improved reliability. For conveyors, best-in-class bearing sealing system and robust motors and VSDs 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 Kleen bearings, meet stringent hygiene standards and conform to IP69 ingress protection. VSD safe torque off removes risks to staff working with high torque machines. ABB Ability™ Smart Sensors for motors, bearings and pumps 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 Reliable hygienic design in stainless motors, gearboxes and bearing 	<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, soft starters, motors, gearing and mounted bearings all play a vital part in keeping your production moving. Choosing the right feature for the right environment is essential in ensuring an optimized production.



Variable speed drives

Energy efficiency

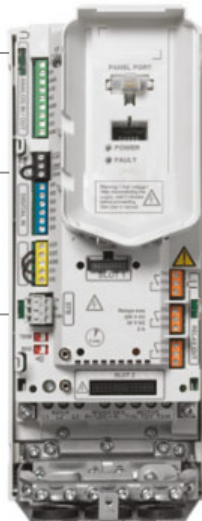
- Monitors indicate cost of energy in local currency, kWh and CO₂ emissions that help control operating costs.

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 to adjust motor speed and torque. Through fieldbus comms, the VSD 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

- At full speed, bypass is activated thereby reducing heat generation from internal losses. Bypass reduces system complexity and size, saving time and money during installation.

Harsh environment use

- IP66 keypad and softstarter's coated electronics provides ultimate protection in dusty or wet environments, ensuring uninterrupted production.

Flexible communication

- All major communication protocols, including built-in Modbus-RTU, enabling operation in local and remote control.





Motors

Dry zone

- Easy to clean and install.

Dust ignition protection

- Aluminum/ cast-iron for explosive dust areas.

Higher efficiency

- IE3, IE4 and higher 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

Synchronous reluctance motor (SynRM) and drive

- IE4 synchronous reluctance motor and drive package helps save energy on processes across the bakery.

Cooling tower packages

- An integrated solution that removes the gearbox and driveshaft from cooling towers thereby reducing energy use, vibration, noise and maintenance costs.

ATEX compliant drives and motors packages

- Tested and certified motors and drives for potentially explosive atmospheres which guarantee people and plant safety according to global regulations.



Gearings and bearings

Grip Tight ball bearings

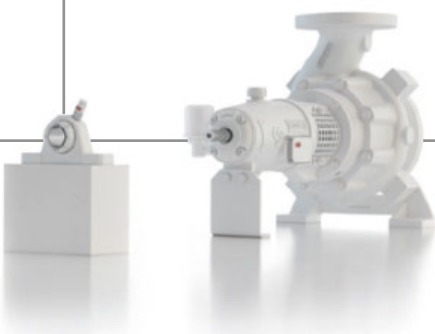
- Suitable for fans, the bearing locks to the shaft concentrically and, through the entire bearing bore, minimizes vibration.

E-Z Kleen coated insert ball bearings

- Ideal for bakeries, the bearing has either a stainless steel or reinforced polymer housing with a corrosion resistant, coated insert.
- Factory-filled with food grade grease, the bearings are designed to provide extended life in harsh washdown conditions.

Ultra Kleen stainless steel insert ball bearings

- Bearings feature a 100 percent stainless steel insert and are factory-filled with food grade grease.
- A patented sealing system creates four areas of protection to keep contaminants out and grease in.



From the factory floor to the cloud and beyond

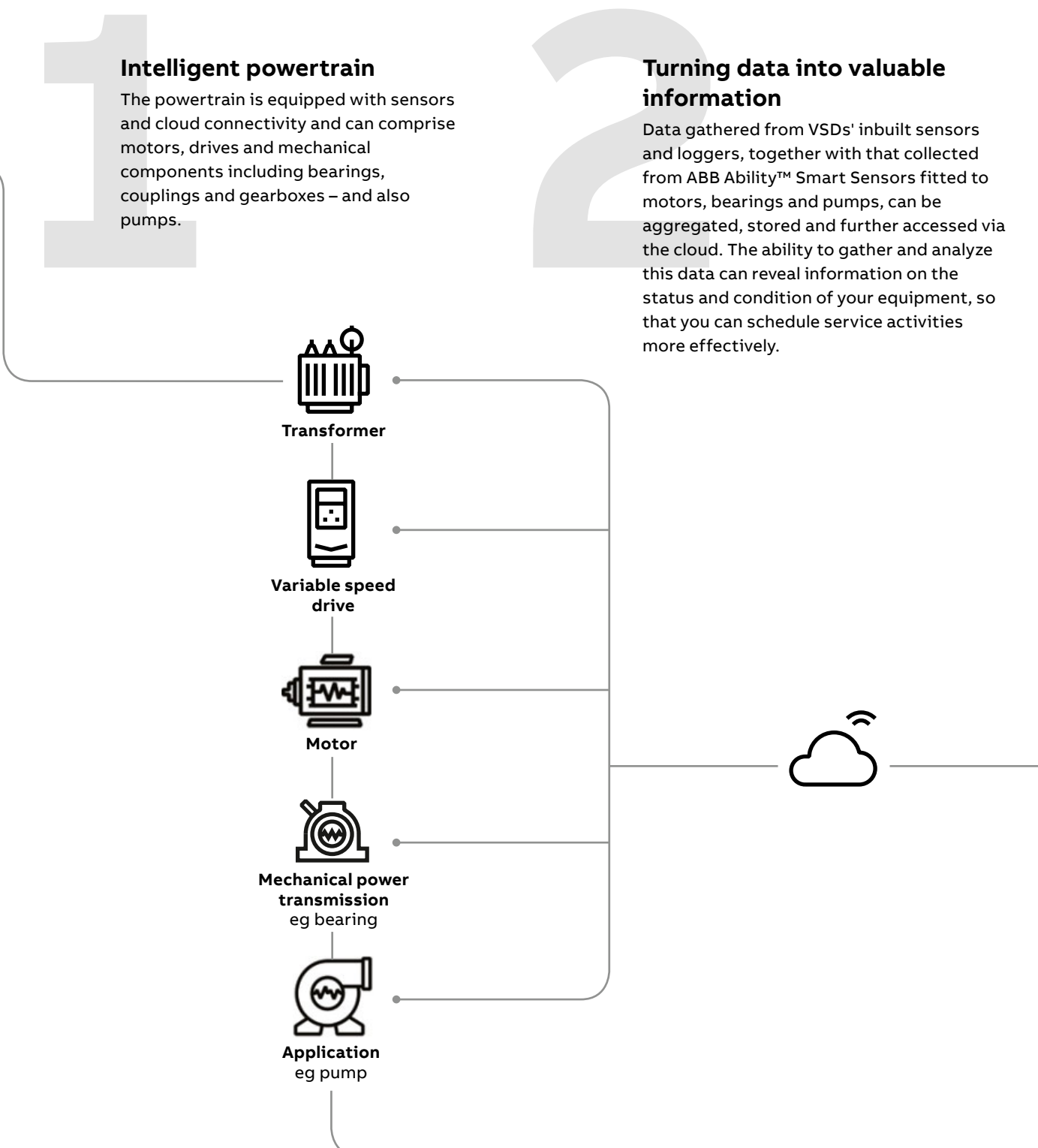
ABB Ability™ Condition Monitoring for powertrains optimizes the performance and efficiency of rotating equipment. It enables full transparency on all parameters for drives, motors, mounted bearings and pumps.

1 Intelligent powertrain

The powertrain is equipped with sensors and cloud connectivity and can comprise motors, drives and mechanical components including bearings, couplings and gearboxes – and also pumps.

2 Turning data into valuable information

Data gathered from VSDs' inbuilt sensors and loggers, together with that collected from ABB Ability™ Smart Sensors fitted to motors, bearings and pumps, can be aggregated, stored and further accessed via the cloud. The ability to gather and analyze this data can reveal information on the status and condition of your equipment, so that you can schedule service activities more effectively.



3 Accessing data for analytics

Through condition monitoring, detailed information on parameters like temperature and vibration can be extracted into a company's own portal and systems page. 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.



4 Gain a digital advantage

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

- Insight into production challenges, helping to control operating costs.
- Greater overview into various aspects of the bakery process, thereby improving quality and reducing variations, errors and waste.
- Lower risk of production failure.
- Change the maintenance from reactive to predictive.

Maintenance Manager



Energy Manager



Production Manager



Safety Manager



Keep your production running

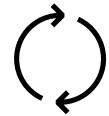
From spare parts and technical support to cloud-based remote monitoring solutions, ABB offers the most extensive service offering to fit your needs. The global ABB service units, complemented by external authorized value providers, form a service network on your doorstep. Maximize performance, uptime and efficiency throughout the life cycle of your assets.

Even before you buy a drive, motor or bearing, ABB's experts are on hand to offer technical advice from dimensioning through to potential energy saving.

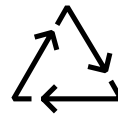
When you've decided on the right product, ABB and its global network of authorized value providers can help with installation and commissioning. They are also on hand to support you throughout the operations and maintenance phases of the products life cycle, providing preventive maintenance programs tailored to your bakeries' needs.

ABB will ensure you are aware of any upgrades or retrofit opportunities. By registering your drives and motors ABB's engineers will proactively contact you and advise on your most effective replacement option.

All of which helps maximize performance, uptime and efficiency throughout the lifetime of your powertrain.



Replacements
Fast and efficient replacement services to minimize production downtime.



End-of-life services
Responsible dismantling, recycling and reusing of products, according to local laws and industrial standards.



Maintenance
Systematic and organized maintenance and support over the life cycle of your assets.





Advanced services

Gain the unique ABB Ability™ digital advantage through data collection and analytics with advanced services.



Extensions, upgrades & retrofits

Up-to-date systems and devices with the best possible performance level.



Engineering & consulting

Ways to identify and improve the reliability, usability, maintainability and safety of your production processes.



Spares & consumables

Authentic, high-quality ABB spares and consumables with quick delivery.



Technical support & repairs

Quick and accurate response during emergencies and efficient support during planned production breaks.



Installation & commissioning

Highly-trained and reliable installation and commissioning experts at your service.



Training

Comprehensive and professional training either at ABB premises or your own.



Agreements

Comprehensive bundling of relevant services into one contract to suit your needs.

Global service network 24/7

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“I need operational excellence, rapid response, improved performance and life cycle management.”

With you, wherever you are in the world

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

Global reach

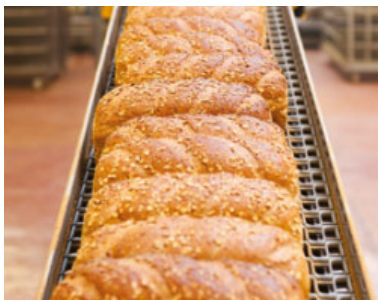
ABB operates in over 100 countries with its own manufacturing, logistics and sales operations together with a wide network of local authorized value providers that can quickly respond to your needs. Stock availability is good, with short delivery times for many products backed by 24-hour spare parts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

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

We have seven global R&D centers with more than 8,000 technologists and invest \$1.5 billion annually on innovation.

End-to-end product portfolio

Alongside its variable speed drives, motors, soft starters, bearings and couplings, 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 to safety PLCs, you can readily implement bespoke 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.





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

www.abb.com/drives

www.abb.com/drivespartners

www.abb.com/motors&generators