Meat, poultry and seafood production
Improving safety, efficiency, and sustainability
Tackling safety, efficiency, and sustainability

More than ever, consumers and retailers are driving innovation in meat, poultry and seafood production. Yet the demands for convenient and healthier foods, smaller portions and natural ingredients, packed in multiple ways, is placing critical importance on safety, efficiency and sustainability. Variable frequency drives (VFDs) and motors now play an even greater role in adjusting production to meet these challenges.

**Food and personnel safety**

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

**Energy efficiency**

“We need to cut our energy bill and reduce emissions.”

**Tackling diverse safety demands…**

- Protect employees from hazards inherent to process equipment, such as grinding, mixing, and cutting machines, as well as risks associated with heat treatment, conveyors and packing machinery.

**…using best-in-class technology**

- Remote monitoring protects personnel from potentially dangerous machinery.
- Advanced functions, like safe torque off, make sure equipment such as grinders and cutters come to a safe and efficient stop.

**Conform to the latest safety standards…**

- Changing legislation, aimed at improving hygiene and food safety, means producers need to adapt or update equipment to remain compliant.
- Processes demand machines with improved cleaning systems.
- 360-degree accessibility for cleaning and inspection of machinery.

**… with solutions that build trust**

- Complying with high ingress protection (IP) standards in hygienic areas can prevent product/motor failures caused by harsh washdowns/chemicals.
- Smooth design with no crevices ensures all areas can be cleaned thoroughly to prevent bacterial growth and contamination of fresh meat.

**Find the big energy consumers…**

- Using ABB Ability™ Smart Sensors for pumps and low voltage motors helps to spot energy saving opportunities with motors running refrigeration pumps to blast chiller fans.
- Focusing on pumping and cooling can optimize energy consumption and lower costs by up to 60 percent.

**… then unlock the saving potential**

- Upgrading to high efficiency VFD/motor solutions lowers energy usage from 20 to 60 percent and reduces carbon dioxide emissions.
- IE4 and higher efficiency class motors are among the most efficient available, contributing to further energy reduction.
- Synchronous reluctance motors (SynRMs) reduce total losses by up to 40 percent, bringing optimal efficiency and reliability.
- Using VFDs for pump control instead of throttling valves saves energy and reduces maintenance.
- ABB Ability™ Operations Data Management zenon software helps detect ways to boost productivity, optimize energy and resource consumption with excellent reporting functions that give full production transparency.
Productivity improvement

Keep production agile and accurate...
- Meat producers need to cut waste, especially in high-value meat products.
- Flexible machinery that can adapt rapidly to changing consumer demand is imperative.
- High starting torque and different processing speeds are often needed throughout the process, often within the same batch.

... with reliable motor-driven solutions from one supplier
- VFD/motor solutions can increase productivity, for example in slicing machinery for processed meats, often without any extra investment.
- Accurate rotation speeds save energy and contribute to high end-product quality in processes such as mixers and grinders.
- Correct speed control eliminates process interruptions.
- Mechanical stress on conveyors is reduced by a VFD's soft start function.

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

Locate the right information...
- Manually extracting plant data is time-consuming and inaccurate.
- Getting access to the right data and turning it into useful information can be difficult.

... through digital solutions
- Multiple inputs and outputs (I/Os) from the VFD to the motor-driven application provide a variety of process information.
- Open fieldbus systems enable easy VFD integration with any PLC or similar plant control system, giving greater insight for better production control, thereby avoiding product recalls.

Operation and maintenance

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

... through advanced maintenance regimes
- Controlled starting avoids sudden shock loading, leading to less wear and tear on gears, belts and driven machines.
- ABB Ability™ Condition Monitoring services deliver accurate, real-time information about VFD and motor events to ensure equipment is available, reliable and maintainable.
- ABB’s global service network and preventive maintenance without any extra investment.
- Accurate rotation speeds in processes, such as mixers and grinders, contribute to high end-product quality while saving energy.
- Correct speed control eliminates process interruptions.
- Mechanical stress on conveyors is reduced by a VFD’s soft start function.

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

Eliminate production risks ...
- Plant shutdowns are costly, as they can result in lost production time, spoiled meat products and reputation damage.

... by utilizing smart and reliable functionality
- Temperature, load, under/overvoltage protection and warning features help anticipate breakdowns.
- ABB Ability™ Smart Sensor’s condition monitoring functionality warns of potential failures, long before they happen, reducing unplanned downtime.
- A drive’s real-time clock allows timed tracing of faults, enabling you to know what happened and when.
- Stainless steel motors last five times longer than standard motors in washdown environments.
- Gearing and bearings designed for harsh conditions offer prolonged life through a best-in-class sealing system.
- Soft starters increase reliability in constant speed applications.
Fine-tuning the supply chain process

The sector’s processing techniques are as diverse as the variety of meat, poultry and seafood products available. Several discrete processing steps are common across the industry with each addressing the importance of food safety, traceability, water use and sustainable packaging.

1. DEBONING, SKINNING AND TRIMMING (FOR POULTRY PRODUCTION)
   Slaughter is a continuous process that is now fully automated. Deboning is semi-continuous with 75 percent manual activity.
   Applications:
   • Defeathering
   • Spiral conveyors
   • Pumps
   Requirements
   • Precise temperature control
   • Accurate tracking of electricity, gas and water use

2. CUTTING, FILLETING, DICING AND SLICING
   A semi continuous process. Generates large quantities of solid waste and wastewater.
   Applications:
   • Overhead conveyors
   • Cutters
   • Pumps
   Requirements
   • Meat products require better color, appearance, taste, texture, quality and higher yields.
   • Waste minimization

3. BLENDING AND GRINDING
   Larger pieces of soft, edible animal tissues can be reduced in size by passing them through meat grinders.
   Applications:
   • Overhead conveyors
   • Grinders
   • Mixers
   • Pumps
   Requirements
   • Grinders need to cut frozen meat or separate hard and soft tissue.
   • High intensity cleaning consumes a vast amount of water requiring efficient pumping and hygiene-compliant motors and drives
   • Programmable drives with accurate speed and torque control optimize the batch control or continuous process control
PACKAGING AND TRANSPORT
Safe movement of goods to match production.
Applications:
• Belt conveyors

Requirements
• Precise control and synchronization of conveyor speeds, avoiding sudden starts and stops that can damage prepared meats or packaged products.
• Conveyors can be run continuously, intermittently or at variable speed, so there is a need to reduce mechanical stress on gears and belts, lowering maintenance costs and increasing production time.

FREEZER TUNNEL
Used to quickly freeze products in a hygienic and controlled environment.
Applications:
• Belt conveyors
• Fans

Requirements
• Temperature changes cause paint to flake off of motors running fans in the high hygiene area, causing a food safety risk.
• Fans for blast chillers need to operate at an optimum speed to freeze meat while saving energy.
• Precise control of belt conveyors to ensure optimal freezing process.

COOLING AND REFRIGERATION
Improve energy efficiency and reliability of cooling pumps and fans. Freeze meat quickly, hygienically and efficiently.
Applications:
• Compressors
• Evaporator/cooling tower
• Cooling water pumps

Requirements
• Replacing throttle valve pump control can save up to 60 percent in energy costs, while ensuring the correct cooling temperature.
• Correct flow rates are required to provide precise cooling of products.
• Compressors require a high level of energy efficiency.
• High compressor reliability reduces downtime that can destroy end product.
• Avoid harmonic disturbances on electric networks which can have an impact on the overall plant and affect end-product quality.
Unlock the potential in meat, poultry and seafood production applications

Alongside energy saving, improved productivity and greater safety, there are many other benefits from using variable frequency drives (VFDs) and food safe motor technology on motor-driven applications.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
<th>Benefits</th>
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<tbody>
<tr>
<td><strong>Pumps</strong></td>
<td>• Minimize water use during process equipment and pipe line cleaning.</td>
<td>• Drives: Clean-In-Place (CIP) with easy-to-use pump control software provides the correct pressure and flow rate to pipe clean and fill functions.</td>
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<td>• High energy user.</td>
<td>• Motor and drive solutions: With half the speed only 1/8 of power is needed.</td>
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<tr>
<td>• Often located in hygienic areas. • Shrouded pump motors are difficult to clean and do not fulfill hygiene requirements.</td>
<td>• Stainess steel motors: IP69 protection. • Paint free-motors: for less demanding environments.</td>
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<tr>
<td>• Circulate right amount of cooling water in pipe lines essential for correct speed.</td>
<td>• Motor and drive solutions: Vary water flow rates.</td>
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<td><strong>Cutters</strong></td>
<td>• Extreme cleaning and washing can lead to regular component failure.</td>
<td>• Stainless steel motors: Wash-down duty motors with hygienic design. • Motors: Protect against extreme wash down conditions up to IP69.</td>
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<tr>
<td><strong>Compressors</strong></td>
<td>• Provide cold air to achieve the required temperature, precisely and energy efficiently.</td>
<td>• High efficiency motor/drive solutions (SynRM) provides energy savings to IE5 standard.</td>
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<tr>
<td>• Ensuring ultimate reliability of compressor operation.</td>
<td>• Softstarters: Suitable for motors running at full speed. • Drives: Extend speed range of compressor.</td>
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<tr>
<td>• Harmonics cause interruptions, interference and downtime.</td>
<td>• Ultra-low harmonic drives: Harmonic mitigation built-in.</td>
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<td><strong>Conveyors</strong> (inc. overhead, belt, chain, turn &amp; transfer, roller/turntables, screw)</td>
<td>• Precise, smooth and consistent control and synchronization of conveyor speeds.</td>
<td>• Drives: Built-in brake chopper provides precise control of conveyor deceleration rate(s), without external hardware. • Safe torque off (SIL3) prevents unexpected movement of conveyor.</td>
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<tr>
<td>• Ultimate reliability and safety so production never stops.</td>
<td>• Motor and drive solutions: Continuous, intermittent or variable speed operation.</td>
<td></td>
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<tr>
<td>• Food safety and hygiene requirements demand harsh washdown protection.</td>
<td>• Food Safe motors and mechanical power transmission products.</td>
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<tr>
<td><strong>Mixers/Grinders</strong></td>
<td>• High starting torque, wide processing speed range and precise control within a batch is often needed to ensure the best quality of raw material.</td>
<td>• Drives: Direct torque control provides accurate speed and torque control for batch or continuous process control.</td>
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<tr>
<td>• Environmental legislation demands a quiet environment.</td>
<td>• Adaptive switching frequency control adjusts motor speed.</td>
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<tr>
<td>• High torque application creates serious safety risk.</td>
<td>• Safe torque off.</td>
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<tr>
<td><strong>Cooling towers</strong></td>
<td>• Belt driven cooling towers are costly to maintain due to mechanical parts wear.</td>
<td>• Cooling tower solutions: Eliminates start-up current peaks, fewer parts, low noise level and increased safety.</td>
</tr>
</tbody>
</table>
Direct torque control provides accurate grinding/mixing speed and torque control, and adapts to batch or continuous process control.

VFD provides precise, smooth and consistent control and synchronization of conveyor speeds.

Food Safe stainless steel motors can withstand extreme wash down conditions, helping them last 5 times longer than general purpose motors.
Features and functions benefiting meat, poultry and seafood processes

Drives, soft starters, motors, gearing and mounted bearings all play a vital part in keeping your production moving. Choosing the right products and features for the right environment is essential in ensuring an optimized production.

Variable frequency drives

- **Anti-cavitation software**
  - Extend pump life and secure the process by detecting cavitation and ensuring optimal process or liquid flow.

- **Energy efficiency**
  - Control operating costs by seeing energy costs in local currency, kWh and CO₂ emissions.

- **Fieldbus compatible**
  - Use information such as flow rates and separator centrifuge speeds to get the VFD to adjust motor speed and torque.
  - Get detailed insight into productivity performance and quality control through fieldbus comms connecting VFD with plant monitoring systems.

- **Flying start**
  - Reduce wear and save time by starting a motor while the load is still spinning.

- **Functional safety**
  - Safely stop applications like grinders, cutters, mixers, and separators using built in safe torque off (safety level SIL3).

- **Low harmonics**
  - Eliminate supply disturbances that could trip production with built-in active supply unit and integrated low harmonic line filter.

- **Reduced noise**
  - Protect staff health and safety with lower motor noise through adaptive switching frequency control.

- **Repeatability**
  - Accurately adjust conveyor speed to suit different products.

- **Ingress protection**
  - IP55 for washdown zones

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.

Drive and motor solutions

- **High efficiency motor and drive (SynRM)**
  - Save energy across the meat, poultry and seafood production process with IES efficiency motors and drive solutions.

- **Cooling tower solutions**
  - Reduce energy, vibration, noise and maintenance costs using a solution that removes the gearbox from cooling towers.
  - Special low-speed permanent-magnet motor.

- **Globally certified drives and motors solutions**
  - Protect plant and people and conform to global regulations using tested and certified motors and drives for potentially explosive atmospheres.
### Motors
- IP69 for water rating ensures suitability for aggressive, clean-in-place washdown procedures.
- Uses H1 grease to lower risk of food contamination.

### Bearings
- Smooth stainless-steel housing without a grease fitting designed to minimize harboring points.
- IP69 for water rating ensures suitability for aggressive, clean-in-place washdown procedures.
- Sealed and lubed-for-life bearings to minimize maintenance costs.

### Gearing
- Two-piece harsh duty seal.
- Factory-filled using H1 food grade synthetic oil.
- Totally enclosed, no paths for contamination.
- Some models available in quill style or 3-piece coupled NEMA.

### Food zone 1
- Eliminate risk of paint chips entering food chain with paint free motor.
- Surface is easy to clean.

### Splash zone 2
- Stainless steel or corrosion resistance bearings in stainless or polymer housing.
- Extend bearing life in harsh washdown conditions using factory-filled food grade grease.

### Dry zone 3
- High quality painted motors made of aluminum or cast iron.
- ABB Ability™ Smart Sensor ready.

### Additional Features
- 13 step coating system.
- Provides 3x the corrosion resistance of epoxy paint.
- Factory-filled using H1 food grade synthetic oil.
- Premium sealing systems used to keep contaminants out and lubrication in.
- Accessories available for protection and safety in high humidity, excessive dusty and dirty, or even extremely dry environments.
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.

**Intelligent powertrain**
The powertrain is equipped with sensors and cloud connectivity and can consist of motors, drives, mechanical components including bearings, couplings, gearboxes and pumps.

**Turning data into insight**
ABB Ability™ enables you to monitor both onsite and remote assets and collect data from the VFD’s built-in sensors and data loggers, as well as from smart sensors fitted to motors, bearings, and pumps. This data can be used to evaluate efficiency of operation as well as diagnose conditions to ensure appropriate decisions are made.
Accessing data for analytics
Detailed information can be extracted into a company’s own portal and systems. Information on many aspects of the production 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
Ensuring that the right person is exposed to the right information at the right time brings:

• Appropriate response to production challenges, minimizing operating costs and product waste.
• Greater insight into various aspects of the production process, thereby improving quality and reducing variations, errors and waste.
• Maximum material traceability to meet regulations.
• Lower risk of production failure and change 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. ABB and its local partners form a service network at your doorstep and help you to maximize performance and ensure uptime and efficiency through the life cycle of your assets.

With you every step of the way
Even before you buy a drive, motor, bearing or softstarter, 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 partners can help with installation and commissioning. They are also on hand to support you throughout the operations and maintenance phases of the product’s life cycle, providing preventive maintenance programs tailored to your food processing facility’s needs.

ABB will ensure you are aware of any upgrades or retrofit opportunities. If you’ve registered your drives and motors with us, then our engineers will proactively contact you advising on your most effective replacement option. All of which helps maximize performance, uptime and efficiency throughout the lifetime of your powertrain.
**Agreements**
Comprehensive bundling of relevant services into one contract to suit your needs.

**Extensions, upgrades & retrofits**
Up-to-date systems and devices with the best possible performance level.

**Technical support & repairs**
Quick and accurate response during emergencies and efficient support during planned production breaks.

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

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

**Engineering & consulting**
Resources who can provide ways to identify and improve the reliability, usability, maintainability and safety of your production processes.

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

**Global service network 24/7**

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

**Training**
Comprehensive and professional training either at ABB or your site.
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 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 meat, poultry and seafood 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 frequency 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 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 and 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

new.abb.com/drives
new.abb.com/drives/segments/food-and-beverage