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

More than ever, consumers and retailers are driving the 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 speed drives (VSDs) and motors now play an even greater role in adjusting production to meet these challenges.

Tackle diverse safety demands...
- Employees must not be exposed to hazards, from process equipment such as mixers, grinders and cutting machines like band saws and bowl cutters, to 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 can prevent product/motor failures in hygienic areas which are due to harsh washdowns/chemicals used.
- 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 either pumps and/or low voltage motors helps to spot energy saving opportunities among the motors running refrigeration pumps through 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 VSD-motor package lowers energy between 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.
- By controlling pumps with VSDs instead of throttling valves, energy is saved and maintenance is reduced.
- ABB Ability™ Operations Data Management zenon software helps detect ways to optimize energy and resource consumption. Offers excellent reporting functions that give full production transparency.

—
“Tackling safety, efficiency and sustainability

Food and personnel safety

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

Energy efficiency

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

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

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

... with reliable motor-driven solutions from one supplier
- VSD-motor packages can increase productivity, for example in slicing machinery for processed meats, often without any extra investment.
- Accurate rotation speeds contribute towards high end-product quality in processes such as mixers and grinders, while saving energy.
- Correct speed control eliminates process interruptions.
- Mechanical stress on conveyors is reduced by a variable speed drive’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) allow a variety of process information from the VSD to the motor-driven application.
- Open fieldbus systems allow easy VSD integration to any PLC or similar plant control systems, giving greater insight, information and better production control, thereby avoiding product recalls.

Operation and maintenance

“How can I control rising costs?”

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

... through advanced maintenance regimes
- Soft 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 VSD 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.
- With VSD pump control software, cleaning time is shorter. Less water and fewer cleaning materials are needed.

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

Eliminate production risks ...
- Plant shutdowns are costly, from 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 upcoming failures, long before they happen, reducing unplanned downtime.
- A drive’s 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.
- 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 strive for 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 from soft tissues.
   - High intensity cleaning consumes 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 mixer 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 flake off from motors running fans in the high hygiene area, causing food safety risk.
• Fans for blast chillers need to operate at best speed to freeze meat while saving energy.
• Precision 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 energy costs, while ensuring the correct cooling temperature.
• Correct flow rate is needed to provide precise cooling of products.
• Compressor needs high level energy efficiency.
• High compressor reliability to avoid downtime destroying end product.
• Avoid harmonic disturbances to electric network which can impact on overall plant and effect 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 speed drives (VSDs) and food safe motor technology on motor-driven applications.

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Solutions</th>
<th>Benefits</th>
</tr>
</thead>
</table>
| **Pumps**  | - Minimize water use during process equipment and pipe line cleaning.  
- High energy user.  
- Often located in hygienic areas.  
- Shrouded pump motors are difficult to clean and do not fulfill hygiene requirements.  
- Circulate right amount of cooling water in pipe lines essential for correct speed. | - Clean-in-Place (CIP) with easy-to-use pump control software gives correct pressure and flow rate to pipe clean and fill functions.  
- Running motor at half speed requires only 1/8 of power.  
- Stainless steel motors: IP69 protection.  
- Vary water flow rates. | - Cleaning time is shorter.  
- Use less water and cleaning materials.  
- Typically, up to 40 percent energy savings compared to throttled control system.  
- Easy to comply with hygiene requirements in the most reliable way. You save money and time on cleaning.  
- Avoiding traditional throttling valves saves energy as right pump speed achieved. |
| **Cutters** | - Extreme cleaning and washing can lead to regular component failure. | - Stainless steel motors: Wash-down duty motors with hygienic design.  
- Motors: Protect against extreme wash down conditions up to IP69. | - Motors can last 5 times longer than standard motors leading to lower total cost of ownership. |
| **Compressors** | - Provide cold air for required temperature, precisely and energy efficiently.  
- Ensuring ultimate reliability of compressor operation.  
- Harmonics cause interruptions, interference and downtime. | - High efficiency motor-drive package (SynRM) provides energy savings to IE5 standard.  
- Softstarters suitable for motors running at full speed.  
- Ultra-low harmonic drives have harmonic mitigation built-in. | - Typically, up to 40 percent energy savings across speed range.  
- Avoids wear and tear to mechanical parts, ensuring uptime.  
- Harmonic content is reduced by up to 97 percent.  
- Genuine unity power factor with no compensation needed. |
| **Conveyors** (inc. overhead, belt, chain, turn & transfer table, roller/turntables, screw) | - Precise, smooth and consistent control and synchronization of conveyor speeds.  
- Ultimate reliability and safety so production never stops.  
- Food safety and hygiene requirements demand harsh washdown protection. | - The 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.  
- Continuous, intermittent or variable speed operation.  
- Food Safe motors and mechanical power transmission products. | - Each conveyor speed adjusted separately and synchronized to ensure material flow between process stages.  
- Goods arrive in time and undamaged.  
- Less maintenance increases process uptime.  
- Lower maintenance costs by reducing mechanical stress on gears and belts.  
- Meet hygiene requirements without compromising on reliability and productivity. |
| **Mixers/Grinders** | - High starting torque, wide mixing speed range and precise control within same batch is often needed to ensure best quality from raw material.  
- Environmental legislation demands a quiet environment.  
- High torque application creates serious safety risk. | - Direct torque control provides accurate speed and torque control and adapts to batch or continuous mixer control.  
- Adaptive switching frequency control adjusts motor speed.  
- Safe torque off. | - Mixing accuracy increases productivity, saves energy and improves safety.  
- Reduced motor noise.  
- Improves operational safety. |
| **Cooling towers** | - Belt driven cooling towers are costly to maintain due to mechanical parts wear. | - Cooling tower package eliminates start-up current peaks, fewer parts, low noise level and increased safety. | - Lower total cost of ownership through reduced maintenance costs. |
01 Direct torque control provides accurate mixing speed and torque control, and adapts to batch or continuous mixer control.

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

03 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 speed drives**

**Anti-cavitation software**
- Extend pump lifetime 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 VSD to adjust motor speed and torque.
- Get detailed insight into productivity performance and quality control through fieldbus comms connecting VSD with plant monitoring systems.

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

**Operational safety**
- Safely stop applications like mixers and separators using in-built 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 packages**

**High efficiency motor and drive (SynRM)**
- Save energy across the meat, poultry and seafood production process with IE5 efficiency motors and drive packages.

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

**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.
<table>
<thead>
<tr>
<th>Motors</th>
<th>Bearings</th>
<th>Gearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>• IP69 for water rating ensures suitability for aggressive, clean-in-place washdown procedures.</td>
<td>• Smooth stainless-steel housing without a grease fitting designed to minimize harboring points.</td>
<td>• Two-piece harsh duty seal.</td>
</tr>
<tr>
<td>• Uses H1 grease to lower risk of food contamination.</td>
<td>• IP69 for water rating ensures suitability for aggressive, clean-in-place washdown procedures.</td>
<td>• Factory-filled using H1 food grade synthetic oil.</td>
</tr>
<tr>
<td></td>
<td>• Sealed and lubed-for-life bearings to minimize maintenance costs.</td>
<td>• Totally enclosed, no paths for contamination.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Some models available in quill style or 3-piece coupled NEMA.</td>
</tr>
<tr>
<td><strong>Food zone 1</strong></td>
<td><strong>Splash zone 2</strong></td>
<td><strong>Dry zone 3</strong></td>
</tr>
<tr>
<td>• Eliminate risk of paint chips entering food chain with paint free motor.</td>
<td>• Stainless steel or corrosion resistance bearings in stainless or polymer housing.</td>
<td>• 13 step coating system.</td>
</tr>
<tr>
<td>• Uses H1 grease to lower risk of food contamination.</td>
<td>• Extend bearing life in harsh washdown conditions using factory-filled food grade grease.</td>
<td>• Provides 3x the corrosion resistance of epoxy paint.</td>
</tr>
<tr>
<td>• Surface is easy to clean.</td>
<td></td>
<td>• Factory-filled using H1 food grade synthetic oil.</td>
</tr>
<tr>
<td><strong>Bearings</strong></td>
<td><strong>Gearing</strong></td>
<td><strong>Motors</strong></td>
</tr>
<tr>
<td>• High quality painted motors made of aluminum or cast iron.</td>
<td>• Multiple housing styles, bore sizes and locking mechanisms.</td>
<td>• Premium sealing systems used to keep contaminants out and lubrication in.</td>
</tr>
<tr>
<td>• ABB Ability™ Smart Sensor ready.</td>
<td>• Variety of sealing options to protect the bearing from contamination.</td>
<td>• Accessories available for protection and safety in high humidity, excessive dusty and dirty, or even extremely dry environments.</td>
</tr>
<tr>
<td></td>
<td>• Roller bearings have patented easy-on, easy-off adapter mounting and removal system.</td>
<td></td>
</tr>
</tbody>
</table>
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 comprise motors, drives, mechanical components including bearings, couplings and gearboxes – and also pumps.

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 collated, 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.
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 wastage of products.
• Greater insight into various aspects of the production process, thereby improving quality and reducing variations, errors and waste.
• Maximum material traceability which helps to fulfil regulatory compliance.
• Lower risk of production failure and changes the maintenance from reactive to predictive.
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 value providers, form a service network on your doorstep. Maximize performance, uptime and efficiency throughout 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 global network of ABB Value Providers can help with installation and commissioning. They will support you throughout the operations and maintenance phases of the products 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.

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

Engineering & consulting
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.”

—

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

Global service network 24/7
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 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.
For more information, please contact your local ABB representative or visit

new.abb.com/drives
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