



MOTION

## **Poultry farming**

Boosting safety, productivity  
and sustainability – from egg  
to broiler production

# Helping poultry housing make the grade

As customer demands evolve, the need to improve poultry welfare, maintain a sustainable environment and retain profitability, are being achieved with the latest IoT-enabled powertrain components. Variable speed drives/variable frequency drives, for instance, are highly reliable devices with a mean time between failure (MTBF) exceeding 60 years (or over 500,000 hours), while often achieving in excess of 50 percent energy saving.



## End-user



“Only happy hens lay efficiently. Poultry require a draft free and dry house. Proper ventilation, humidity and temperature management is essential.”

**Energy & Facilities Manager**

### Challenges

- Poultry are very sensitive to temperature and require the best cooling and heating system inside the house.
- Sustainability means ensuring the energy footprint is totally optimized: from drying manure and using the pellets as heat, to embracing renewables.
- Target is optimum energy efficiency, lower bills and reduced CO<sub>2</sub> emissions.

### Solutions

- Applying VSDs and high efficiency motors to as many applications as practical – from ventilation fans and pumps to conveyors and hammermills – reduces energy use by up to 60 percent and cuts maintenance needs.



## Consultant



“The layer houses I design need to meet the strictest animal welfare codes while fulfilling the world’s ever-changing sustainability regulations.”

### Challenges

- Focus is to protect the health and safety of chickens and personnel.
- Ultra-reliable automation systems are critical to meet the egg laying demand.
- There is a push to make layer houses self-sufficient in their energy use.

### Solutions

- VSDs, softstarters, motors and generators are critical to the continuous operation of ventilation, conveying, emergency power back-up and pumping systems.
- Powertrain equipment helps meet specific design requirements, while reducing power consumption and increasing safety for poultry and personnel.



### System Integrator



“Component compatibility with common standards and interfaces ensures smooth integration and trouble-free commissioning.”



### Original Equipment Manufacturer (OEM)



“We require components that are reliable, priced realistically, available for instant delivery and from suppliers with a global reach.”

#### Challenges

- Connecting and integrating components into ventilation, conveying or pumping systems must be straightforward, ensuring smooth interoperability.
- Efficient layer house management requires detailed access to fault logs and operational data for condition monitoring and troubleshooting.
- Equipment reliability is vital to avoid breakdowns and damaged reputations.

#### Solutions

- Support of all major communication protocols ensures VSDs, softstarters and PLCs are an integral part of a building management system and can contribute to an overall control strategy.

#### Challenges

- A portfolio of automation technologies that are matched and fully compatible from selection and dimensioning to installation and commissioning.
- Local supply of genuine spare parts and field servicing engineers is essential for machinery shipped globally.

#### Solutions

- Broad offering including VSDs, motors, PLCs, HMIs, safety products, choice of real-time Ethernet technologies, software programming.
- Global service network and preventive maintenance contracts relieve pressure on in-house teams and increase speed of response to critical issues.

# Improving operational efficiency boosts output and profitability

A typical egg production facility is home to over 100 variable speed drives/ variable frequency drives controlling motors in a diverse array of applications. The aim is to ensure production is optimized, efficient, reliable, and safe.

## 1 FOOD MIXING AND DOSING

Feed for the chickens is produced in food kitchens. Trucks despatch food ingredients like corn and molasses which are stored in silos. Ingredients are transferred to a cleaning and grinding process before being mixed to a recipe which varies depending on the time of day. Augers transfer the day-specific feed into the relevant storage bunker.

### Applications:

- Pumps
- Conveyors
- Hammermills/grinders
- Mixers
- Augers

### Requirements:

As food kitchen is 24-7 with a process of cleaning, grinding and mixing ingredients, reliability is of utmost importance.

## 2 WASHING, SORTING, AND PACKAGING

Automatic washers remove manure and other debris from the shells, the wastewater of which is pumped to holding tanks before being transferred to fields for crop irrigation. Cameras can detect any cracks in the eggs before machines are used to sort the eggs by size and then packed into appropriate-sized trays. Robots are used to stack the trays ready for transportation.

### Applications:

- Pumps
- Synchronized conveyors
- Packaging machines
- Refrigeration & cooling

### Requirements:

Gentle conveyor control, smooth transfer between belt systems, refrigeration to ensure eggs retain freshness and quality.

## 3 LAYER HOUSES

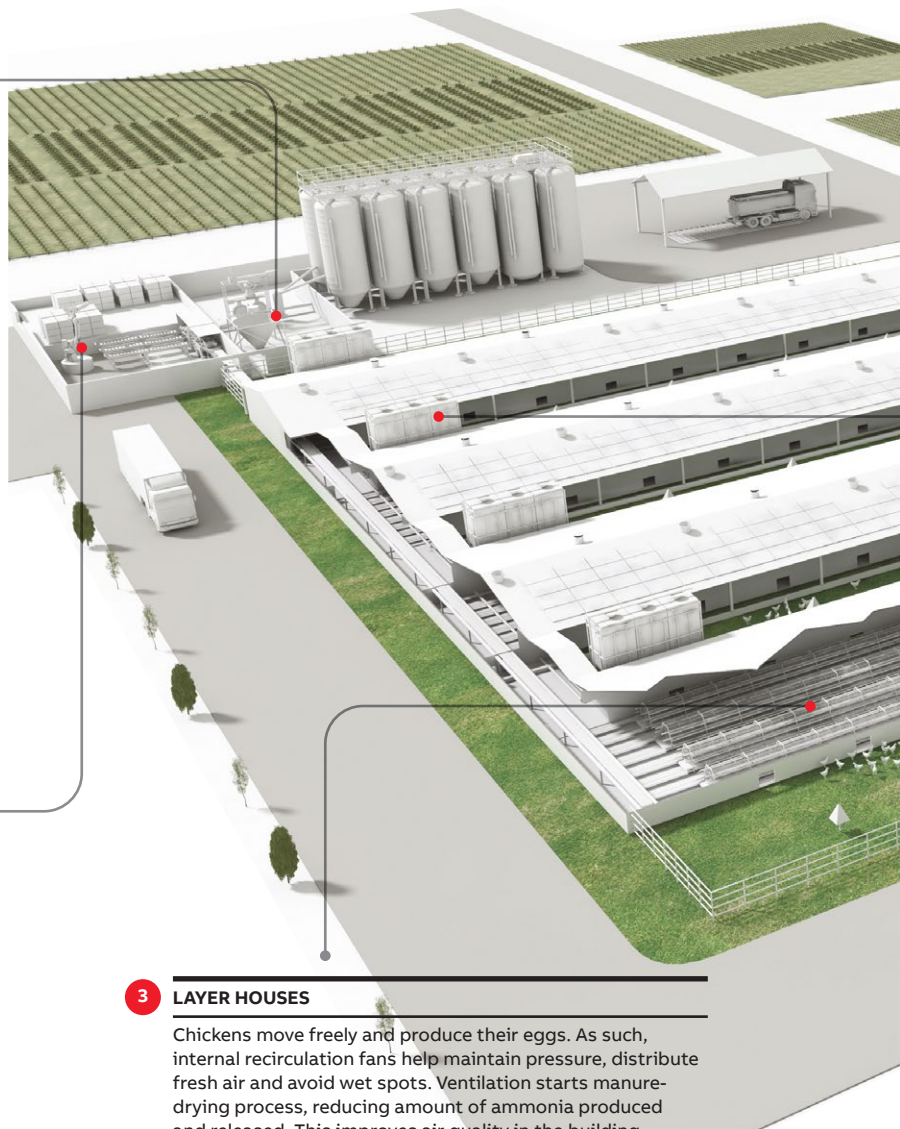
Chickens move freely and produce their eggs. As such, internal recirculation fans help maintain pressure, distribute fresh air and avoid wet spots. Ventilation starts manure-drying process, reducing amount of ammonia produced and released. This improves air quality in the building and increases nutrient value of manure. Each layer house typically shelters between 50,000 to 100,000 chickens. Eggs are collected on conveyors and transferred to the sorting and packaging area.

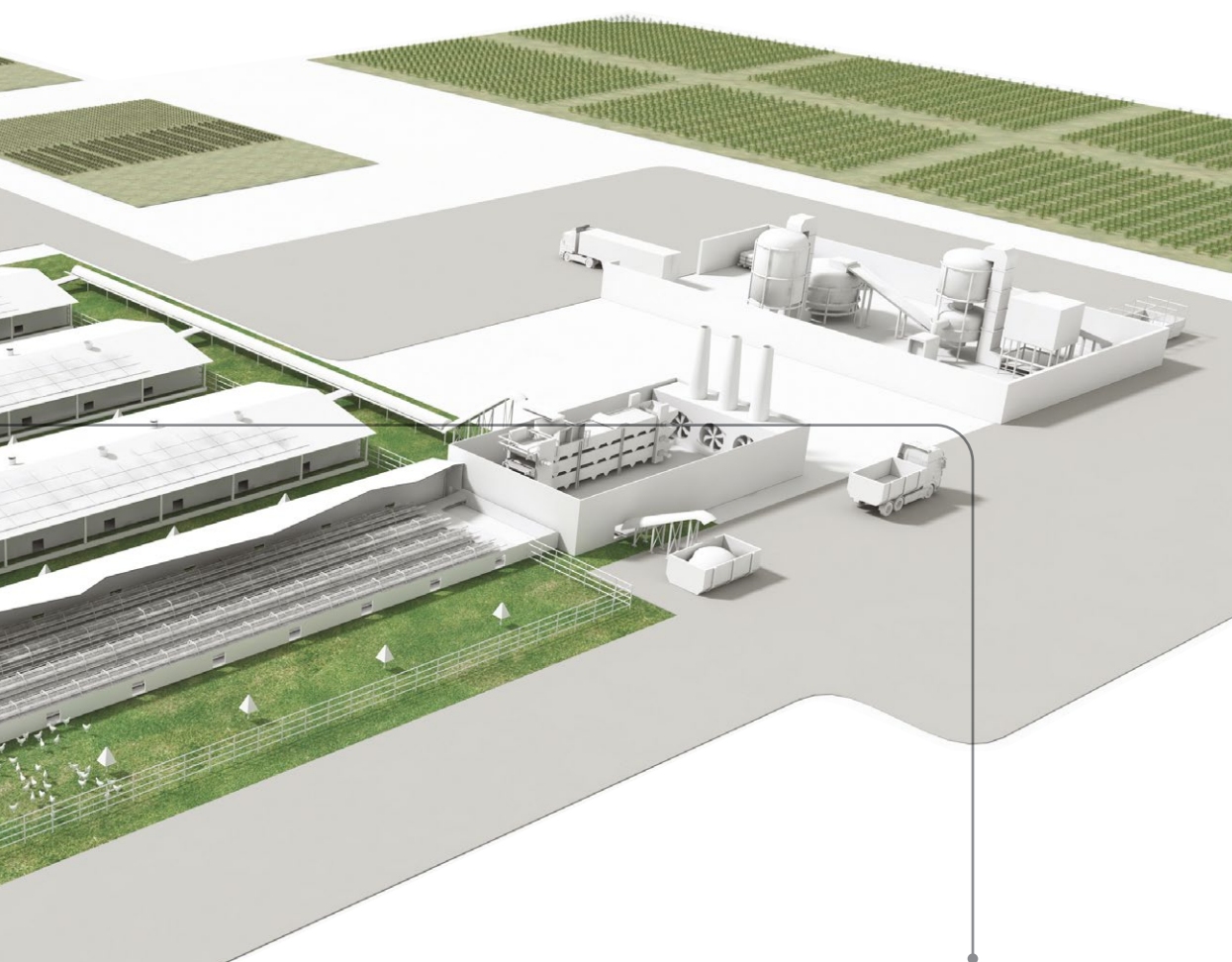
### Applications:

- Conveyors
- Air handling units
- Recirculation fans
- Air scrubbers

### Requirements:

Eggs automatically roll from cages to conveyor for prompt collection and refrigeration.





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#### STORAGE BUNKERS

Three compartments, with each storing separate recipe suitable for different times of day. During night, chicken is in house. From 07:00 to 11:00 chickens lay 95% of eggs. Layer house doors are then opened and creates over-pressure which makes it easier for chickens to leave house. In afternoon, chickens are encouraged to return to layer house by feeding high calcium food.

##### Applications:

- Conveyors
- Feeders

##### Requirements:

Fans are adjusted to create an underpressure, so air pressure goes from outside, in, making it easier for chicken to enter the house.

# Climate control in poultry houses

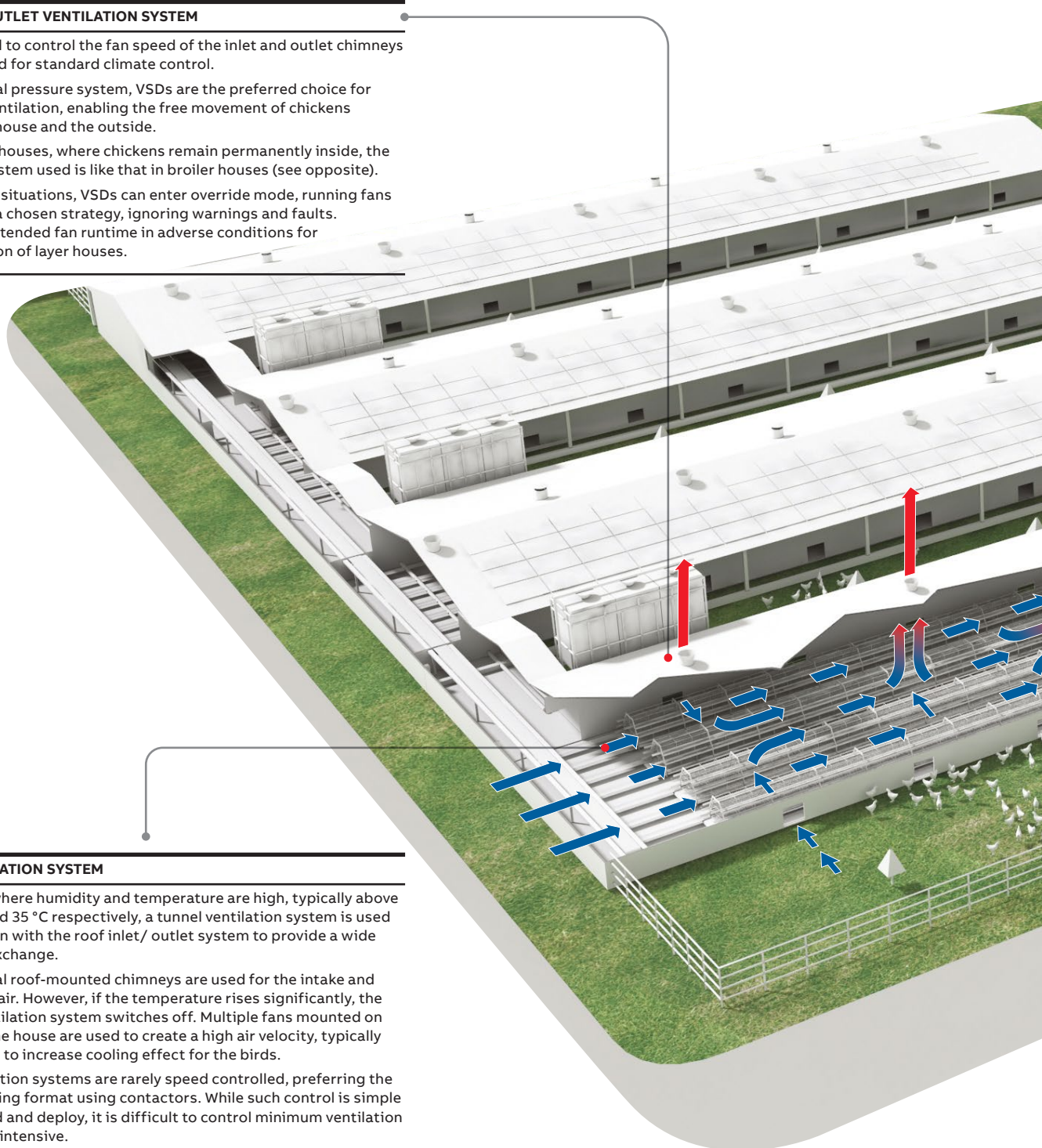
With a high reliability and many safety and protection functions built-in, VSDs offer a perfect solution for ventilation systems.

## ROOF INLET/ OUTLET VENTILATION SYSTEM

- VSDs are used to control the fan speed of the inlet and outlet chimneys which are used for standard climate control.
- With this equal pressure system, VSDs are the preferred choice for controlling ventilation, enabling the free movement of chickens between the house and the outside.
- In some layer houses, where chickens remain permanently inside, the ventilation system used is like that in broiler houses (see opposite).
- In emergency situations, VSDs can enter override mode, running fans according to a chosen strategy, ignoring warnings and faults. This allows extended fan runtime in adverse conditions for safe evacuation of layer houses.

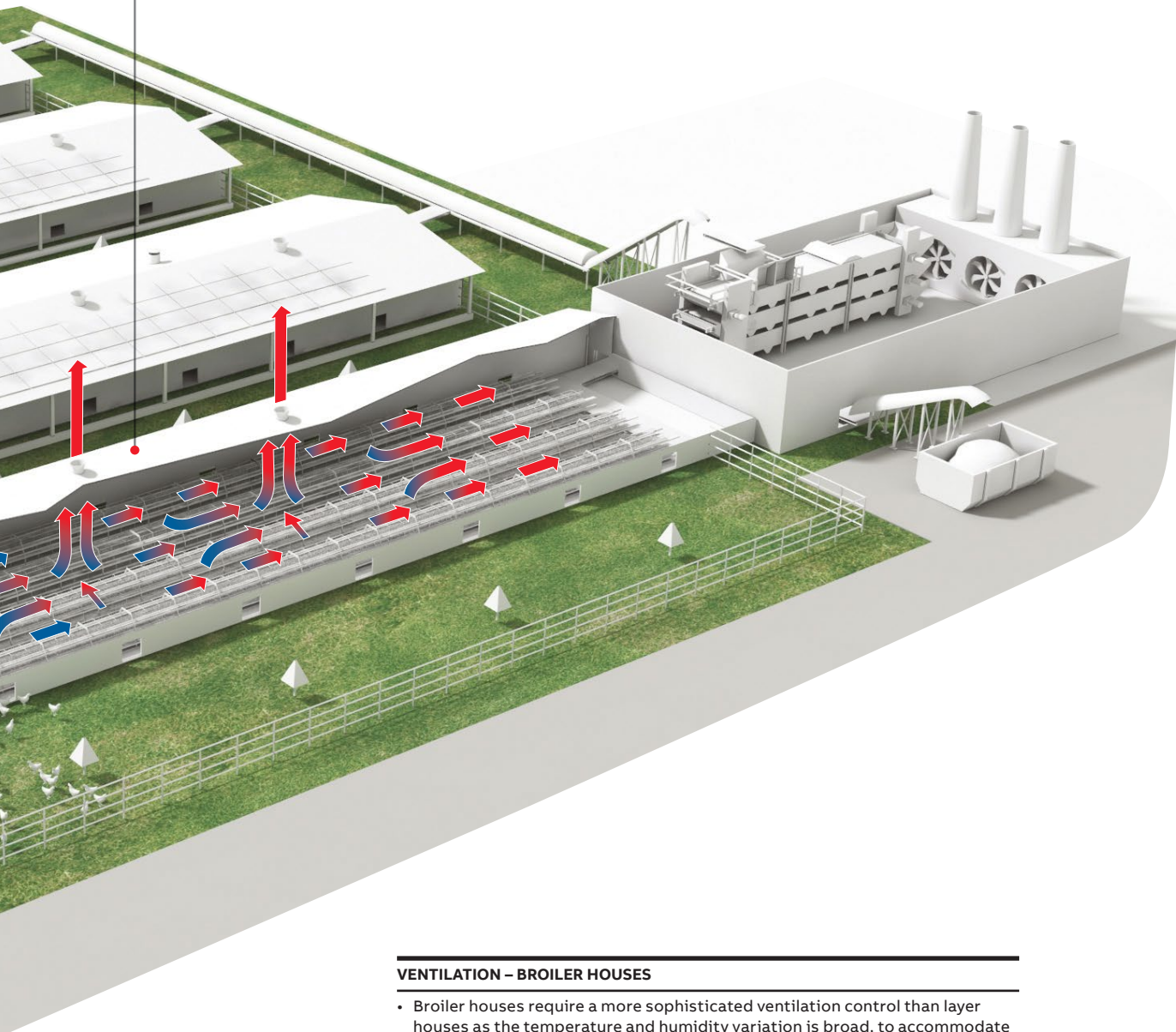
## TUNNEL VENTILATION SYSTEM

- In countries where humidity and temperature are high, typically above 80 percent and 35 °C respectively, a tunnel ventilation system is used in combination with the roof inlet/ outlet system to provide a wide range of air exchange.
- The traditional roof-mounted chimneys are used for the intake and extraction of air. However, if the temperature rises significantly, the standard ventilation system switches off. Multiple fans mounted on the walls of the house are used to create a high air velocity, typically 3 m/s / 10 f/s, to increase cooling effect for the birds.
- Tunnel ventilation systems are rarely speed controlled, preferring the on-off switching format using contactors. While such control is simple to understand and deploy, it is difficult to control minimum ventilation and is energy intensive.
- In some countries the minimum speed is controlled with a VSD and the fans are only switched on/off when a high ventilation level is needed. This is referred to as a cascade system, whereby using just 20 percent of total fan load, speed control of all fans can be achieved.



#### VENTILATION – LAYER HOUSES

- As chickens can freely venture inside and outside of the layer house, the roof inlet/ outlet ventilation system simply draws in fresh air and extracts CO<sub>2</sub>, ammonia, particulate matter and moisture, while equalizing the overall pressure within the house.



#### VENTILATION – BROILER HOUSES

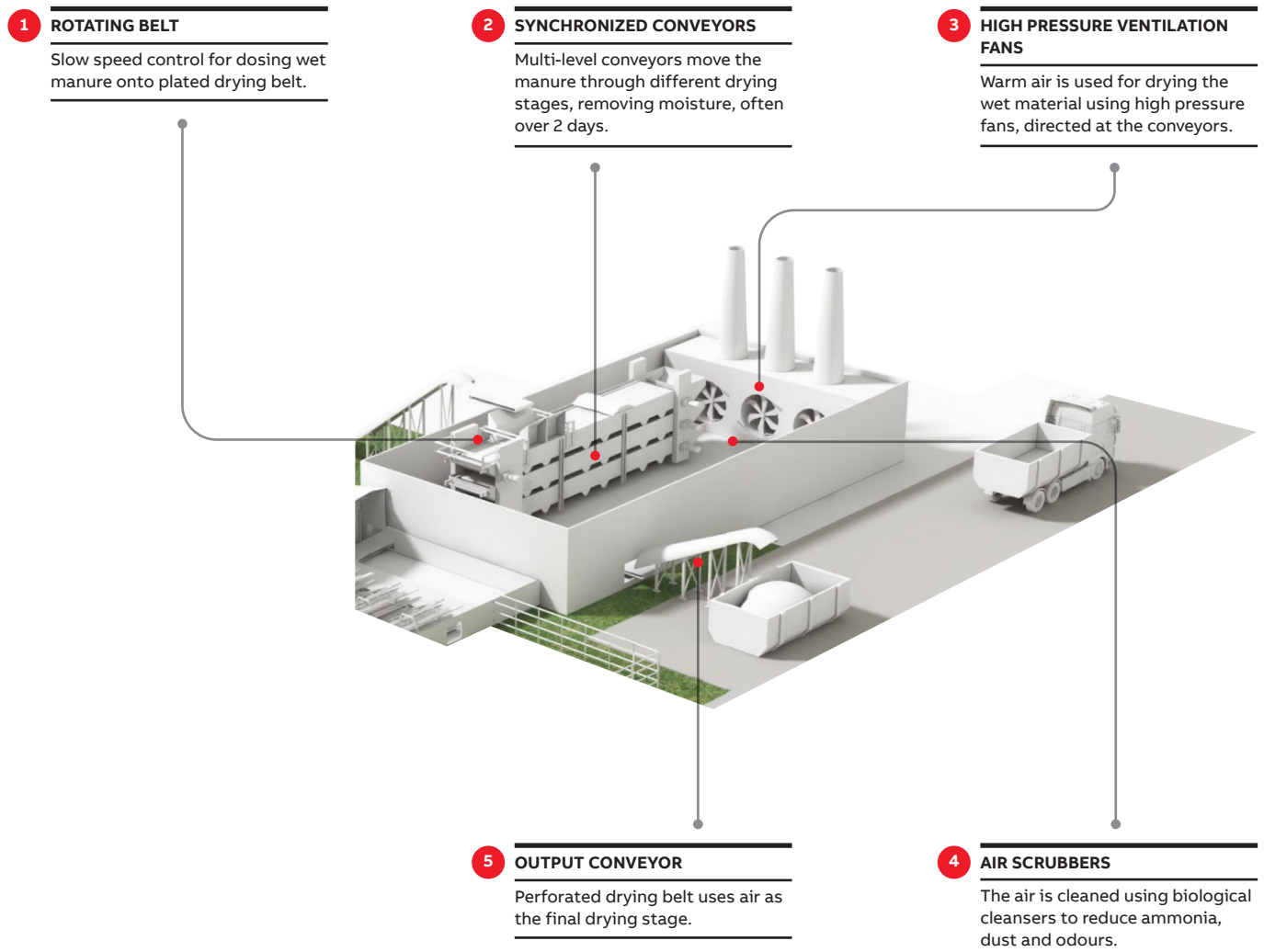
- Broiler houses require a more sophisticated ventilation control than layer houses as the temperature and humidity variation is broad, to accommodate the air needs as 50 g / 1.8 oz chicks mature into 3.5 kg / 7.7 lbs chickens.
- Chicks need very little air and so a small number of fans will be switched on for several minutes only. This enables a low ventilation level to be reached.
- Each time the fans are switched on/ off they must open/ close all the inlet valves, leading to mechanical components needing to respond.

# Focus on manure drying...

## Helping to reduce ammonia, dust and odors...

Manure drying is a critical process as the cost of shipping wet manure is extremely high. After drying, the manure can be used to produce fertilizer or fuel for boiler systems. Robustness of mechanical and electronic system for use in harsh environment. System needs to run continuously to manage the chicken's waste product.

**VSDs, motors and PLCs can be used on the following applications bring energy saving, high reliability and low maintenance costs:**

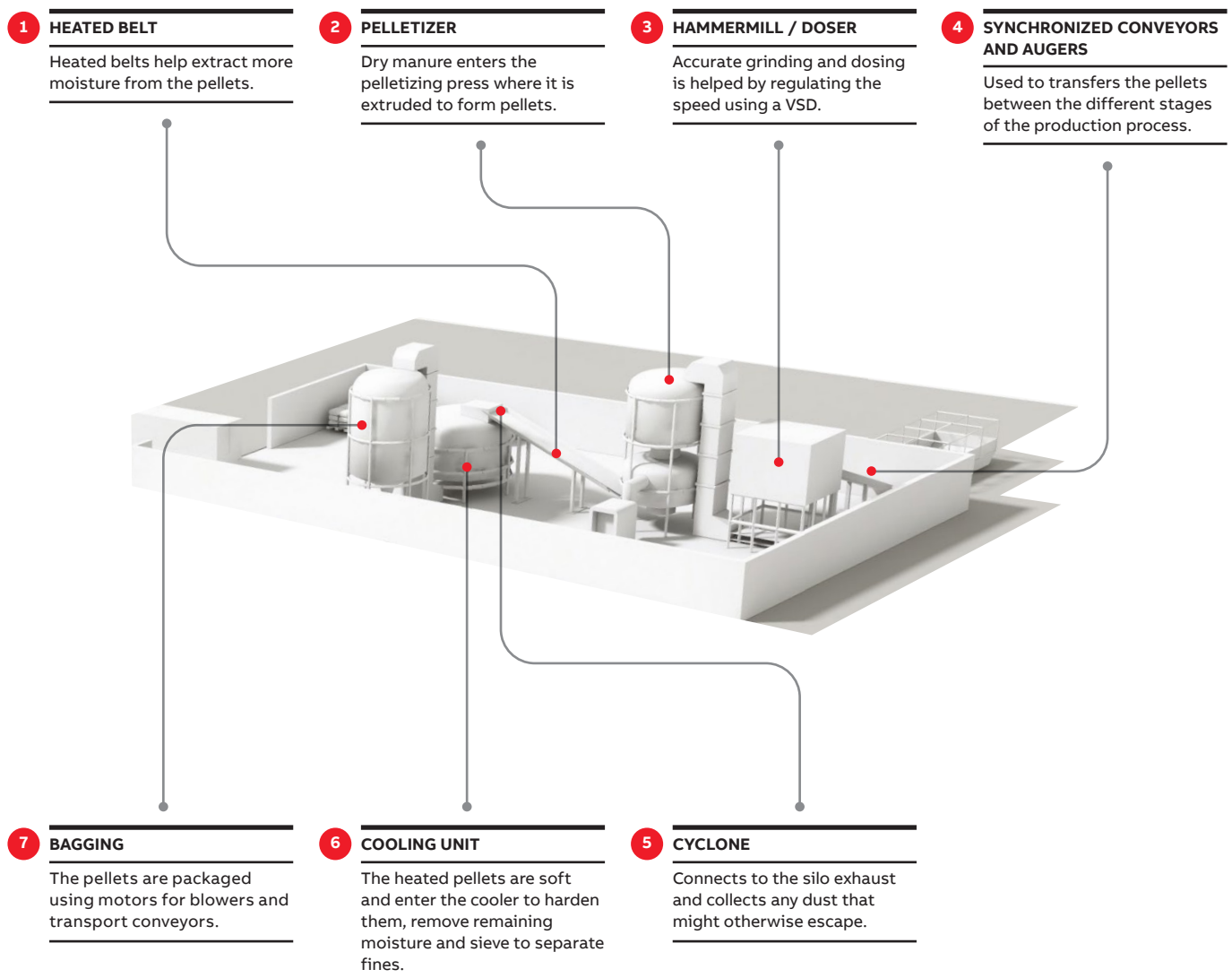


# ...and pellet production

## ... while protecting against harsh environments

Dried manure is converted to fertilizer (or fuel) pellets for volume or dust reduction, transport and ease of packaging. The harsh environment requires IP55 enclosures and integrated closed loop controllers.

**VSDs, motors and PLCs can be used on the following applications bring energy saving, high reliability and low maintenance costs:**









# Maximizing application potential throughout poultry farming

Egg production is needed to meet growing population demands. There is a need to ensure facilities are optimized and efficient, to remove emissions, ammonia and fine dust while saving energy and enhancing food safety and overall productivity.

	Challenge	Solution	Benefit
 <b>Augers (Spiral conveyor)</b>	<ul style="list-style-type: none"> <li>Demand high reliability as constantly start and stop as the feed's mixing and dosing requirements change throughout the day</li> </ul>	<ul style="list-style-type: none"> <li>Reliability of ABB VSD and motor package provides maximum uptime across all required speed changes, ensuring feed is transported safely, quickly and without being separated</li> </ul>	<ul style="list-style-type: none"> <li>On-time food delivery for chickens</li> <li>Fewer, if any, auger breakdowns</li> </ul>
	<b>Conveyors</b> <ul style="list-style-type: none"> <li>Egg fragility demands a gentle, seamless transfer of products from chicken to tray</li> </ul>	<ul style="list-style-type: none"> <li>PID control provides constant feedback loop so motor always operates at correct speed, while automatically compensating for any external factors</li> <li>This prevents conveyor drift</li> </ul>	<ul style="list-style-type: none"> <li>Fewer damaged eggs maintains healthy profitability</li> </ul>
 <b>Fans</b> <ul style="list-style-type: none"> <li>Air handling units</li> <li>Recirculation fans</li> <li>High pressure ventilation fans</li> </ul>	<ul style="list-style-type: none"> <li>Drying and pelletizing manure is costly and demands accurate dosing to avoid waste</li> </ul>	<ul style="list-style-type: none"> <li>Using VSD to control motor means speed is more carefully ramped up and down</li> <li>Manure is moved uniformly and synchronized with other conveyors</li> </ul>	<ul style="list-style-type: none"> <li>High precision control and repeatability leads to a higher quality fertilizer</li> </ul>
	<ul style="list-style-type: none"> <li>Motor control centers are located remotely from conveyor, incurring costly, long motor cables</li> </ul>	<ul style="list-style-type: none"> <li>Robust IP55/65 motor and VSD package located close to motor</li> <li>C4 conformal coating inside the VSD protects sensitive electronics</li> </ul>	<ul style="list-style-type: none"> <li>Reduced cable costs and lower risk of EMC disturbance</li> </ul>
	<ul style="list-style-type: none"> <li>Good ventilation systems must deliver fresh air inside the house and remove excess heat, moisture and undesirable gases from the house</li> </ul>	<ul style="list-style-type: none"> <li>VSDs offer:               <ul style="list-style-type: none"> <li>easier to equalise pressures</li> <li>low energy consumption</li> <li>low noise levels</li> <li>long service life</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Longer interval between maintenance</li> </ul>
	<ul style="list-style-type: none"> <li>Pressure between inside and outside layer house needs to be equalized to enable free entry and exit of chickens</li> <li>Traditional direct-on-line fan control cannot control over- or under-pressure</li> </ul>	<ul style="list-style-type: none"> <li>VSDs accurately control speed of inlet and outlet fans, ensuring a balanced pressure</li> </ul>	<ul style="list-style-type: none"> <li>Chickens do not incur obstacle leaving and entering the house, no wet spots</li> </ul>
	<ul style="list-style-type: none"> <li>Remote location of egg farms can lead to poor quality mains supply, leading to fan interruption or breakdown</li> </ul>	<ul style="list-style-type: none"> <li>Power loss ride-through function is used if incoming supply voltage is cut off</li> <li>VSD continues to operate using kinetic energy of rotating motor</li> <li>VSD is fully operational if motor rotates and generates energy for VSD</li> </ul>	<ul style="list-style-type: none"> <li>Boosts reliability of fans ensuring chicken's welfare is highly maintained</li> </ul>
	<ul style="list-style-type: none"> <li>Hottest air is near ceiling</li> </ul>	<ul style="list-style-type: none"> <li>VSD provides slow moving circulating fans which are used to push hot air back down to floor level</li> </ul>	<ul style="list-style-type: none"> <li>The more uniform the house temperature, the lower the heating costs</li> </ul>
	<ul style="list-style-type: none"> <li>Standards specify how long and at what temperatures ventilation fans should operate in extreme conditions</li> <li>Special attention is given to acceleration and braking time</li> </ul>	<ul style="list-style-type: none"> <li>Motors must be tested to EN 12101-3 – the most demanding standard for smoke extraction</li> <li>In emergency situations, VSDs enter override mode, allowing extended fan runtime in adverse conditions for safe evacuation</li> </ul>	<ul style="list-style-type: none"> <li>During an emergency, like a fire, ventilation is part of the fire suppression system. It removes smoke and heat from the building, maintains evacuation routes and gives emergency services access to fire location</li> <li>VSDs, softstarters, motors and generators are critical to continuous operation of ventilation and fire suppression systems</li> </ul>



	Challenge	Solution	Benefit
	<b>Feeders</b> <ul style="list-style-type: none"><li>Accurate and controlled dosage of raw materials and additives is crucial when creating chicken feed</li></ul>	<ul style="list-style-type: none"><li>VSD speed and/or torque control of feeder motors ensures precise material dosage which is under continuous control</li></ul>	<ul style="list-style-type: none"><li>Eliminates mechanical dosing systems and enables precise information on dosed amounts of ingredients</li></ul>
	<b>Hammermills</b> <ul style="list-style-type: none"><li>High overloads during start and throughout operation</li></ul>	<ul style="list-style-type: none"><li>Soft starting and reversing, smoothed high torque peaks, easy speed adjustment and change of direction</li></ul>	<ul style="list-style-type: none"><li>Speed adjusted according to load, improving reliability and prolonging hammermill lifetime</li></ul>
	<ul style="list-style-type: none"><li>Connect load to mains while still rotating</li></ul>	<ul style="list-style-type: none"><li>Flying start used when a motor is connected to a flywheel or a high inertia load</li><li>VSD started with a reduced voltage and then synchronized to the rotating rotor</li><li>Once synchronized, voltage and speed are increased to corresponding levels</li></ul>	<ul style="list-style-type: none"><li>Reduces start-up times and reduces wear on equipment</li></ul>
	<b>Mixers</b> <ul style="list-style-type: none"><li>Accurate control of mixing speeds is critical to achieving correct feed structure</li></ul>	<ul style="list-style-type: none"><li>VSDs adapt to varying mixing loads, constantly monitoring the torque that each mixing motor requires and adjusting it when necessary</li></ul>	<ul style="list-style-type: none"><li>Programming recipe's exact speed and torque saves production time, reduces energy and improves feed quality</li></ul>
	<b>Packaging machines</b> <ul style="list-style-type: none"><li>Swift and repeatable movement between packing stages is critical to avoid waste</li></ul>	<ul style="list-style-type: none"><li>VSD provides high speed operation that ensures maximum throughput, with minimum waste</li></ul>	<ul style="list-style-type: none"><li>VSDs enable accurate speed control and positioning with minimum pressure applied to eggshells</li></ul>
	<b>Pumps</b> <ul style="list-style-type: none"><li>Different day/night feeding and welfare patterns means water supply varies throughout day</li></ul>	<ul style="list-style-type: none"><li>Built-in PID control and automatic sleep mode regulates pressure</li></ul>	<ul style="list-style-type: none"><li>Increases lifetime of pump and saves energy</li></ul>
	<ul style="list-style-type: none"><li>Maintaining correct temperature depends on accurate flow of cooling or heating media</li></ul>	<ul style="list-style-type: none"><li>VSD provides accurate speed control using built-in PID control or linked to external building management system</li></ul>	<ul style="list-style-type: none"><li>Avoid pressure peaks in pipelines by building up flow in a controlled manner</li></ul>
	<ul style="list-style-type: none"><li>Mechanical control valves and bypass lines are subject to leaks and pressure surges</li></ul>	<ul style="list-style-type: none"><li>VSDs simplify pipe systems by eliminating control valves and bypass lines and provide soft-start and stop, thereby reducing wear on motors and avoiding leaks caused by pressure surges</li></ul>	<ul style="list-style-type: none"><li>Replacing throttling with VSDs to control flow rates, reduces speed of the pump, delivering electrical power savings based on the cube of the reduction</li></ul>
	<b>Refrigeration &amp; cooling</b> <ul style="list-style-type: none"><li>Any refrigeration system with a wide load variation during its operating hours, or with a heat load less than peak load, runs risk of high energy use</li></ul>	<ul style="list-style-type: none"><li>A VSD-motor package increases capacity due to capability of running above nominal speed</li><li>Stable suction pressure ensures consistent cold room temperature</li></ul>	<ul style="list-style-type: none"><li>Reduces operating costs and CO<sub>2</sub> emissions</li></ul>

# Features and functions benefiting poultry farming

Drives, motors, PLCs and softstarters all play a vital part in keeping egg production moving. Choosing the right products and features for the right environment is essential in ensuring an optimized production.



## Variable speed drives/ variable frequency 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 CO<sub>2</sub> emissions

### Fieldbus compatible

- 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

### 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 and animal welfare with lower motor noise through adaptive switching frequency control



### Repeatability

- Accurately adjust conveyor speed to suit different products

### Ingress protection

- IP55 for washdown zones

### Protection

- Temperature, load, under/overvoltage protection, and warning features within drives help anticipate breakdowns

### Multiple I/Os

- Provide a variety of process information from the VSD to motor control. Egg counters can be connected to VSDs

### Mains imbalance outage de-rate

- Should one main phase fail, the VSD reduces speed to 80 percent, giving a 50 percent load to the drive to keep it running. Improves motor reliability.

### Bypass function

- Although seldom used, enables load to be connected directly to the mains

### Temperature de-rate

- If VSD becomes too hot it will reduce its switching frequency to produce less heat but will not stop running

### C4 conformal coating

- Protects sensitive electronics against ammonia and other aggressive gases



## 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



## Variable speed drives/variable frequency drives for solar panels

### Maximum uptime

- Operates without grid directly from photovoltaic (PV) cells

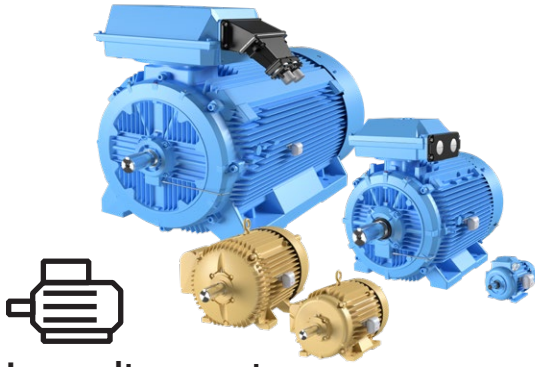
### Ease of installation

- Compatible with all pump types and set-up for serial production

### Return on Investment (ROI)

- Superior ROI compared to diesel-powered pumping





## Low voltage motors

- Robust construction for outdoor environments
- Bearing locked at D-end to avoid axial play
- Bearings can be sealed or regreasable
- 60 Hz and 50 Hz designs are available in IEC and NEMA frames
- Fan and motor fins optimized for low noise levels
- Oversized terminal box fitted as standard for ease of installation
- IP55 protection against ingress of water or solids with higher ratings as options. IP56 protection available as option.
- Surface treatment (polyurethane or epoxy) in accordance with corrosion class C3, with C4 and C5 as an option
- IE3, IE4 or ultra-premium IE5 efficiency offering to support emissions reduction
- Suitable for VSD/VFD operation



## 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

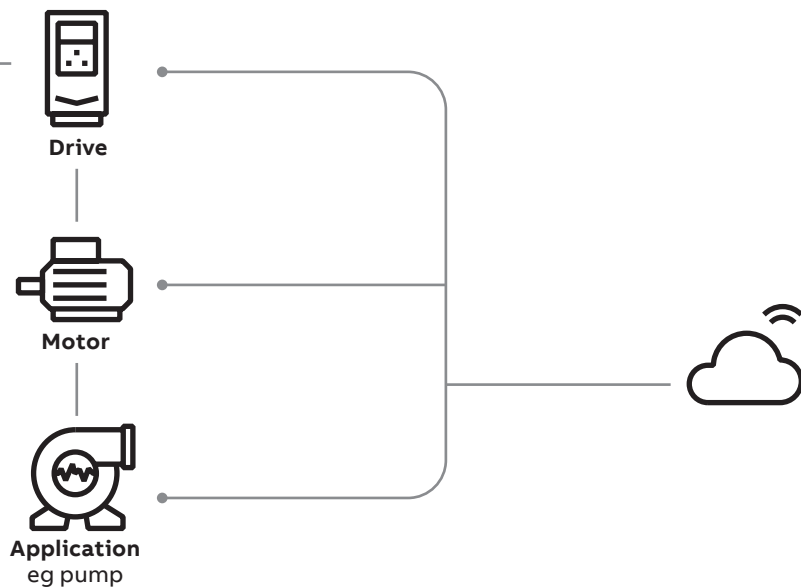
ABB Ability™ Condition Monitoring for powertrains optimizes the performance and efficiency of electric motor-driven rotating equipment. It enables better decision making by providing real-time access to data on all parameters for drives, motors and pumps.

## 1 Intelligent powertrain

The powertrain is equipped with sensors and cloud connectivity and can comprise motors, drives and pumps.

## 2 Turning data into valuable insights

Data gathered through VSDs' inbuilt sensors and loggers together with that collected from ABB Ability™ Smart Sensors fitted to motors and pumps, 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.



## 3 Accessing data for analytics

Detailed information can be extracted into a company's own portal and systems. Information on many aspects of the poultry 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.



## 4 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, minimising operating costs and wastage of products.
- Greater insight into various aspects of the poultry 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.

End-user



Consultant



System integrators



Original Equipment Manufacturers (OEMs)



# 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.

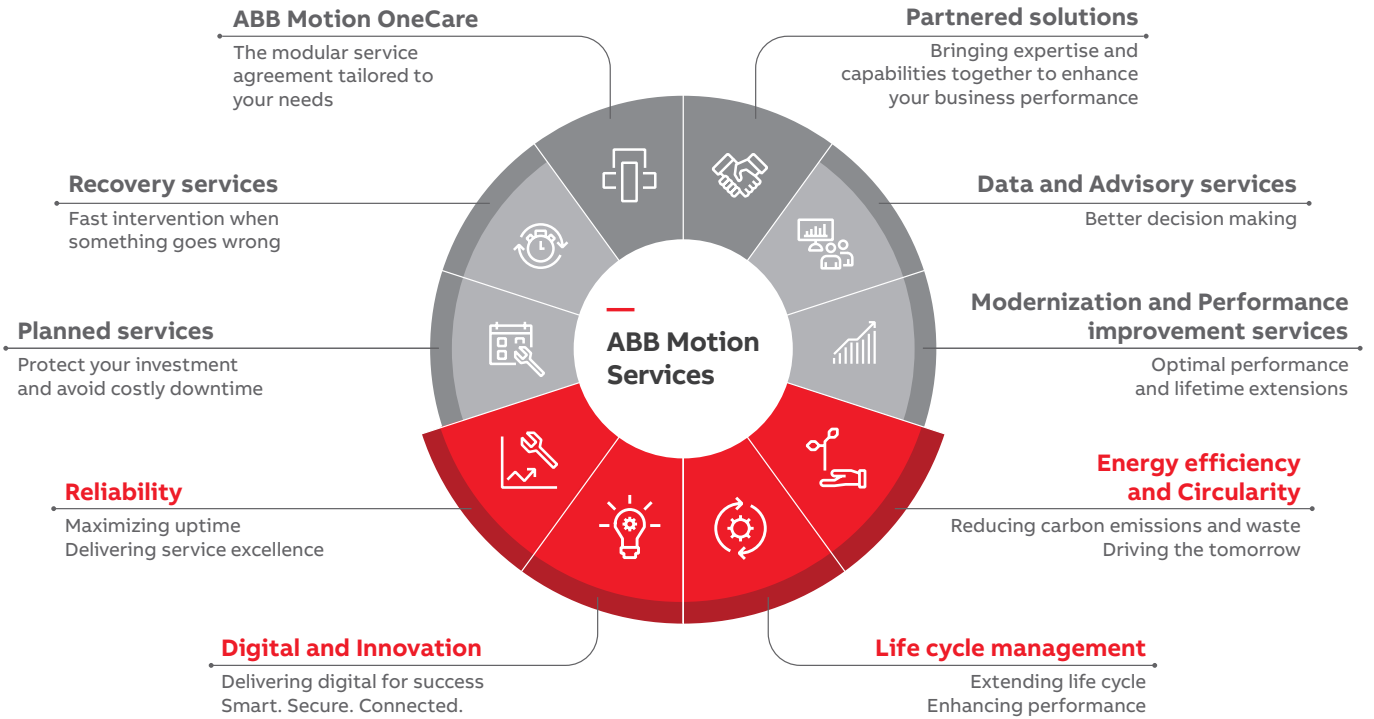
With a service offering tailored to your needs, ABB Motion Services maximizes the uptime and extends the life cycle of your electrical motion solutions, while optimizing their performance and maximizing your energy efficiency gains throughout the entire lifetime of your applications. We help to keep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

## Global reach

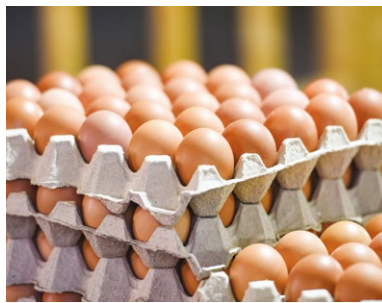
ABB operates in over 100 countries with its own manufacturing, logistics and sales operations together with a wide network of local channel partners that can quickly respond to your needs. Stock availability is good, with short delivery times for many products backed by 24-hour spare parts delivery.

In addition, we work closely with poultry 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 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

**[new.abb.com/drives](https://new.abb.com/drives)**

**[new.abb.com/drives/drivespartners](https://new.abb.com/drives/drivespartners)**

**[new.abb.com/motors-generators](https://new.abb.com/motors-generators)**

**[new.abb.com/motors-generators/segments/food-beverage](https://new.abb.com/motors-generators/segments/food-beverage)**

**[new.abb.com/drives/segments/food-and-beverage](https://new.abb.com/drives/segments/food-and-beverage)**

**[solutions.abb/motionservices](https://solutions.abb/motionservices)**

