MITSUBISHI ELECTRIC
Changes for the Better

Automating the World

FOOD & BEVERAGE AUTOMATION SOLUTIONS

High performance solutions for bakery production

Key Benefits:

- Increase yield
- Improve quality
- Increase profitability

RISING TO ANY CHALLENGE

REDUCE COSTS, BOOST PRODUCTIVITY

INNOVATION AND EXPERTISE

Mitsubishi Electric is a global supplier of automation and software solutions for a wide range of industries and markets. For more than 25 years, we have been working with end users and OEM machinery builders in the food sector to address everyday bakery production issues.

We can help you evaluate your business challenges and provide innovative ideas to reduce costs, improve productivity, and maintain quality and consistency within your operation.

Mitsubishi Electric leverages expertise from our own manufacturing processes to develop affordable, high-quality solutions for your supply chain. Our data logging and MES, SCADA, and IT integration products identify and report nonconformance, downtime, and productivity rates on production lines.

Modern bakeries need flexible control systems that can accommodate regulatory, environmental, and nutritional factors, as well as changing food fashions and consumer tastes. Mitsubishi Electric delivers.

- Improve productivity and flexibility
- Maintain profit margins
- Reduce energy costs
- Boost operational efficiencies

BAKERY AUTOMATION

Consumer-led demands for new product varieties, including convenience foods and healthy options, put bakeries in constant competition for shelf space and brand loyalty. To gain market share and increase profit margins, it is key to keep in sync with the latest trends.

Bakery equipment and processes must adapt to a continually changing marketplace while balancing variables such as energy and raw ingredient costs, waste minimization, and regulatory requirements.

Mitsubishi Electric's wide variety of automation solutions — each backed by our service, support, and industry know-how — help bakeries produce consistently high-quality products on time, every time.

- Accommodate labor fluctuations
- Capitalize on fast-moving trends
- Optimize efficiency
- Manage logistics
- Minimize waste

WHERE PRECISION MATTERS

FLOUR MILLS

KEY ISSUES

- Moisture
- Stock rotation
- Track and trace
- Batch weights
- Batch testing
- Supply chain
- Regulatory reporting

IMPROVE QUALITY AND YIELD

Creating and maintaining the correct environment at the milling stage of the baking process ensures dough consistency and final product quality. Properly batching raw ingredients for the mixer improves yield.

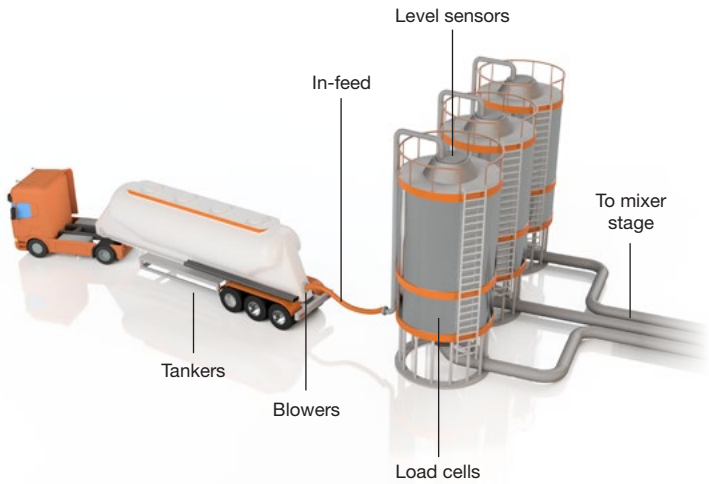
Mitsubishi Electric's wide range of input and remote networking solutions seamlessly interface with process signals from system devices to provide full diagnostics and error detection.

- Ultrasonic level sensors
- Flow meters
- Bar codes
- Load cells/weigh scales

Variable frequency drive (VFD) technology conveys flour into the plant. Accurate speed control precisely delivers ingredients to the mixer. The results:

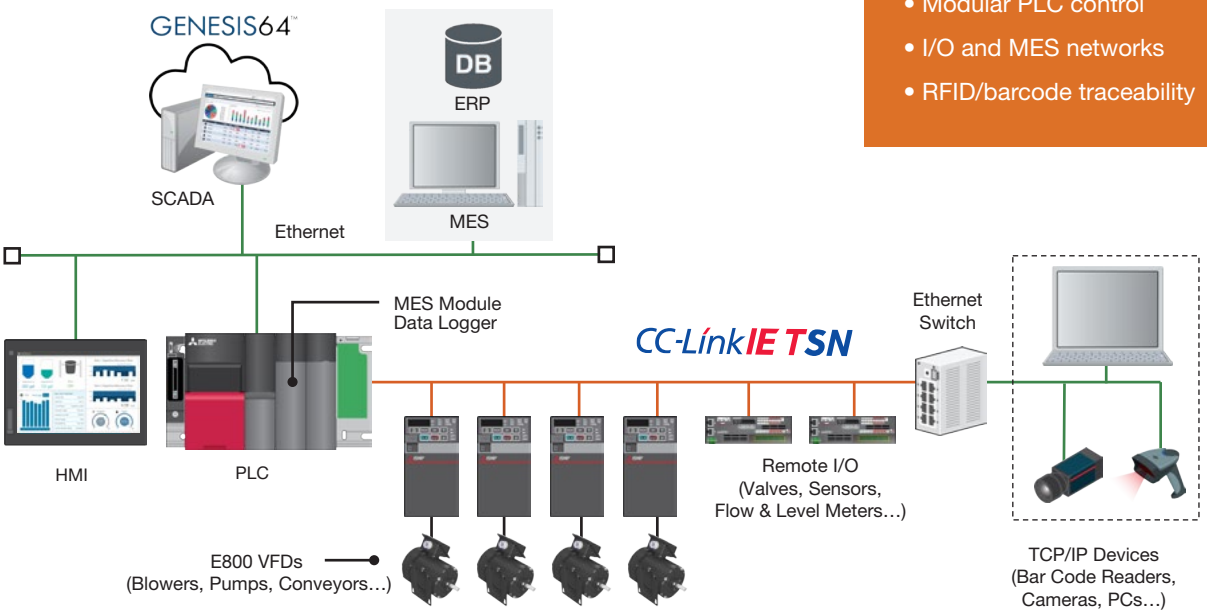
- Easy maintenance
- Secure stock levels
- Lower energy consumption
- Reduced stress on mechanical components

Accurate speed control enables precise delivery of ingredients to the mixer.



EQUIPMENT

- Ultrasonic-level measurement
- Variable frequency drive control pumps and fans
- HMI/SCADA visualization
- Load cell measurement
- Flow meters
- Modular PLC control
- I/O and MES networks
- RFID/barcode traceability



Our typical control structure enables transparency from mill to enterprise levels.

MANAGE INVENTORY

Mitsubishi Electric's secure IT connectivity is non-PC-based and managed automatically through the control system, which links to the inventory management system to ensure timely re-ordering and reporting.

MEET REGULATORY DEMANDS

Need an easier way to comply with FDA 21 CFR Part 11 regulations and to keep your stakeholders fully informed? Go digital with our scalable **ICONICS Suite™** of automation software.

ICONICS GENESIS64™ SCADA and universal connectivity platform integrates information from across the organization for real-time insight into your operations. ReportWorX™ automated reporting tool turns volumes of track-and-trace data into operational intelligence.

The benefits are hard to ignore:

- Open connectivity to 3rd-party devices
- Seamless connection to business systems
- Improved analytics and efficiencies
- Inventory automation
- Reduced storage and shipping costs
- Lower insurance rates
- No more hand-written reporting

CONSISTENCY IS KEY

MIXERS

KEY ISSUES

- Mixer torque control
- Energy – kW/kg feedback per mix
- Dough consistency and repeatability
- Variable mix time
- Recipe control

Accurate weighing and energy management ensure repeatable product quality.

OPTIMIZE MIXING METHODOLOGY

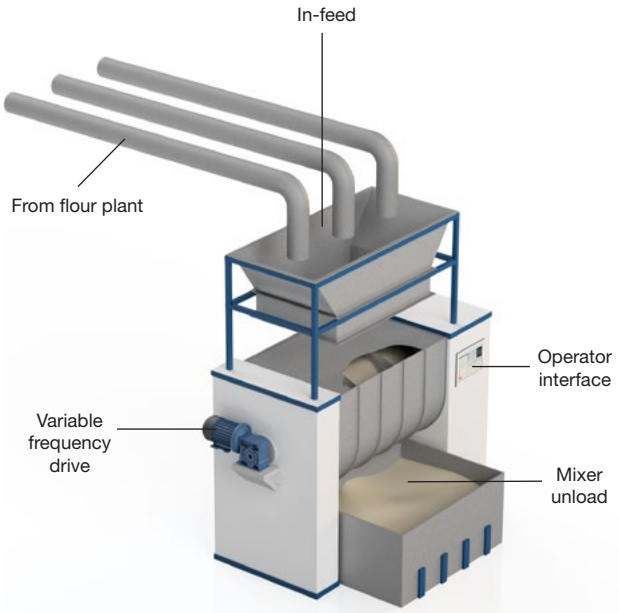
A bakery's creative process begins with the mixing. The speed and strength of the mixer has significant effects on the structure of the dough.

Mitsubishi Electric's advanced variable frequency drives have been proven to improve dough quality by ensuring that the energy used during the mixing process adheres to efficiency and quality metrics at all times. **ICONICS™ OEE*-integrated solutions** transform real-time data from disparate sources into custom KPIs.

- Mix time
- Energy consumption
- Time under vacuum
- And more

It's all about control.

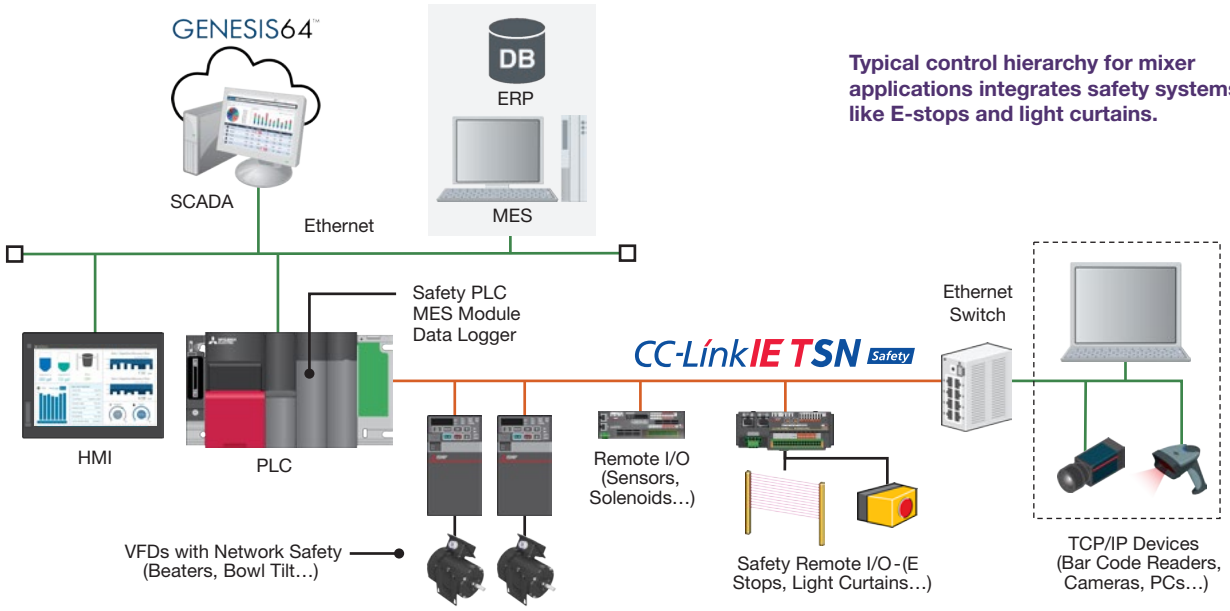
- Recipe and batch control reproduce consistent mixes.
- Accurate weight and ingredient management yield repeatable product quality.
- OEE reporting provides actionable intelligence for effective business processes.
- Track and trace techniques give each batch a unique ID.



Overall Equipment Effectiveness

EQUIPMENT

- Variable frequency drives
- Modular PLC
- HMI/SCADA visualization and mix adjustment



Typical control hierarchy for mixer applications integrates safety systems like E-stops and light curtains.

FINE-TUNE ADJUSTMENTS

Mitsubishi Electric's human machine interface (HMI) and visualization technologies enable local operator feedback and fine-tuned calibrations to maintain batch size flexibility and other adjustments.

MONITOR ENERGY USE

The control system synchronizes the mix profile with the rest of the production process. When necessary, you can delay or hold the mix at low speeds before unloading so as not to over-mix the dough or mistakenly discard it as waste.

Mitsubishi Electric integrates safety systems into your overall control strategy. Our **CC-Link IE TSN** and other open networks form the basis of the main I/O method and allow direct control and monitoring of energy use across the plant.

Here's what Mitsubishi Electric adds to the mix:

- Repeatability of the mix recipe
- Controlled energy input
- Profiling of the mix
- Waste reduction
- Reliable manufacturing
- Functional safety

TOTAL CONTROL

DIVIDERS

KEY ISSUES

- Variable product size
- Weight consistency
- Safety
- Gentle treatment of dough
- Recipe control
- Changeover time
- Simple maintenance
- Track and trace

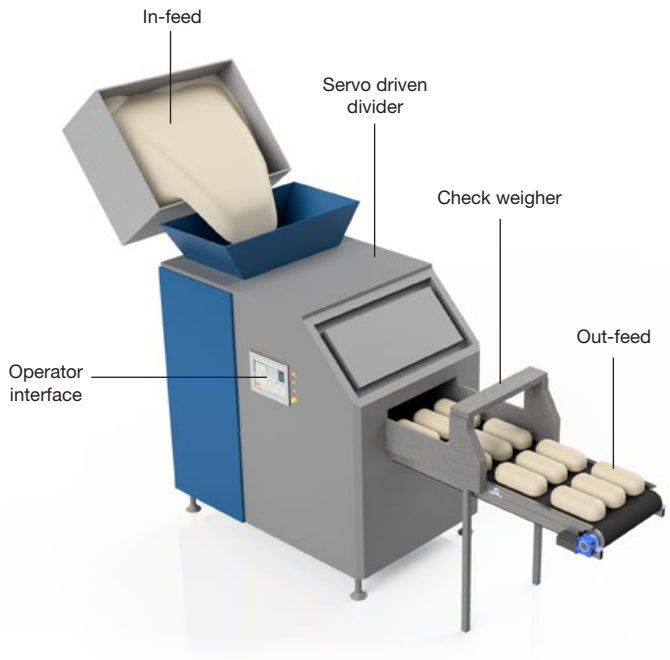
HANDLE WITH CARE

Careful handling is critical at the dividing stage so as not to damage the structure of the dough. Mitsubishi Electric's variable frequency drives and servo control technologies provide accurate scaling and the flexibility to adjust output weights during production.

Our extremely sensitive servo systems:

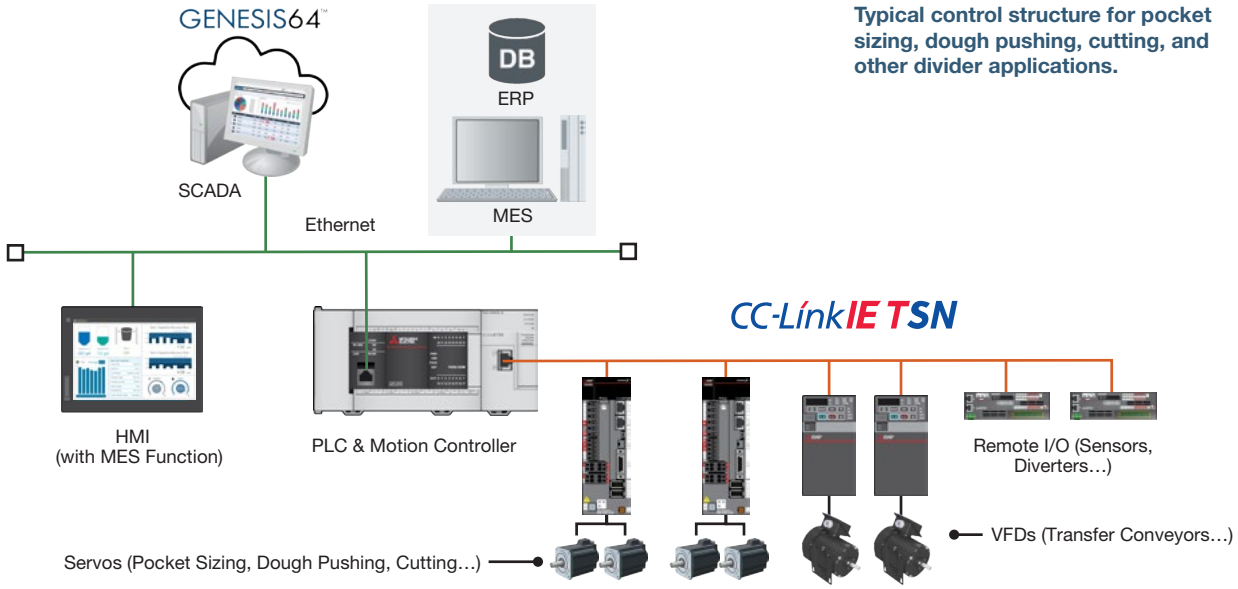
- Provide easily repeatable product changeovers
- Reduce changeover downtime
- Improve performance
- Save on ingredients
- Improve yield

Variable frequency drives and servo control technologies provide accurate dough scaling and output weights.



EQUIPMENT

- Variable frequency drives
- Servo systems
- HMI/SCADA visualization
- PLC/motion controllers



Typical control structure for pocket sizing, dough pushing, cutting, and other divider applications.

TRACK AND TRACE

Collect and store OEE data to utilize for FDA 21 CFR Part 11 compliance, lean manufacturing, six sigma continual process improvements, and more. Our **ICONICS Suite™** monitors KPIs such as weight per piece and target weight variance to give you a contextualized view of your process.

SEAMLESSLY INTEGRATE

Mitsubishi Electric controllers make it easy to interface with check weighing systems. Our **CC-Link IE TSN** open integrated network protocol lets you manage all of your tasks on the same network — critical and non-critical, in real time or deferred — including 3rd party devices.

Our control systems deliver economies of scale:

- Repeatable product quality
- Quick changeover
- Excellent product flexibility
- Weight variance detection
- Batch control and management
- Increased yield

PERFECTLY POSITIONED

FORMERS, MOLDERS, AND PAN SETTERS

KEY ISSUES

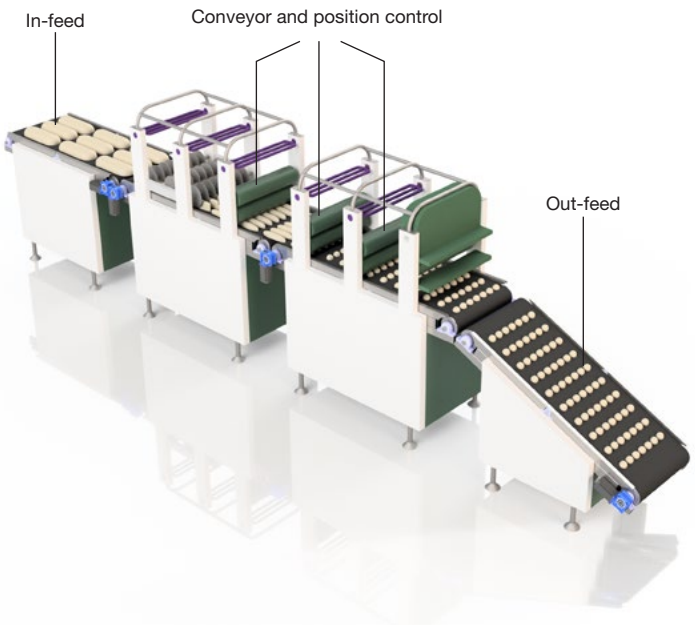
- Speed control
- Separation
- Conveying
- Pan positioning
- Tin size variation
- Recipe control
- Pan tracking
- Waste
- Double dough detection

MINIMIZE STRESS

Forming divided dough into the right shape and placing it into the pan requires careful coordination between each step of the process. Challenges include accurate positioning at high throughput speeds while exerting minimal pressure on the dough.

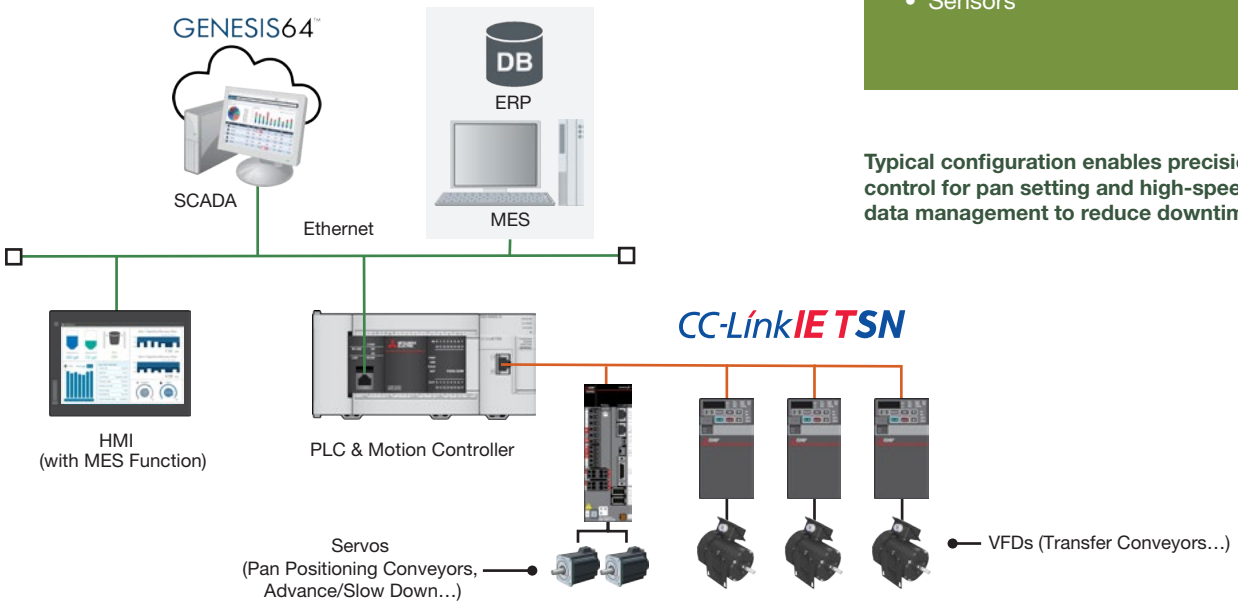
Mitsubishi Electric's multi-axis drive control systems maintain precision synchronicity between conveyors and other line components to very tight tolerances.

Synchronizing the speed and positioning of the dough and pan conveyors increases throughput.



EQUIPMENT

- Variable frequency drives
- Servo systems
- PLCs/motion controllers
- HMI/SCADA visualization
- Sensors



Typical configuration enables precision control for pan setting and high-speed data management to reduce downtime.

CATCH AND CORRECT ERRORS

To minimize downtime and detect errors, our sensors monitor line activity in real time and instantly feed data back to the controller.

- Identify and address issues such as double dough, tin size variation, and wastage.
- Collect and store data for production analysis and track and trace compliance.
- Enable feedback and fine adjustments at both the HMI and enterprise level.

Our motion control systems leave no room for error:

- Fast, accurate speed and position control
- Multi-axis synchronization
- Instant track-and-trace data
- Increased throughput
- Minimum downtime

PROOFERS AND OVENS

KEY ISSUES

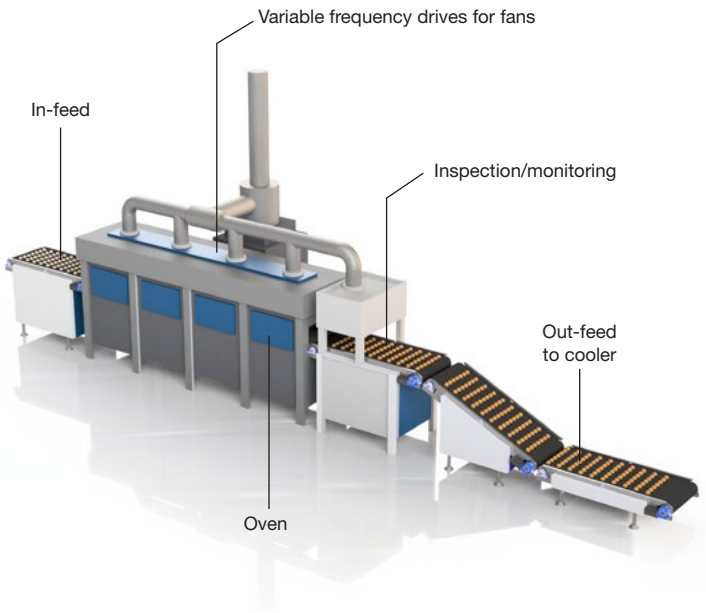
- Humidity
- Ambient temperature compensation
- Temperature control
- Safety
- Color monitoring
- Energy consumption
- Conveyor speed
- Heat exchange
- Waste

REDUCE ENERGY CONSUMPTION

Proofers need consistent temperature and humidity levels to allow the dough to rise evenly for uniform quality of the batch. It can take a significant amount of energy to maintain speed and temperature while compensating for ambient conditions.

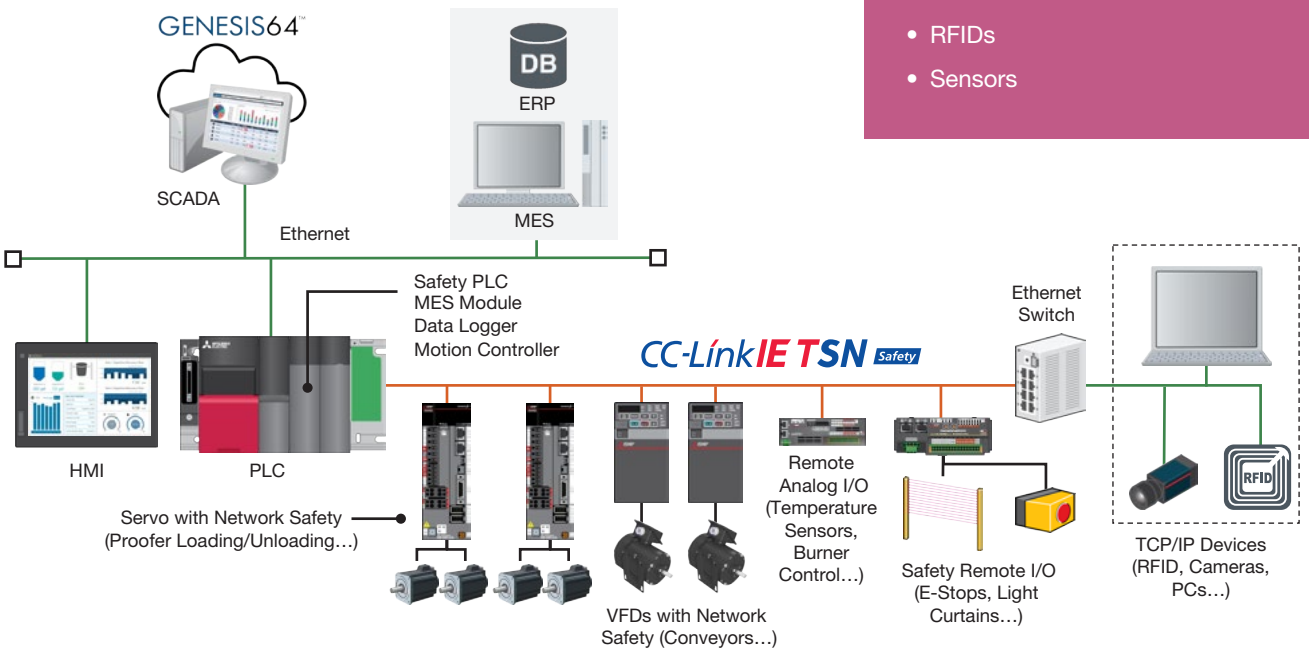
Mitsubishi Electric variable frequency drives control fan and conveyor systems for optimal energy savings. Our proven technology yields quick returns on investment and continued ongoing efficiencies.

Variable frequency drives reduce energy consumption to boost profitability.



EQUIPMENT

- Variable frequency drives
- Servo systems
- PLCs/motion controllers
- HMI/SCADA visualization
- RFIDs
- Sensors



Integrated control solutions result in quick ROI.

MANAGE MULTIPLE TASKS

The oven consumes the most energy in the bakery, making our energy-saving variable frequency drives even more beneficial. Most modern industrial ovens are available in adjustable lengths to accommodate multiple product requirements.

Mitsubishi Electric's open network architecture easily interfaces with 3rd party systems such as vision, burner controllers, and RFID sensors to control the various aspects of the system:

- Bake times
- Loading and unloading
- Temperature settings
- Conveyor controls
- Fan optimization
- HMI display
- Track and trace
- Recipe management
- Alarm and event annunciation

Mitsubishi Electric Automation rises to the challenge:

- Accurate temperature and humidity control
- High-torque conveyor loads
- Instant feedback
- Speed control
- Energy-saving fan control
- Synchronized drives
- Interfacing of infrared and vision systems
- Safety integration

A MATTER OF DEGREES

COOLERS

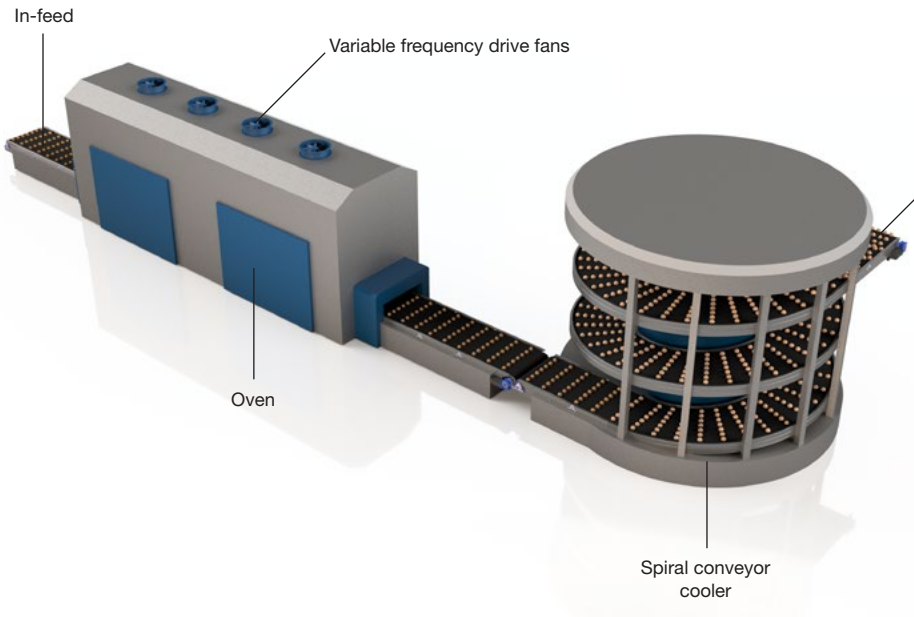
KEY ISSUES

- Humidity
- Spiral conveyor design
- Weight loss
- Heat exchange and recovery

COOL JUST RIGHT

Freshly baked bread must cool more than 115 degrees to reach the optimum temperature for slicing and packing. Cooling too slowly reduces productivity. Cooling too quickly can significantly damage the product.

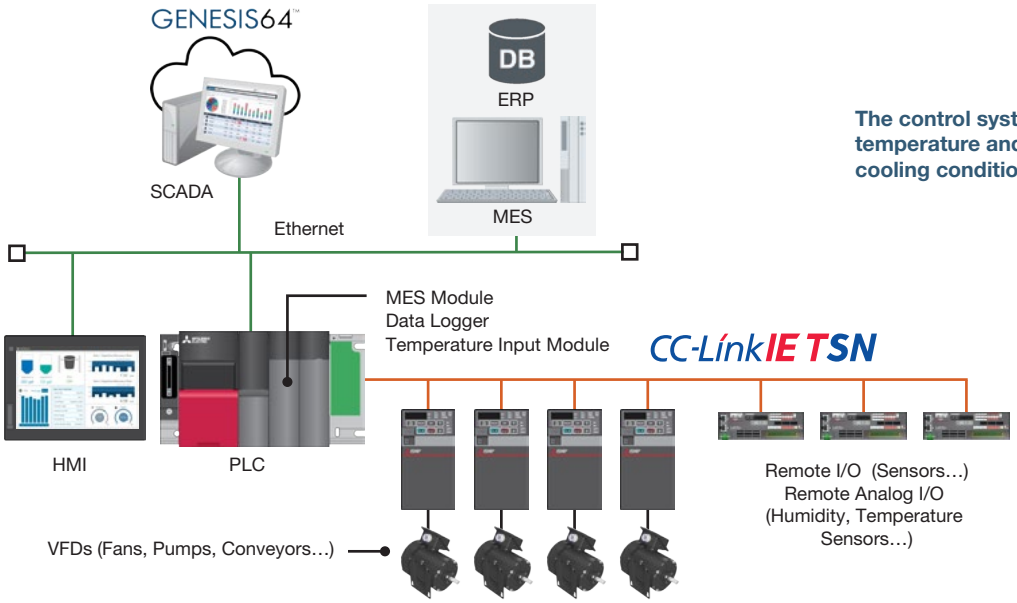
Since heat rises, Mitsubishi Electric control systems monitor temperature and humidity at a number of points in the spiral and adjust conveyor and fan speeds to maintain the optimum cooling profile throughout.



Cooling to optimum temperatures is key for slicing and packaging.

EQUIPMENT

- Variable frequency drives
- Servo systems
- HMI/SCADA visualization
- PLC/motion controllers



The control system monitors temperature and humidity to optimize cooling conditions.

RECYCLE LOST HEAT

Lost heat from the cooling process can be recovered and used elsewhere in the plant, such as to pre-warm proofers or supply hot water to facility faucets. The principle of heat recovery is simple, but requires considerable coordination to put into practice. Mitsubishi Electric automation systems include the tools to make the savings a reality.

- Sensors
- Thermocouples
- Solid state controllers
- Local graphic operator interfaces

Mitsubishi Electric puts principles into practice:

- General control
- Energy savings
- Heat recovery
- Optimum cooling conditions

FINISHING TOUCHES

SLICING AND PACKAGING

KEY ISSUES

- High speeds
- Slice width variation
- Waste/crumbs/damage
- Traceability
- Labelling
- Tray handling
- Palletizing
- Safety

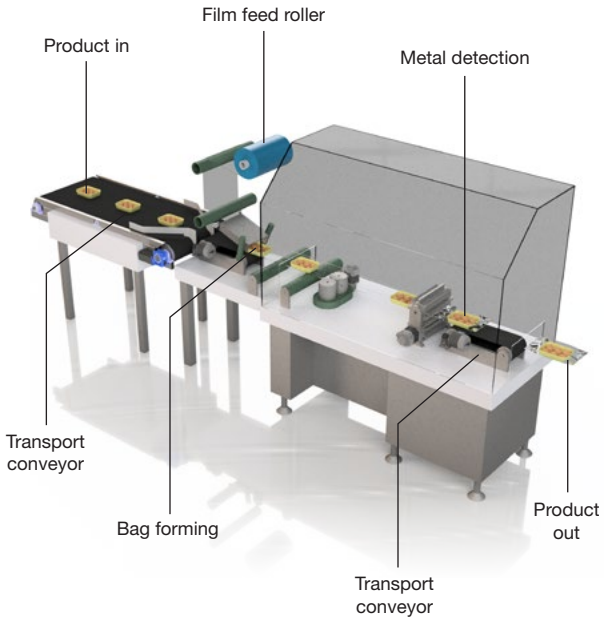
SHIP OUT IN SHIP SHAPE

Slicing and packaging are the last steps in the bakery process before the product ships. Much is still left to be done, preferably at high-speeds for maximum throughput.

Mitsubishi Electric can help:

- Our servo control-based systems help to prevent deformed slices and reduce crumb waste.
- Our **ICONICS Suite™** of automation software manages bar code and sell-by date labelling and electronically produces track-and-trace records and regulatory compliance reports.
- Our integrated safety controls ensure the most secure working environment for high-speed palletizing equipment.
- Our programing tools simplify setup, adjustment, and operation for production line printing, coding and marking.

The final steps of the baking process operate at high speeds for maximum throughput.



MAKE THE INVISIBLE VISIBLE™

ICONICS SUITE™

REAL-TIME INSIGHT FOR EVERY BAKERY ROLE

- OPERATORS
- ENGINEERS
- EXECUTIVES
- SYSTEM INTEGRATORS

Mitsubishi Electric's scalable automation software provides **real-time visualization, mobility, analytics, and connectivity** to deliver a contextualized view of enterprise operations.

CONNECT

Our **GENESIS64™** universal connectivity platform converges IT and OT* by supporting industry-standard open protocols to integrate all kinds of devices, equipment, and systems.

**Operational Technology*

CONTEXTUALIZE

Asset-based organization and navigation facilitates data normalization, comparisons, and situational awareness to get to root causes quicker with actionable information.

VISUALIZE

GENESIS64™ scales from desktops to browsers, tablets, smartphones, and wearable devices for secure, real-time visualization critical to keeping operations running smoothly.

DATA UTILIZATION

Improve productivity and quality with interactive analytics that include OEE, SPC*, energy, and fault detection to provide insight from edge to cloud.

**Statistical Process Control*

WE'RE WITH YOU ALL THE WAY

CONTINUED SUPPORT FOR CONTINUED SUCCESS

If you're ready to modernize your bakery infrastructure and management, we're ready to help.

SUPPORT

- Field engineering support group for sales teams
- Specialists focused on the technical application of each product
- Project groups supporting OEM and end-user conversions
- Technical support center with ultra-quick call response time
- On-site field service calls
- Online manuals

TRAINING

- In-house, on-site, and online courses
- E-learning group classes
- Quick-tip videos
- Customized training
- Hands-on learning with simulation equipment
- One-on-one CNC training classes

SOLUTIONS AND SERVICES

Service Solutions

- Machine Down
- Start Up
- On-site Technical Support
- On-site Application Engineering
- Retrofits/Upgrades
- Extended Warranties
- Preventive Maintenance
- Robot Diamond Assurance

Project Solutions

- IoT Services
- Machine Upgrade or Conversion
- Turnkey
- Project Management

Engineered Solutions

- Configured drives, custom panels, configurable standalone robotic cells, and specialized software
- Expertise to deliver anything from a simple stand-alone cabinet to a fully integrated turnkey motor control center
- Engineered and manufactured to your precise specification and budget requirements
- Consultation services to help define and interpret project specifications
- Certified to meet a wide array of standards including UL, cUL, CSA and CE

Let's automate the world together.

Schedule a meeting.

Creating Solutions Together.

Low-voltage Power Distribution Products

Transformers, Med-voltage Distribution Products

Power Monitoring and Energy Saving Products

Power (UPS) and Environmental Products

Compact and Modular Controllers

Servos, Motors and Inverters

Visualization: HMIs

Edge Computing Products

Numerical Control (NC)

Collaborative and Industrial Robots

Processing machines: EDM, Lasers

SCADA, analytics and simulation software

Mitsubishi Electric's product lineup, from various controllers and drives to energy-saving devices and processing machines, all help you to automate your world. They are underpinned by software, innovative data monitoring, and modelling systems supported by advanced industrial networking and Edgecross IT/OT connectivity. Together with a worldwide partner ecosystem, Mitsubishi Electric factory automation (FA) has everything to make IoT and Digital Manufacturing a reality.

With a complete portfolio and comprehensive capabilities that combine synergies with diverse business units, Mitsubishi Electric provides a one-stop approach to how companies can tackle the shift to clean energy and energy conservation, carbon neutrality and sustainability, which are now a universal requirement of factories, buildings, and social infrastructure.

We at Mitsubishi Electric FA are your solution partners waiting to work with you as you take a step toward the realization of sustainable manufacturing and society through the application of automation.
Let's automate the world together!

Note: not all products are available in all countries

Contact Mitsubishi Electric to put your solution in motion.

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e-F@ctory

e-F@ctory Alliance

Mitsubishi Electric's e-F@ctory concept utilizes both FA and IT technologies, through collaboration with e-F@ctory Alliance Partners, to reduce the total cost of development, production, and maintenance, with the aim of achieving manufacturing that is a "step ahead of the times".

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L-VH-1019