Utilizing its technological prowess and extensive experience, Mitsubishi Electric has remained a leader in the vertical transportation market since entering the business in 1931. The Company’s creative, innovative spirit, represented by production of the world’s first spiral escalator and elevator group-control systems that use artificial intelligence technologies, continues to receive high evaluations industry-wide. Our products and systems are renowned for their high levels of quality, reliability and safety; and it is this sense of security and trust fostered with building owners and end-users alike that has led to the global expansion of our elevator/escalator business and the after-sales network to service it.

We understand responsibilities as a good corporate citizen, and continue to implement measures for protecting the environment and ensuring a sustainable society for future generations. A number of original technologies are being introduced to ensure more efficient products, systems and manufacturing operations, thereby enhancing productivity, reducing energy consumption and providing smoother, faster and more comfortable vertical transportation systems.
At Mitsubishi Electric, we produce the most technologically innovative elevators in the world. They benefit from our constantly evolving technology and our years of accumulated experience. Our elevators continue to establish benchmarks for quality in the industry, and consistently set new standards for performance and reliability. The Series GPM-III elevators exhibit this philosophy in every detail of design and concept.

Higher Speeds
As buildings grow taller, the need for faster elevators becomes more pressing. To meet the market’s demands, Mitsubishi Electric produced the world’s fastest passenger elevators as verified by the Guinness Book of Records. Series GPM-III is available for elevators with rated speed of 200 fpm and higher to cover a wide range of applications.

Futuristic Key Technologies
Series GPM-III elevators use advances in core technology to realize optimum performance and operation efficiency. The advances include new gearless traction machines which utilize the PM (permanent magnet) motor*, VVVF (variable voltage, variable frequency) Inverters, AI (artificial intelligence), and Data Network Systems.

*PM motor is applied to elevators with rated speed of 400 fpm and higher.

Intelligent Door System
An advanced RISC (Reduced Instruction Set Computer) microprocessor and VVVF inverters also control the elevator doors. This intelligent system detects the actual door load conditions at each floor and automatically adjusts the door speed and torque to suit. The result is stable, sensitive door opening and closing.

Variety of Features and Functions
A wide variety of both standard and optional features and functions is available with Series GPM-III, to improve passenger safety and comfort and to simplify building management.

Mitsubishi Electric elevators, escalators and building management systems are always evolving, helping achieve our goal of being the No.1 brand in quality. In order to satisfy customers in all aspects of comfort, efficiency and safety while realizing a sustainable society, quality must be of the highest level in all products and business activities, while priority is placed on consideration for the environment. As the times change, Mitsubishi Electric promises to utilize the collective strengths of its advanced and environmental technologies to offer its customers safe and reliable products while contributing to society.
Traction Machine with PM Motor

**Delivers Optimal Performance**

PM motor is applied to elevators with rated speed of 400 fpm and higher.

**A More Comfortable Ride**

The PM motor makes it possible to suppress harmonic noise to a level below that of conventional induction motors. Furthermore, the PM motor features a quick response time since it requires no exciting current. Again, the reduced noise and vibration translates into a more comfortable ride for passengers.

**Miniaturation**

Traction machines with PM motors are smaller and more compact compared to those with conventional induction motors. The PM motor allows for a multi-pole arrangement and the result is a more compact machine. At the same time, the unit’s height is reduced by the application of a double disk-brake system.

**Pioneered by Mitsubishi**

Mitsubishi Electric presents another world first: a new type of gearless traction machine for high-speed elevators with a PM motor. This unique application of PM motor and double disk-brake system to the elevator traction machine enables several improvements—including higher efficiency, greater comfort, and miniaturization.

**Improved Efficiency and Response**

Because it does not require an exciting current, the PM motor delivers higher efficiency and quicker response compared to conventional motors. Furthermore, the PM motor maintains this level of efficiency regardless of the number of poles.

**Unique to Mitsubishi**

Mitsubishi Electric was the first in the world to develop successfully VVVF inverter control technology for high speed elevators. We also introduced inverters throughout the entire line-up—from low- to super high-speed ranges. Recent advances have led to even further improvements in operation.

**Precise, Effective Speed Control**

Mitsubishi VVVF inverters make the ride much smoother by precisely adjusting speed control with voltage and frequency regulation. The inverters also include the latest low-noise modules to make the ride even quieter.

**Practical Application**

Mitsubishi Electric has already installed the world’s fastest VVVF inverter-controlled passenger elevators in the Landmark Tower in Yokohama, Japan. These elevators provide a quiet, comfortable ride as well as large savings in energy.

**Even More Advances**

Series GPM-III elevators use further advances to control the motor speed. Utilizing the latest in semiconductor technology, Mitsubishi has incorporated on a single System LSI device, several control systems and our all new high speed digital signal processor.

**VVVF Inverter Drive**

Share a Ride in Comfort

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---

**Milestones of Energy-saving Technologies in High-speed Elevator Development**

<table>
<thead>
<tr>
<th>Year</th>
<th>Motor</th>
<th>Traction machine</th>
<th>Control circuit</th>
<th>Power consumption</th>
<th>CO2 emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>DC motor</td>
<td>Gearless</td>
<td>Relay</td>
<td>100%</td>
<td>54%</td>
</tr>
<tr>
<td>1980</td>
<td>Induction motor</td>
<td>Gearless</td>
<td>Microcomputer</td>
<td>95%</td>
<td>57%</td>
</tr>
<tr>
<td>1990</td>
<td>Permanent magnet motor</td>
<td>Gearless</td>
<td>VVVF™ control</td>
<td>72%</td>
<td>45%</td>
</tr>
<tr>
<td>2000</td>
<td>Gearless</td>
<td>Gearless</td>
<td>Microcomputer</td>
<td>62%</td>
<td>45%</td>
</tr>
<tr>
<td>2010</td>
<td>Gearless</td>
<td>Gearless</td>
<td>Microcomputer</td>
<td>95%</td>
<td>54%</td>
</tr>
</tbody>
</table>

*1: Variable Voltage, Variable Frequency

*2: CO2 emissions in this table are from elevator operation and do not include emissions from manufacturing, transportation and other processes.

[Calculation conditions]
Number of persons: 17, Rated speed: 150m/min., Rated capacity: 1150kg
Power consumption values are based on a coefficient of 0.6kg/kWh.
The CO2 emissions values in this table vary according to conditions.
Group Control System: ΣAI-2200C

Incorporates Advanced Artificial Intelligence

Milestones of Group Control Technologies

ΣAI-2200C is an advanced group control system which is composed of many group control features. With these features, it improves average waiting time.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Group control system</td>
<td>CS-2100C</td>
<td>CS-2100C</td>
<td>AI-2100</td>
<td>AI-2100N</td>
<td>ΣAI-2200C</td>
</tr>
<tr>
<td>Standard group control features</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average waiting time (index)</td>
<td>100</td>
<td>85</td>
<td>72</td>
<td>58</td>
<td>45</td>
</tr>
</tbody>
</table>

*The average time until the assigned car arrives at the hall after a passenger presses a hall button.

Mitsubishi Technology

Using its original Expert System and fuzzy-logic technology, Mitsubishi Electric has developed a supervisory system that improves operation efficiency and increases user satisfaction.

Greater Passenger Satisfaction

The AI system evaluates the psychological waiting time for users and factors it into the decision process when responding to hall calls. This Mitsubishi-pioneered technology provides optimum service and user satisfaction by eliminating the irritation felt while waiting for a car on any floor of the building.

Intuitive & Comfortable

Comfortable elevator operation and ride under ever-changing usage conditions – that’s the concept realized with the ΣAI-2200C group control system from Mitsubishi Electric. Incorporating the latest advancements in fuzzy-logic, this system utilizes intuitive control to provide smooth operation and a stress-free ride. The moment a hall call button is pressed, the optimal car to respond to the call is selected based on factors such as waiting time, travel time, current car occupancy and energy consumption, and the Immediate Prediction Indication feature is simultaneously activated to reduce user irritation generated when waiting for the car to arrive.

A Proficient Network

The Data Network System uses microprocessors distributed throughout the elevator configuration for more flexible control of the overall system. Each microprocessor is specially designed for thought-processing, thus greatly enhancing the “Human-Elevator Interface.”

Highly Reliable and Efficient System

Each microprocessor is connected via a serial transmission line to ensure higher reliability and efficiency. The system also shares diagnostic programs among the microprocessors and incorporates backup systems to further enhance reliability and passenger safety.

Increased Flexibility

The distribution of data network microprocessors simplifies modification to features or operation of the system, allowing the system to evolve with the changing needs of the building and its tenants.

Data Network System

Distributed Microprocessors Enhance the Human-Elevator Interface

Immediate Prediction Indication (AIL) for Easy-to-use Elevators

When a passenger has registered a hall call, the designated car is selected and the corresponding hall lantern immediately lights up. To inform the passenger of the car arrival, the hall lantern flashes on and off for three seconds before the arrival.
Cutting-edge Technologies for Allocation Control

Cooperative Optimization Assignment
Forecasting a near-future hall call to reduce long waits
When a hall call is registered, the algorithm predicts a near-future call that could require long waits. Through evaluation of the registered hall call and the forecasted call, the best car is assigned. All cars work cooperatively for optimum operation.

Dynamic Rule-set Optimizer (DRO)
Selects optimum car allocation through “rule-set” simulation
The neural network technology has enabled the system to continually and accurately predict the passenger traffic within intervals of several minutes. A high-speed reduced instruction set computer (RISC) runs real-time simulations using multiple rule-sets and the predicted passenger traffic to select the rule-set which optimizes transport efficiency.

Simulation example and performance results of each rule-set
The diagram below shows an example during a morning up peak time. An ideal rule-set is selected every few minutes according to the predicted traffic conditions.

Performance results of each rule-set (average waiting time)

Energy-saving Operation — Allocation Control (ESO-W)
Maximizing operational efficiency and minimizing energy consumption
This system selects the elevator in a group that best balances operational efficiency and energy consumption. Priority is given to operational efficiency during peak hours and energy efficiency during non-peak hours.

Car allocation that maximizes operational efficiency does not necessarily translate to energy efficiency. A car uses energy efficiently when it travels down with a heavy load, or up with a light load. Accordingly, if multiple cars have the same traveling distance, this system chooses the car that requires the least energy.

Through a maximum 10% reduction in energy consumption compared to our conventional system, this system allows building owners to cut energy costs without sacrificing passenger convenience.

Car selection
During non-peak hours when energy efficiency is prioritized, car B is selected.
Destination Oriented Allocation System (DOAS)

Allocating Passengers to Cars Depending on Destination Floors

When a passenger enters a destination floor at a hall, the hall operating panel immediately indicates which car will serve the floor. Because the destination floor is already registered, the passenger does not need to press a button in the car. Furthermore, dispersing passengers by destination prevents congestion in cars and minimizes waiting and traveling time. (Car destination floor indicator can be installed on the car operating panel to display floors to stop.*1)

Advantages of DOAS in the lobby

Without DOAS

Passengers wait for cars wondering which car will arrive first. Once a car arrives, regardless of the destination, passengers rush to get into the car. Without DOAS, passengers rush to get into the car. When the car arrives, regardless of the hall, passengers rush to get into the car assigned elevator, the car is on its way and there is no hurry when the car arrives.

With DOAS

When passengers enter a destination floor at a hall, the hall operating panel indicates which elevator to take. As passengers proceed to the hall, the hall operating panel indicates which elevator to take. As passengers proceed to the destination, the number assigned to the destination is displayed. As a result, passengers are not in a hurry and can move smoothly according to the elevator's current location and passenger load, as well as predicted congestion levels throughout the day.

Example of hall arrangement without hall lantern*2

A fully loaded car bypasses hall calls in order to maintain maximum operational efficiency. If there are no calls for a specified period, the car lighting will automatically shut off to conserve energy. If there are no calls, the car lighting will automatically shut off to conserve energy. If there are no calls for a specified period, the car will make an auxiliary stop for unloading or loading (ESO-Y).

Hall operating panel

When a passenger enters a destination floor number, the elevator number assigned to the destination is displayed.

Notes:

*1: Car destination floor indicator can be installed as an option.
*2: Hall arrangement with hall lantern is available as an option.

Advantages of DOAS in the lobby

Passengers wait for cars wondering which car will arrive first. Once a car arrives, regardless of the destination, passengers rush to get into the car. Without DOAS, passengers rush to get into the car assigned elevator, the car is on its way and there is no hurry when the car arrives.

With DOAS

When passengers enter a destination floor at a hall, the hall operating panel indicates which elevator to take. As passengers proceed to the assigned elevator, the car is on its way and there is no hurry when the car arrives.

Features

Please refer to the LA-2200C brochure for details.

Standard Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>1 Car</th>
<th>2-4 Car</th>
<th>5-10 Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation and Service Features</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Car Call Executing (CCO)</td>
<td>When a car has requested to the first floor call in its direction, the system disregards remaining calls in the other direction as soon as it departs from the nearest.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Continuity of Service (COS)</td>
<td>A car which is experiencing trouble is automatically withdrawn from the group control to maintain overall group performance.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Automatic Hall Call Registration (HCR)</td>
<td>If an elevator call not ready to be served, the next elevator call in the same direction of requested call is selected.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Backup Operation for Group Control Malfunction (GCM)</td>
<td>An operation of the car controllers which actively starts to maintain service in the event of a network failure or transmission line in the group controller has failed.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Next Landing (NL)</td>
<td>If the elevator doors do not open fully at a destination floor, the doors close and the car automatically moves to the next or previous floor where the doors will open.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Overload Hosting Stop (OSH)</td>
<td>A feature to avoid exceeding the maximum passenger capacity and to avoid unnecessary calls.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Safety Landing (SL)</td>
<td>If an elevator stopped between floors has an emergency malfunction, the controller checks the space, and if it is considered safe, the car will move to the nearest floor at a lower speed and the doors will open.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Independent Service (IN)</td>
<td>Emergency operation when car service is interrupted due to group control malfunction for any reason, such as car malfunctions, repair, and required only to one car.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic System (AIS)</td>
<td>A fully loaded car bypasses hall calls in order to maintain maximum operational efficiency.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Car Light Shut Off – Automatic (LSO-A)</td>
<td>If there is no call for a specified period, the car lighting will automatically shut off to conserve energy.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Far Too Short Off – Automatic (STO-A)</td>
<td>If there are no calls for a specified period, the car will make an auxiliary stop for unloading or loading (ESO-Y).</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Auto call cancelling – Automatic (CCO-A)</td>
<td>If the standard of registered call cars does not correspond to the car, automatic calls are automatically deleted to avoid unnecessary calls.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Group Control Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>1 Car</th>
<th>2-4 Car</th>
<th>5-10 Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert System and Fuzzy Logic</td>
<td>The system predicts a potential hall call which could cause longer waiting time.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Psychological Waiting Time Evaluation</td>
<td>When a car is on its way, it allows passengers to board the car at their own pace.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Auto Call Time Evaluation</td>
<td>When a car is on its way, it allows passengers to board the car at their own pace.</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Peak Traffic Control (PTC)</td>
<td>The system selects the elevator that best balances operational efficiency and energy consumption according to each elevator's current location and passenger load, as well as predicted congestion levels throughout the day.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Strategic Overall Scheduling (SOH)</td>
<td>The system selects the elevator that best balances operational efficiency and energy consumption according to each elevator's current location and passenger load, as well as predicted congestion levels throughout the day.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Door Operation Features

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
<th>1 Car</th>
<th>2-4 Car</th>
<th>5-10 Car</th>
</tr>
</thead>
<tbody>
<tr>
<td>Door Load Detector (DLA)</td>
<td>When excessive door load has been detected within opening or closing, the doors immediately move in the reverse direction.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Door Sensor Self-Diagnosis (SDS)</td>
<td>The doors open in case of an error and do not open in case of a failure.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic Door Speed Control (DSO)</td>
<td>The doors control the speed in order to maintain maximum operational efficiency.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Automatic Door Open Time Adjustment (ATF)</td>
<td>The control microprocessor or transmission line in the group controller has failed.</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Notes:

- = Not applicable

To reduce passenger waiting time, cars which have finished service are automatically directed to positions where they can be assigned to the next hall call.

Hall operating panel

When a passenger enters a destination floor number, the elevator number assigned to the destination is displayed.

Notes:

*1: Car destination floor indicator can be installed as an option.
*2: Hall arrangement with hall lantern is available as an option.
**GROUP CONTROL FEATURES**

- **Emergency Operations and Features**
  - Firefighter’s Emergency Operation (FE)
  - Earthquake Emergency Operation (EER-DS)
  - Non-Service to Specific Floors-Car Button Type (NS-CB)
  - Swing Service (SWSV)
  - Main Floor Parking (MFP)

- **Optional Features**
  - Special Floor Priority Service (SFPS)
  - Special Car Priority Service (SCPS)
  - Light-Load Car Priority Service (UCPS)
  - Down Peak Service (DPS)
  - Special Announcement Type (AAN-A)
  - Emergency Light-Load Service (EER-LS)
  - Earthquake Emergency Operation (EER-DS)

- **Signal and Display Features**
  - Announcement Type (AAN-C)
  - Electronic Chime System (ACS)
  - Hall Position Indicators (HPI)
  - Second Car Prediction (TCP)
  - Immediate Prediction Indication (AIL)

- **Door Operation Features**
  - Mitsubishi Emergency Landing Device
  - Mitsubishi Emergency Landing Device (AECH)
  - Immediate Prediction Indication (AIL)
  - 3D Multi-Beam Door Sensor
  - DOAS

- **DOOR OPERATION FEATURES**
  - Lunchtime Service (LTS)
  - Supervisory Panel (WP)
  - Operation by Emergency Power (OEPS-AU)
  - Voice Guidance System (AAN-G)
  - Car lighting

- **EMERGENCY OPERATIONS AND FEATURES**
  - In case of power failure, the elevator moves to the designated floor and opens the door to secure the safety of passengers. Then, the elevator will operate by emergency power until normal power recovery. (Emergency operation conforms to the local code.)

- **DOOR OPERATION FEATURES**
  - In case of power failure, the elevator moves to the designated floor and opens the door to secure the safety of passengers. Then, the elevator will operate by emergency power until normal power recovery. (Emergency operation conforms to the local code.)

**Notes:**
- #1 = Please consult your local sales office for lead times and details.
- #2 = AECH is standard feature when 3-8 car
- #3 = DOAS cannot be combined with BSO, IUP, UPS, TTS, IFC, A-DMO, TCP or BFC.
- **BUREAU VERITAS® Certification**

ISO 9001

BUREAU VERITAS

ISO 9001:2015

Mitsubishi Elevator Inawaza Works has acquired ISO 9001 certification by the International Organization for Standardization based on a review of quality management. The company has also acquired environmental management system standard ISO 14001 certification.