PASSENGER ELEVATOR MODERNIZATION
(HIGH-SPEED CUSTOM-TYPE)
Mitsubishi Electric’s green technologies have been developed as part of its long and profound commitment to energy-saving.

Mitsubishi Electric has been focusing on energy-saving technologies for many years. The regenerative converter is a good example. It reuses power in previous systems by transmitting the power generated during traction machine operation back to the distribution transformer. The power is then fed into the electrical network in the building along with electricity from the power supply. Since incorporating regenerative converters in the 1980s, they have contributed to significant reductions in power consumption.

Milestones of Energy-Saving Technologies in Elevator Development

<table>
<thead>
<tr>
<th>Year</th>
<th>Traction Machine</th>
<th>Motor Drive</th>
<th>Control Circuit</th>
<th>Power Consumption/CO₂ emissions*2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>Helical Gear</td>
<td>Ward Hoist</td>
<td>Relay</td>
<td>100%</td>
</tr>
<tr>
<td>1980</td>
<td>Gearless</td>
<td>Thyristor</td>
<td>Relax</td>
<td>100%</td>
</tr>
<tr>
<td>1990</td>
<td>Gearless</td>
<td>Microcomputer</td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td>2000</td>
<td>Permanent Magnet</td>
<td>VVF Control</td>
<td></td>
<td>95%</td>
</tr>
<tr>
<td>2010</td>
<td></td>
<td></td>
<td></td>
<td>95%</td>
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Notes:
*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.
It is Time to Update Your Elevators

Elevator modernization brings you a smooth ride, better traffic flow and more amenities. Utilize our world-leading technologies to optimize the performance and functionality of your elevators.

Advantages of NexWay Modernization

- Earth Conscious
  - Reduction of power consumption
  - Efficient use of reusable parts

- Safety
  - Higher safety with Door Load Detector feature (option)

- Comfort
  - Reduction of failure
  - Better riding comfort

- Efficiency
  - Reduction of passenger waiting time

- Sophisticated Designs
  - A wide variety of designs

Application

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<tr>
<td>(m/s)</td>
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<tr>
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<td>30</td>
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Mitsubishi Electric is the world’s first company to develop VVVF Inverter Control technology for elevators. It not only delivers smooth control of the traction machine, but its regenerative system significantly conserves energy.

**VVVF Inverter Control**

- 40% reduction in power consumption
- 30% reduction in power capacity

Our unique motor stator core technology, Joint-Lapped Core, has dramatically reduced not only the size of traction machines but also energy consumption.

**PM* Gearless Traction Machine**

Our innovative door operation system employs a highly efficient "one-chip RISC microcomputer*" which detects minor variations in the door load on each floor, the strength of the wind, and even sediment in the sill grooves. It adjusts the door open and close speeds, as well as the door motor torque as needed, for each floor using the Auto-Tuning function.

**Advanced Door Controls**

- 40% reduction in power consumption
- 30% reduction in power capacity

Surplus power supply can be diverted to the air-conditioners, OA system, etc.

**Surplus Power**

Before modernization

- Before modernization
- Before modernization

After modernization

High-Speed Computer Processor

The introduction of high-density, integrated LSI digital control circuitry resulted in a significant increase in computer processing speed, enabling precise control of the traction motor for acceleration and deceleration. This innovation delivers a quality ride with minimal noise and vibration. The adoption of a low-noise IGBT with faster switching speeds also contributes to further noise reduction.

**Active Roller Guide (Optional)**

The amount of lateral vibration generated by high-speed elevator cars is tremendous. A world’s first innovation in the industry, Mitsubishi Electric’s Active Roller Guide technology reduces the vibration by approximately 50%. It works via an accelerometer that detects car vibration during operation, along with actuators that cancel the vibration through a controlled electromagnetic force. Mitsubishi Electric Active Roller Guides ensure a more comfortable ride than elevators employing conventional roller guides.

**Safety**

- 40% reduction in power consumption
- 30% reduction in power capacity

Note: Not applicable to some plans.

* Please consult us when Active Roller Guide is required.
**Advanced Technologies**

### Efficiency

#### AI Neural Networks

Our breakthrough AI Neural Network technology enhances transport efficiency and reduces passenger waiting time through optimum car allocation, which allows elevators to use energy effectively.

- **AI-2200C group control system provides approx. 20% reduction in waiting time.**

![AI-2200C Performance Graph](image)

**Legend:**
- **AI-2200C**
- **Margin of Error:** ±5%

**Notes:**
- Translated with 8 cars, 20 persons each at 2.5m/sec for 15 stops.

#### Cooperative Optimization Assignment

Group control system forecasts a near-future hall call to reduce long waits.

![Cooperative Optimization Assignment Diagram](image)

#### Dynamic Rule-Set Optimizer

Based on real traffic data, passenger traffic is predicted every few minutes. According to the prediction, real-time simulation selects the best Rule-Set (multiple rules have been set as car allocation patterns), which optimizes transport efficiency.

![Dynamic Rule-Set Optimizer Diagram](image)

### Energy-Saving Operation — Allocation Control

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.

### Destination Oriented Allocation System (DOAS) (Optional)

The Destination Oriented Allocation System allocates passengers to cars depending on destination floors.

- **DOAS (Lobby floor(s))**
  - Conventional system
  - AI-2200C application

- **DOAS (All floors)**
  - Conventional system
  - AI-2200C application

**Notes:**
- Install DOAS hall operating panels on all floors. Cars receive destination information from all floors to provide the best service for more complex traffic conditions throughout the day.

- Please consult our local agents for DOAS (all floors).

The features introduced on these pages are applicable to AI-2200C only. Please refer to page 19 and 20.
Sophisticated Designs

A wide variety of sophisticated designs are available to meet your requests. Our latest designs will give passengers an attractive new ride.

**Car Designs**

- L210
- N300
- N130
- N120

**Button Line-up**

Buttons accented with LED halo illumination

- CBV1-C730
- CBV1/PIV1/HBV1
- CBV2/PIV2/HBV2
- CBV3/PIV3/HBV3
- CBV4/PIV4/HBV4
- CBV5/PIV5/HBV5
- CBV6/PIV6/HBV6

Square buttons

- Blue
- White
- Yellow-orange

**Hall Designs**

- E-302
- E-312

For details of designs and other options, refer to the NexWay brochure.

Actual colors may differ slightly from those shown.
Car Signal Fixtures

**Car Operating Panel (For front return panel)**

- **Segment LED indicator**
  - CBV■-C710, C716
  - CBV■-C720, C726
- **Dot LED indicator**
  - CBV■-D710, D716
  - CBV■-D720, D726
- **Segment LED indicator**
  - CBV■-C730, C736
  - CBV■-D730, D736
- **Dot LED indicator only**
  - CBV■-C720, C726
  - CBV■-D720, D726
- **LCD indicator**
  - CBV■-C780, C786
- **Flat buttons (plastic)**
  - CBV■-C760, C766
- **Keypad type**
  - CBVF■-C250
- **Star: Tactile button**
- **Numbers: Flat buttons**
- **Swing type**
  - CBV■-D710, D716
  - CBV■-D720, D726
  - CBV■-D730, D736
- **(10.4-inch)**
  - CBV■-D740, D746
  - CBV■-D750, D756
- **(15-inch)**
  - CBV■-D750, D756
  - CBV■-C730, C736
- **CBVF-C250**
- **CBN■-C710, C716**
- **CBH-C240, C245**
  - CBH-C295
- **CBN■-C720, C726**
- **CBN■-C730, C736**

**Notes:**
- *1: Segment LED indicators cannot display some letters of alphabet. Please consult our local agents for details.
- *2: Please select a button type referring to page 10, and enter the number in the space shown as □.
- *3: Faceplates with stainless-steel, mirror-finish are also available (optional). Please consult our local agents for details.
- *4: The types in parentheses ( ) show auxiliary car operating panels (optional). The design is slightly different from the above image.
- *5: Please consult our local agents for further information such as installation location.
- *6: Please consult our local agents for the production terms, etc.

Actual colors may differ slightly from those shown.
Car Signal Fixtures

Car Operating Panel (For side wall)

Segment LED indicator

Dot LED indicator

Dot LED indicator only

LED indicator (5.7-inch) only

Flat buttons (plastic)

Numbers: Flat buttons

Star: Tactile button (stainless-steel matte)

Notes:

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*5: Please consult our local agents for the production terms, etc.
**Hall Signal Fixtures**

**Hall Position Indicators and Call Buttons**

- **Segment LED indicator** *(1, 2, 3, 4)*
  - With plastic case

- **Dot LED indicator**

- **LCD indicator**

- **With plastic case**

- **No-entry Indicators for EN81-73**

- **Hall Lanterns**

- **Segment LED indicator**

**Hall Position Indicators**

- **PIV-A1010N** *(3)*
  - Gold ornament
  - PIV-A1010B *(4)*

- **PIV-A1020N** *(3)*
  - Silver ornament
  - PIV-A1020B *(3)*

- **PIV-C710N** *(3, 4)*
  - PIV-C710N *(3, 5)*

- **PIV-C720N** *(3, 4)*
  - PIV-C720N *(3, 5)*

**Cross-section of boxless fixtures**

These hall signal fixtures can be easily mounted on the wall surface without having to cut into the wall to embed the back box.

**Actual colors may differ slightly from those shown.**

**Notes:**

- *1: Segment LED indicators cannot display some letters of alphabet. Please consult our local agents for details.
- *2: Dot LED indicators are available (optional). Please consult your local agents for details.
- *3: Please select a button type referring to page 10, and enter the number in the space shown as ■.
- *4: Faceplates with stainless-steel, mirror-finish are also available (optional). Please consult your local agents for details.
- *5: These types are applicable to EN81-70 compliant elevators only at 1C-2BC, where one car is controlled independently.
- *6: These types are not applicable to elevators complying with EN81-70.
Modernization Plans

### Replaced elements
- CM2: Traction machine, Control panel, Signal fixtures, Door motor, Machine beams, etc.
- SM: Traction machine, Control panel, Signal fixtures, Car, Door operator (Car & Hall), etc.
- FM: All parts

### Reused elements
- CM2: Car sling / Car platform / Car interior / Car door / Landing doors / Landing sills / Door frames / Guide rails / Counterweight / Buffer footings, etc.
- SM: Landing sills / Door frames / Guide rails, etc.
- FM: None

Work Not Included in Elevator Contract

The following items are excluded from Mitsubishi Electric’s elevator modernization work, and are therefore the responsibility of the building owner or general contractor.

### Elevator Halls and Hoistways
1. Finishing of walls and floors of elevator halls after installation of elevator hall fitting.
2. Hoistway repair work.
3. Installing intermediate beams (where existing ones cannot be used).
4. Drilling holes for jambs and transom panels, hall indicators, hall buttons, etc. in the entrance halls on each floor (where existing ones cannot be used).
5. Installing steel backing plates for the jambs and transom panels, hall buttons, hall indicators, etc. in the entrance halls on each floor where steel-frame construction is used (when existing ones cannot be used).
6. Installing fasteners for the mounting of rail brackets on floors where steel-frame construction is used (where existing ones cannot be used).

### Machine Rooms
1. Removing of machine-room floor (breaking up cinder concrete).
2. Laying conduits in the machine-room floor before laying and finishing cinder concrete.
3. Drilling holes in machine-room floor.
4. Providing a temporary opening to introduce machinery and restoration work.
5. Access to the elevator machine room sufficient to allow passage for transporting machinery from outside the building.

Temporary Installation Work
1. Disposing of removed parts, cleaning up and disposing of broken glass and scrap.
2. Providing a suitable, locked space for storage of removed or to-be-installed elevator parts and tools.
3. Supplying electric power for the work and lighting.

### Installation Period Cautions
1. Security guards should be deployed throughout the installation period.
2. Providing temporary hall enclosures.
3. It should be remembered that a certain amount of vibration and noise is inevitable during the installation period.
4. It should be noted that flammable materials will be used during the installation period.

### Cautions to Be Noted During the Installation Work
1. Providing temporary hull enclosures.
2. It should be remembered that a certain amount of vibration and noise is inevitable during the installation period.
3. It should be noted that flammable materials will be used during the installation period.

Work responsibilities in installation and construction shall be determined according to the local laws. Please consult our local agents for details.
Features

**Features**

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<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Description</th>
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<td></td>
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<tr>
<td>Automatic Door-Speed Control</td>
<td>DASG</td>
<td>Direct leadership, which can depend on the type of hall doors, is enabled to avoid the door speed coinciding throughout all floors. (Cannot be used with some doors.)</td>
</tr>
<tr>
<td>Door Load Detector</td>
<td>DLD</td>
<td>When excessive door load has been detected while opening or closing, the doors automatically reverse.</td>
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<tr>
<td>Door Nudging Feature — With Buzzer</td>
<td>DNG</td>
<td>A buzzer sounds and the doors slowly close when they have remained open for longer than the preset period. With the ANN-B or ANN-F feature, a buzzer and color guidance sound instead of the buzzer.</td>
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<tr>
<td>Door Self-diagnosis</td>
<td>DDOA</td>
<td>Failure of non-contact door sensors is checked automatically, and if a problem is diagnosed, the door-close time is delayed and closing speed is retarded to maintain door service and ensure passenger safety.</td>
</tr>
<tr>
<td>Electronic Door Open</td>
<td>EDM</td>
<td>Door open time is maintained using the SI or Multi-beam Door-Operate Sensor feature that detects passage of the car.</td>
</tr>
<tr>
<td>Extended-doors Open Button</td>
<td>EDKB-TB</td>
<td>When the button inside a car is pressed, the doors will remain open longer to allow loading and unloading of baggage or equipment.</td>
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<tr>
<td>Hall Motion Sensor</td>
<td>HMD</td>
<td>The sensor detects the opening of the doors to detect passengers or objects.</td>
</tr>
<tr>
<td>Multi-beam Door Sensor</td>
<td>MDS</td>
<td>Multiple Infrared light beams pass outside the doors to detect passengers or objects as the doors close. (Cannot be combined with the SI-Forward.)</td>
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<td>Side-by-Side Multi-beam Sensor</td>
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<td>Return with Hall Button</td>
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<td>Closing doors can be reopened by pressing the hall button corresponding to the traveling direction.</td>
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<td>Repeated Door-closed</td>
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<td>Should a door fail to close, the doors will open and close until the device is closed from the car.</td>
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<td>SDE</td>
<td>The sensor edge detects passengers or objects during door closing.</td>
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<td>Safety Ray</td>
<td>SR</td>
<td>Light-emitting infrared light beams cover the full length of the doors as they close to detect passengers or objects. (Cannot be combined with the Multi-beam Door Sensor feature.)</td>
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**OPERATIONAL AND SERVICE FEATURES**

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<td>Exclusive operation where an attendant can be operated using the buttons and switches in the car operating panel allowing smooth operation of passengers or loading of baggage.</td>
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<td>Automatic Bypass</td>
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<td>Fully loaded car bypassed calls in order to maintain maximum operational efficiency.</td>
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<td>Automatic Hall Call Registration</td>
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<td>If a car cannot carry all waiting passengers because it is full, another car will automatically be assigned for the remaining passengers.</td>
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**Emergency Operations and Features**

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<td>Mitsubishi Elevators &amp; Escalators Monitoring and Control System</td>
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<td>Each elevator's status and operation can be monitored and controlled using an advanced Building Technology which provides an interface through personal computers. Special features include: protection of traffic statistics and analysis and also self-diagnosis.</td>
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<td>Mitsubishi Emergency Landing Device</td>
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<td>Upon power failure, each elevator is equipped with a stairway function using the emergency power supply to travel to a specified floor where the doors then open to facilitate the safe evacuation of passengers. After all cars have arrived, predetermined cars are reset to normal operation.</td>
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<td>Supervisory Panel</td>
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<td>Each elevator's status and operation can be remotely monitored and controlled through a panel (e.g., in the building's supervisory room, etc.).</td>
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<td>When excessive door load has been detected while opening or closing, the doors automatically reverse.</td>
</tr>
<tr>
<td>Door Nudging Feature — With Buzzer</td>
<td>DNG</td>
<td>A buzzer sounds and the doors close slowly when they have remained open for longer than the preset period. With the ANN-B or ANN-F feature, a buzzer and color guidance sound instead of the buzzer.</td>
</tr>
<tr>
<td>Door Self-diagnosis</td>
<td>DDOA</td>
<td>Failure of non-contact door sensors is checked automatically, and if a problem is diagnosed, the door-close time is delayed and closing speed is retarded to maintain door service and ensure passenger safety.</td>
</tr>
<tr>
<td>Electronic Door Open</td>
<td>EDM</td>
<td>Door open time is maintained using the SIB or Multi-beam Door-Operate Sensor feature that detects passage of the car.</td>
</tr>
<tr>
<td>Extended-doors Open Button</td>
<td>EDKB-TB</td>
<td>When the button inside a car is pressed, the doors will remain open longer to allow loading and unloading of baggage or equipment.</td>
</tr>
<tr>
<td>Hall Motion Sensor</td>
<td>HMD</td>
<td>The sensor detects the opening of the doors to detect passengers or objects.</td>
</tr>
<tr>
<td>Multi-beam Door Sensor</td>
<td>MDS</td>
<td>Multiple Infrared light beams pass outside the doors to detect passengers or objects as the doors close. (Cannot be combined with the SIB-Forward.)</td>
</tr>
<tr>
<td>Side-by-Side Multi-beam Sensor</td>
<td>SIBS</td>
<td>Multiple Infrared light beams pass outside the doors to detect passengers or objects as the doors close. (Cannot be combined with the SIB-Forward.)</td>
</tr>
<tr>
<td>Return with Hall Button</td>
<td>ROHB</td>
<td>Closing doors can be reopened by pressing the hall button corresponding to the traveling direction.</td>
</tr>
<tr>
<td>Repeated Door-closed</td>
<td>RDC</td>
<td>Should a door fail to close, the doors will open and close until the device is closed from the car.</td>
</tr>
<tr>
<td>Safety Door Edge</td>
<td>SDE</td>
<td>The sensor edge detects passengers or objects during door closing.</td>
</tr>
<tr>
<td>Safety Ray</td>
<td>SR</td>
<td>Light-emitting infrared light beams cover the full length of the doors as they close to detect passengers or objects. (Cannot be combined with the Multi-beam Door Sensor feature.)</td>
</tr>
</tbody>
</table>
### Features

#### GROUP CONTROL FEATURES

- **Features**
  - **Traffic evaluation**
  - **Strategic Overall Spotting**
  - **Special Floor Priority Service**
- **Description**
  - To reduce passenger waiting time, cars which have finished service are automatically
  - Strategic Overall Spotting
  - Special Floor Priority Service
- **Up Peak Service**
  - In order to meet increased demands for upward travel during the Up Peak, cars are
  - **VIP Operation**
  - A specified car is withdrawn from group control operation for VIP service operation.
  - This service is designed to accommodate people who require special assistance, such as
- **Elevator Analysis**
  - A computer analyses the traffic pattern and recommends the optimal number of cars for
  - This feature is effective for buildings with a large number of passengers.

#### SIGNAL AND DISPLAY FEATURES

- **Features**
  - **Voice Guidance System**
  - **Hall Information Display**
- **Description**
  - A system which allows communication between passengers inside a car and
  - A 5.7-inch LCD for car operating panels shows the date and time, car position,
  - This LCD (10.4- or 15-inch) for car front return panels shows the date and time, car
- **Notes**
  - 1C - 2BC (1-car selective collective) – Standard, 2C - 2BC (2-car selective collective) – Optional
  - ΣAI-22 (3- to 4-car group control system) – Optional, ΣAI-2200C (3- to 8-car group control system) – Optional
  - AIC (hall)
  - AECH (car)
  - AAN-G
  - CID-S
  - TCP
  - ACS
  - CID
  - AIL
  - ITP
  - AAN-G
  - **Notes**
  - ΣAI-22 (3- to 4-car group control system) – Optional, ΣAI-2200C (3- to 8-car group control system) – Optional
State-of-the-Art Factories...
For the Environment. For Product Quality.

Mitsubishi Electric elevators and escalators are currently operating in approximately 90 countries around the globe. Built placing priority on safety first, our elevators, escalators and building system products are renowned for their excellent efficiency, energy savings and comfort. The technologies and skills cultivated at the Inazawa Works and 13 overseas manufacturing factories are utilized in a global network that provides sales, installation and maintenance in support of maintaining and improving product quality. As a means of contributing to the realization of a sustainable society, we consciously consider the environment in business operations, proactively work to realize a low-carbon, recycling-based society, and promote the preservation of biodiversity.

ISO9001/14001 certification
Mitsubishi Electric Corporation Inazawa Works has acquired ISO 9001 certification from the International Organization for Standardization based on a review of quality management. The plant has also acquired environmental management system standard ISO 14001 certification.

Eco Changes is the Mitsubishi Electric Group’s environmental statement, and expresses the Group’s stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

Safety Tips: Be sure to read the instruction manual fully before using this product.